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The Return of the Machine Bureaucracy?

Management Control in the Work Settings of Professionals

Abstract: *Knowledge-intensive firms are frequently believed to operate under conditions that invalidate industrial-bureaucratic forms of managerial control. The nature of work, the professionalism of the workers makes traditional organizational structures and managerial techniques archaic and inefficient. However, empirical material from recent studies in two major knowledge-intensive firms indicates that traditional managerial forms of control have maintained and even reclaimed a seemingly vital space in organizational practice. The two cases belong to different branches, thus possibly prefiguring an emergent trend toward the industrialization of at least parts of knowledge work, involving standardization of tasks and methods of working, reinforcing the exchangeability of individuals and units, and increased efforts to manage by numbers and other criteria from the past.*

The ideas of “knowledge work” and “knowledge-intensive firms” have gained much attention among scholars during the last decade (e.g., Starbuck 1992, 1993; Alvesson 1995; Deetz 1995; Morris and Empson 1998; Robertson et al. 1999). The concept of knowledge work is also important in overlapping academic fields, as demonstrated by the interest in professional service companies (Greenwood et al. 1990; Hinings et al. 1991; Wallace 1995; Lowendahl 1997), knowledge creation in organizations (Nonaka 1994; Cook and Brown 1999), and concepts such as social and intellectual capital (Nahapiet and Ghoshal 1998). The basic reason for distin-

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guishing knowledge work and knowledge-intensive firms from other kinds of work and firms is the assumption that this kind of work, and this kind of environment, contains unique and essential qualities. The most dramatic difference lies in the assertion that knowledge work is primarily intellectual, as it draws on mental abilities, rather than physical strength or manual craft.

Knowledge-intensive firms (KIF) claim to produce qualified products and/or services, and even generate new and unique knowledge. Organizations as diverse as law and accounting firms; management, engineering, and computer consultancy companies; advertising agencies, research-and-development (R&D) units, pharmaceuticals, and high-tech companies are often seen as typical KIFs. The category thus includes professional service companies, but also covers organizations that do not necessarily emphasize a particular profession as a strong source of organizational identity. Nevertheless, the professional is at the heart of KIFs as carrier of the knowledge-claims that defines the category. Since many professionals today are employed in other forms of KIFs than core professional organizations (e.g., law firms, hospitals, and universities), a focus on the broader category is called for to understand the professional's—the knowledge worker's—working conditions.

It is generally believed that knowledge-intensive firms somehow prefigure and symbolize the future of work life. According to Kane and St. Marceau, the “new paradigm” of management means that core competence drives product development, and that “tacit and local knowledge of all members of the organization is the most important factor in success, and creativity creates its own prerogative” (Kane and St. Marceau 1996, 205). KIFs are thus not only interesting in their own right, but also because they are often viewed as models to be inspired from and copy.

The notion of knowledge-intensive firms and related concepts such as knowledge work is, of course, not unproblematic. Since all organizations and work involve “knowledge,” what qualifies as a KIF or non- (or less) knowledge-intensive organization and non-knowledge worker, is rarely self-evident. The concept of “knowledge intensiveness” is vague, and tends to encourage interpretations of knowledge that erase the distinction between knowledge and other forms of human capacity, particularly if one considers “embodied” (i.e., individual skills and capabilities) and “encultured” (i.e., shared meanings and understandings) versions of it (Blackler 1995). It is difficult to substantiate knowledge-intensive companies and knowledge workers as distinct and uniform categories. Nevertheless, there are differences between professional service and high-tech companies on the one hand, and more routinized service and industry companies on the other, for example, in terms of broadly and socially shared ideas about the significance of a long theoretical education and of intellectual capacities for the work. It makes sense to refer to KIFs as a vague but meaningful category, with sufficient heuristic value to be useful. The category does not lend itself to precise definition or delimitation because it includes organizations that are neither unitary nor unique.

Typically, the literature suggests that the concept applies to organizational settings that share the following common denominators: (1) Personnel are highly qualified and have professional backgrounds (i.e., academic or other comparable pre-employment training and education); (2) products and services are complex and/or non-standard; and (3) product, market, and personnel development are significant activities within the organization.

However, drawing from intimate and close readings of two case studies of typical knowledge-intensive firms—a management consultancy firm and a pharmaceutical company—we identify developments that seemingly run counter to the perceived general trend toward debureaucratization. These organizations display the typical marks of bureaucratization—namely, an emphasis on hierarchy, centralization, and standardization. Thus, the purpose of the analysis is first to reveal how the two cases suggest that the organization and management of KIFs may depart fundamentally from the way they are commonly characterized, accounting for the ambiguous character of knowledge work. Second, our goal is to unfold the potential of a critical and reflexive orientation toward some of the simplistic, standardized, and value-laden vocabulary common in much organizational writings. Finally, by drawing attention to complexity, variation, and local meaning in the cases, we also hope to contribute to an alternative and more contextually sensitive conceptualization of organization and management of KIFs than might be common.

Researching knowledge-intensive firms

Antithesis of bureaucracy?

The literature on knowledge-intensive firms generally pictures KIFs as a departure from the bureaucratic form (e.g., Sveiby and Riesling 1986). The difficulties of employing valid and reliable rules and performance measures has led many authors to emphasize cultural-ideological or clan control instead of bureaucratic or market-like (i.e., output) forms of internal control (Kanter 1983; Wilkins and Ouchi 1983; Hedberg 1990; Kunda 1992; Alvesson 1995; Mintzberg 1998).

In a study of a major U.S. high-technology company, Van Maanen and Kunda emphasized that, for many employees, “‘culture’ replaces ‘structure’ as an organizing principle and is used both to explain and guide action” (Van Maanen and Kunda 1989, 72). They considered that the formal organization is not, *per se*, particularly important. Kunda (1992) maintained, however, that certain elements of bureaucratic control remain in place, even when normative control is predominant. Desirable behavior, however, is achieved as a result of regulations and rules that focus on the individual’s experiences and ideas, rather than on a direct focus on control of his or her behavior.

One central aspect of knowledge-intensive firms is ambiguity—persistent un-

Table 1
Knowledge-intensive firm and the bureaucratic-ideal type: A comparison

Key aspects	Bureaucratic ideal type	Knowledge-intensive firm
Mode of production	Standardization	Ad hoc problem solving
Dominant control logic	Enforcement of rules	Negotiated order
Environmental contingencies providing relative advantage	Stable, anticipated change	Turbulent, disruptive change
Nature of product and services	Homogenous	Ambiguous
Leveraging capital	Financial	Intellectual
Locus of power	Manager	Professional

certainty (not easily reduced through more information), confusion, and contradiction (Alvesson 1993; 2001). Ambiguity is present in several ways for KIFs. The concept of knowledge, for example, is highly ambiguous, thereby making both the product of the KIF (i.e., knowledge) and its production processes (i.e., knowledge development and maintenance) ambiguous in character. The very idea of sophisticated knowledge (i.e., scarce expertise in a socially legitimated area) means that complexity and uncertainty prevail. This issue concerns the very nature of knowledge by calling for theoretical thinking and the exercise of judgment, rather than for the provision of objective facts. Besides, the results of knowledge work are frequently difficult to assess. It calls for subjective judgment—and here, even experts may have deviating opinions, as one study of auditors has shown (Bédard and Chi 1993).

Knowledge-intensive firms are typically engaged in complex and difficult tasks that cannot be perfectly converted into standardized work procedures and regulations. Hence, knowledge-intensive companies are forced to attract and retain qualified people who can adapt their repertoires to meet the demands of the task. As a consequence, managing them strictly through a focus on behavior is difficult, due to the nature of the work, as a considerable amount of self-organization is necessary (Mintzberg 1998). Attempts toward standardization are further halted by client interaction: “Client involvement adds to task uncertainty, requiring professionals to create their roles to some extent in the course of a client assignment” (Morris and Empson 1998, 619). This means that the most important organizational knowledge is dislocated from standardized work processes to the individual’s skills, experiences, and capabilities. In contrast to the bureaucratic form, mission-critical organizational knowledge is thus not “stored” or manifested in procedures and processes in KIFs, but rather in qualified individuals—the professionals (see Table 1).

Societal and organizational trends

The claim that knowledge-intensive firms break with or substitute the bureaucratic form is sometimes linked to general societal and organizational trends and development. These are frequently described as increasing the significance of knowledge, flexibility, networking, and innovation—all features making bureaucracy and its features (e.g., hierarchy, stability, standardization, and rules) less relevant as key organizational mechanisms. There is currently a strong interest among organizational practitioners and academics in highlighting “knowledge” as a key dimension in management and organization (e.g., Spender 1996; Davenport and Prusak 1998; Hansen et al. 1999; Hansen and Von Oetinger 2001). Authors report that the locus of organizational exemplars has shifted from capital-intensive industries such as steel and automobiles, to information-intensive industries such as financial services and logistics, and now toward innovation-driven industries such as computer software and pharmaceutical companies. In the latter, knowledge and the ability to apply it—that is, competence—are seen as vital.

A large body of authors claims that entrepreneurial orientations of highly qualified personnel are increasingly central to the operations of companies. According to Miles et al. (1997), for example, certain trends have characterized organizational evolution for quite some time: First, an increase in the number of organizational members expected to develop the ability to self-organize around operational, market, and partnering tasks; second, an increase in the number of personnel expected to perform entrepreneurial tasks (i.e., identifying customer needs, and then finding and focusing resources on them); third, increased membership opportunities to experience psychological ownership of particular clients, markets, customized products and services, and so on. This trend means that the biggest challenge “is not just the investment required to build key competencies; it is the willingness to allow the levels of self-governance necessary to fully utilize that competence” (Miles et al. 1997, 18).

Other authors talk about the need for constant fuelling of the employees with new knowledge (Wikström et al. 1993). To do business has simply become more knowledge-intense. It is claimed that generating, bringing in, applying, and exploiting knowledge in production processes, goods, and services calls for new forms of organizing, and new relationships with suppliers and customers. The authors suggest that we view the company as a “knowledge system.”

These authors emphasize general trends regarding organizational types, forms of management, and the significance of knowledge. Although the scope and depth of environmental changes are sometimes criticized (cf. Thompson 1993; Warhurst and Thompson 1998)—and the suggested link to the break with bureaucratic modes of organizing is sometimes questioned (Courpasson 2000)—there seems to be a consensus that environmental pressures play an increasingly important role in shaping organizational structures in ways resembling those typically ascribed to knowledge-intensive firms, such as the “adhocracy” that is

usually understood as lodging experts working together in teams that demand mutual adjustment as a coordinating mechanism. The latter is encouraged by extensive use of liaison devices such as project and matrix structures, task forces, and integrating managers (Mintzberg 1983).

As mentioned above, the significance of knowledge and its adjunct learning are strongly emphasized in contemporary writings on management. As perhaps most vividly advocated by Senge (1996), the manager is no longer a “boss,” but rather a teacher primarily concerned with knowledge development and learning. Although the manager-as-teacher phenomenon may lack strong empirical support, several intellectual currents push forward the idea that changes in technology, business environment, and society have redefined the manager’s role. Most notably, these currents are visible in the related ideas of organizational learning and knowledge management. Organizational learning is typically associated to the idea of “communities of practice” (cf. Wenger and Snyder 2000). The vocabulary in use—e.g., “community,” “sharing,” “caring,” “nurturing social relations”—breaks radically with conventional ideas of bureaucracy. Management is rather a matter of coping with and encouraging diversity, and of facilitating knowledge sharing. As O’Dell and Grayson (1998) observed, sharing is difficult, if not impossible, to cultivate through the use of formal reward systems, but calls for intrinsic motivation—that is, knowledge sharing needs to be self-rewarding and thus largely outside the scope of influence of an external actor such as management, as conventionally understood.

Typically, texts on knowledge management explicitly or implicitly claim that the assistance of the creation, maintenance, and dispersion of knowledge is the manager’s most important job (Hansen et al. 1999; Hansen and Von Oetinger 2001). For example, Nonaka (1994) explicitly linked managerial practices and knowledge creation in an attempt to provide ideas on how to manage knowledge creation. In the context of knowledge creation, Nonaka claimed that managers are best viewed as “catalysts.” This breaks with conventional ideas of managers mainly as operating based in, and through, the means of bureaucracy.

To sum up, knowledge-intensive firms typically deal with tasks that invalidate and break with bureaucratic modes of operation: hierarchy, division of labor, formalization, and standardization. The literature on contemporary organizations in general, and KIFs in particular, suggests that bureaucratic modes of operation are substituted for more organic and flexible forms of organizing. This seems to be a general trend: Markets are more turbulent, customer preferences are more differentiated, and production systems are more knowledge-intensive—all factors that make bureaucratic modes of operations a less-viable option.

However, drawing from empirical findings from a study of two knowledge-intensive firms, we will argue that managerial control in the bureaucratic mode seems to gain ground in KIFs. Furthermore, we will argue that bureaucratic modes of operation may have cultural and rhetorical, rather than material, significance. Thus, it might appear as a rational response to conditions endemic to KIFs.

In the following sections, we will point at and discuss similarities and differ-

ences in the way bureaucratic modes of operations are implemented. We will start by analyzing the management consultancy firm, proceed with the analysis of the pharmaceutical company, and end our analysis with an interpretation and discussion of our findings.

The gilded cage: Bureaucracy in a global management consulting firm

Beta Consulting Ltd. is one of the largest consulting companies in the world. It is fast growing and has more than 30,000 employees worldwide. It works with management and information technology (IT) consultancy. It caters to all consultancy market niches, but claims to be particularly strong at implementation. Beta comfortably qualifies as a knowledge-intensive company—virtually all consultants have an academic degree, some services may be standardized but are generally quite complex, product and personnel development are deemed to be critical activities and a relatively high proportion of resources are spent on it. However, Beta departs quite dramatically from the conventional wisdom of how KIFs are supposed to be organized. Strikingly, Beta appears to operate in a way that shares more features with the traditional bureaucratic firm than with conventional images of KIFs. Beta is distinguished by an emphasis on hierarchy, formalization of work procedures, predictability in work outputs, and interchangeability of parts (i.e., individuals).

Hierarchy

Hierarchy is highly visible and pronounced at Beta. The firm is a career company, which means that initial advancement is fast and dramatic for the individual. There are four basic levels: analyst, consultant, manager, and partner. Employees are expected to advance within fixed intervals, and only a limited number will eventually become partners.

The hierarchy is further elaborated with the practice of designating a total number of years at the position as a marker of seniority. Consequently, a consultant is not only a consultant: He or she is also a C2 or C3, meaning consultant with two years experience and consultant with three years experience, respectively. Thus, one responding manager stated that:

If you ask about my hierarchical position, I am a senior manager. If anyone from Beta would ask about it, then I am an M6 since the first of March. M1 is a first-year manager and M6 is a sixth-year manager. That's how we label things. So if I am recruiting for a project, then I would ask: What are you? And they would answer C2 or C3, meaning second-year consultant and third-year consultant.

All work activities are organized around the concept of the team. This means that junior consultants always work in constellations with more senior consult-

ants, and also that a fairly clear-cut division of labor, both vertically and horizontally, is put into play. Seniors treat their location at various levels as strong indicators of their competence. A person who has been on a particular level for two years is viewed as more competent than one who has been there one year. Informants report that junior people carefully monitor their position in the company's promotion/differentiation system. Hierarchy is therefore carefully fine-tuned from above as well as below.

There is a general perception among organizational members at Beta that the company is hierarchical. Although there are claims that the grips of the hierarchy tend to loosen as one advances in the hierarchy, sheer organizational demographics—those below thirty years old constitute roughly 70 percent of the workforce—make it clear that a strong majority of the organizational members face hierarchical constraints in their work.

Standardization of work procedures

Work is standardized in a variety of ways at Beta, first through a unified package of methods that consultants are expected to use in projects. Due to the fact that most projects differ somewhat from each other, the methodology is not expected to be used rigidly. Rather, it is viewed as a resource—but one that is prescribed to be used in projects, one way or another, as a couple of managers put it:

Projects are managed pretty much by the book, which means that you have a set of activities that are supposed to be concluded in decision points. We are good at providing structure to problems and to provide a structured way to solve it.

As a manager, you learn how to manage projects: to get an idea, a task, and slice it in manageable portions that make it workable, and to proceed regardless, although there are uncertainties.

Second, there are many systems and structures for work within human resource management. For example, assessments are to be given, and feedback provided, on a regular basis based on a detailed list of issues to be covered. Third, Beta Consulting has invested heavily in systems for knowledge management. Knowledge management is primarily seen as a way of taking advantage of the scale and scope of the accumulated experience generated within the firm. Another key aspect is to diminish the importance of the individual and of personal experience. The idea is that ideas and experiences developed in one project can be recycled and reused in other projects with minimal adaptation. The premise is that experience can be codified and rationalized in a way that suits database storage and retrieval.

Predictability in work outputs

Organization members uniformly point out Beta Consulting's reliability in keeping deadlines and delivering the specified solution as a particular strength, to the

extent that they talk of a “culture of delivery.” Beta is, of course, not alone in having a slogan like “Client First,” but possibly pushes this a bit further than many other companies:

Irrespective of what kind of internal issues have been planned and booked for a long time, if we are needed at the client’s place, this is what guides us. And this may create a hell internally, to put it straight, but this priority is very strong. (Associate partner)

One important part of the capacity to deliver lies in the extensive use of standardized work methodology, and applying the same conceptual tools in a variety of different businesses. This use is perceived as a competitive advantage within Beta Consulting. Since the company mainly employs graduates from business schools and technical universities, they usually start with highly adaptive employees who have no difficulty adopting a uniform way of doing things.

The company is a relatively “tight ship” and employees must be prepared to work with various tasks:

Customers see us as providers of competence, but also as resources in pushing. They know that we go in there with high a motivation, a willingness to work hard. They also expect us to contribute new thoughts and ideas. But somehow it feels as not many expect us to come as the real experts and contribute with the fantastic and brilliant ideas that will revolutionize the world. . . . This is more a matter of hard work and producing sufficiently good ideas and drive and see to it that things get on their place. And it becomes increasingly a matter of getting things straight. (Partner)

One consultant describes Beta as “the McDonald’s of management consultancy”—predictable and reliable, but hardly innovative or surprising. There is a lot of talk about the need to create and give space for entrepreneurship within the company, implying that the latter is currently lacking.

Interchangeability of parts (individuals)

The key unit in Beta Consulting is always the team. Every project and customer contact is constructed around a particular team. Thus, management control in Beta Consulting generally revolves around team management:

We enter as a group. We are perhaps not individuals, but work more as a group. We always work in teams, and it is not the particular individual that makes work good. (Partner)

Since all individuals within a particular level are deemed as equally competent, at least with the support of methods and knowledge-management systems, specific individual competence is generally viewed as interchangeable, and thus relatively unimportant as a measure of efficient use. The knowledge-management system, in particular, is tightly connected to the idea of the interchangeable individual:

The accumulation of experiences is one of the advantages of being a large consultancy company, and we are trying to take advantage of it in a way that makes it less dependent on individuals. We try to make sure that the knowledge is less tightly coupled to individuals and that individual consultants are persuaded to share their experiences and knowledge for the common good. (Senior manager)

As a consequence, the individual is typically rather insignificant, at least as an organizational resource. At one level, the individual is highly visible in the organization because it is the individual who is evaluated, rewarded, and punished. But at another level, the individual is hardly visible at all, and he/she is viewed as perfectly exchangeable and replaceable:

There is a tradition at Beta to view individuals as perfectly interchangeable. If there exists a project where a resource is needed, and there exists a resource, then you will move the free resource to the project and you are expected to work there. As a consequence, you may end up working with things that you explicitly have requested not to work with, because you don't see any potential for development there, as has happened for me a couple of times. (Consultant)

Conclusions

Although Beta certainly qualifies as a knowledge-intensive firm, as noted above, it appears to draw heavily on typical bureaucratic modes of operation in the way work is organized. Power and authority are distributed through hierarchy; work methodologies are standardized; work procedures are fine-tuned toward predictability of outputs, and organizational members are viewed and treated as interchangeable parts. There is also a huge apparatus with rules, procedures, checklists for human-resource management issues such as assessment, feedback, and promotion. It seems only logical that loyalty, so important for KIFs, is secured mainly from an instrumental and calculative point of view, and that social relations and community feelings are not well developed.

However, organizational practices at Beta also deviate from bureaucratic principles in some instances. The most notable deviation is the way organizational members interact in teams, which is far from bureaucratized. Here, work is organized in a fairly organic and "adhocentric" way. Improvisations are abundant. Members are expected to contribute regardless of hierarchical standing. Social relations in the team are typically intimate and intense. In short, work and interaction in teams have most, if not all, of the distinguishing features of knowledge work as outlined in the literature.

The bureaucratic modes of operation at Beta are, of course, always present, even in team interaction. However, they operate more as a supporting structure than a controlling and regulating structure. Bureaucratic procedure appears to be more like a vehicle of shared understanding than a protocol for prescribed behavior. In this sense, bureaucracy at Beta appears to be a cultural phenomena: an expression of a particular collective mindset and frame of reference.

We will further address this theme after analyzing bureaucratization in a different setting, namely that of a pharmaceutical company.

A lean and mean drug-hunting machine? The bureaucratization of a pharmaceutical company

Pharma Inc. is a large research-intensive pharmaceutical corporation that recently acquired another large pharmaceutical company. Pharma was founded in the 1970s, and became international during the 1980s through the establishments of local independent subsidiaries. The company developed substantially during the 1980s and became quite large in a few markets. However, in the late 1990s, some of its products matured and they acquired another pharmaceutical firm. In that process, Pharma reorganized its operations substantially, and has since been implementing what is described as a global organization. This was considered appropriate, following interpretations of a more global and diverse industry and market. At the corporate level, Pharma is horizontally differentiated into a few global functions of which research and development, the focus of this analysis, is the largest in terms of monetary and human resources. The R&D function is organized as a matrix organization, combining horizontal R&D functions with the vertical product development process coined “business processes.”

People at Pharma are highly qualified with academic degrees, often Ph.Ds. Much R&D is done through alliances with people in academia, especially at the research cell where this study was primarily conducted. To some extent, Pharma has been considered to be very academic in the sense of people being very independent and self-governing, requiring less organizational governing and managerial intervention.

Recently, and as part of the acquisition process, management at Pharma has voiced ambitions to create what by some has been described as a “lean and mean drug-hunting machine.” From a fairly decentralized and organizationally diversified corporation, the company is now framed in new terms, organizational principles, and practices. This framing is conceptualized in talk of competence, creativity, and innovativeness. Parallel to this, and of specific interest here, is that the framing can be seen as a drive toward increasing standardization and centralization, thus laying the groundwork for extended bureaucratization that is facilitated by modern technological ideas of rational drug discovery, the latter becoming more pronounced and articulated in the acquisition process.

“Rational drug discovery”

Modern drug discovery is concerned with inventing compounds that influence an organism by blocking disease processes within and around cells. To block disease processes, drugs should have a similar chemical structure to the natural entities (e.g., proteins, enzymes) of cells. Modern research is characterized by sys-

tematic and targeted methods for developing chemical entities—what is called “rational drug discovery” (Vagelos, quoted in Nichols 1994, 105)—as compared to traditional random-based methods (Bierly and Chakrabarti 1996). Rational methods require starting with the identification of “targets,” such as proteins supposedly involved in disease processes, and attacking them either by activating or blocking them. Target identification is critical in R&D, since drug discovery hinges on the possibility of identifying some “unmet medical need” (Internal document: “Pharma R&D: Process, Responsibilities and Decision Points”). The target method is a disease-driven approach that is common in the pharmaceutical industry. Consider Merck’s development of medicines for cholesterol, for example: “When we began to look for a drug to lower abnormally high cholesterol, . . . we focused on blocking the enzyme that controls the overproduction of cholesterol” (Vagelos, quoted in Nichols 1994, 107–8).

At Pharma, drug discovery involves the use of large “compound libraries” as a basis for screening targets in search for chemical compounds. The compound library consists of most chemical entities invented in the company, and is a large information library that can be exploited by scientists in their search for compounds. In screening, targets are tested against several hundreds of thousands of compounds in order to find some with effects, to find compounds that are active either by stimulating or blocking targets—that is, chemical entities that are potential medicines. The identified compounds are developed through further pharmacological and commercial tests, and might become “lead compounds” and, later, “candidate drugs.” Screening is thus central to modern drug discovery; it is a process that is quite substantially mechanized. As one of the manager said:

The screening is fully automated. Robots and everything. You could say that there are rather few people doing a lot of tests. And tremendously automated and impressive, when you look at it.

Screening is considered rather superficial; scientists are not really expected to get too deeply involved in the early phases of compound search, but rather are expected to receive a clear answer as to whether the compound is active or not, as one manager explained:

Many researchers might think, “You can fall in love with certain substances”—that is, try a bit more, a few more models, a bit deeper. Many believe that if you take a few substances and dig very deep, then you will find something, [but] we don’t think so.

Instead of getting intellectually entrenched in the research, scientists are thus expected to screen for as many compounds as possible, with as little effort and within as limited a time period as possible, without entering into details in the early research phases. One manager explained:

You could say that [the selection] is a bit anti-intellectual. The point is really to run through as many targets as possible, as many substances as possible, in order to find these good values.

One manager maintained that this process follows a rational logic, compared to the experimental trial-and-error method that characterizes entrepreneurial creators. As one manager said:

[A rational logic constitutes a] radically new trend for people in discovery, because now they have to admit that [research] is a machine process: You decide what do to before you do it, and then you go for it as hell; and in the end, you have an enormous amount of data, and that is where the brain starts working. But don't involve the creative or those with an entrepreneurial mind [in the research process], because they only govern it in the wrong direction. (Research manager)

Consequently, one manager maintained that technology and “data management” are the most important aspects of research and development of the industry:

Technology is going to solve its problems for [the pharmaceutical industry], because in the future we won't need terribly many technicians. But [the industry] will still need that core of really bright people who will become data managers and data manipulators, while other jobs are going to disappear. (Research manager)

“Rational drug discovery” thus constitutes a mechanized search method: It facilitates volume thinking and early selection of pharmacologically and commercially interesting entities. This mechanization puts less emphasis on individual scientists’ intellectual brilliance, and more emphasis on those managing the processes. As a manager in Pharma, put it: “It used to be more brain and less mass production.”

The emphasis put on technology and mass production has raised issues of standardizing the R&D processes, making them more transparent, ordered, and manageable. We now turn to these organizational issues.

Standardization of work processes

One manager explained that, in order to practice industrialization, it is important to have an industrialized view of doing research: “There are people with a lot of good ideas, but we have to create this industrialized climate and expectation of ideas, and we are in the process of creating that in the projects. . . .”

The streamlining and emphasis on technology is common in the development phases, as well as in the testing phases, as one manager explains:

Our production work is done in development. We put a lot of energy in telling our positions: This is a production line. If you're not interested in this, don't come here. (Research manager)

In order to sustain standardization and research productivity, new operating models and routines, as well as reporting relationships within research-and-development, have recently been introduced. In addition to the technological aspects of screening discussed above, the new operating models aim at formalizing

the R&D process substantially; it is now punctuated by a series of specific milestones/tollgates that constitute decision points where management reviews project progression. At every decision point, there are now clearly specified principles of what is expected in terms of project progression and its pharmacological/commercial relevance and validity. Principles and procedures are formulated in order to facilitate the industrialization of the R&D processes. These are of a “generic” kind, meaning that they frame work in terms of which activities should take place within various R&D phases. For example, at various stages, there is demand for “proof of concepts” that signal some differentiating factor from competitor drugs; there are directions on what liaisons should be established between departments; what kind of tests and assessments are required and when they should be performed; which type of documentation routines should be used in clinical trials; and which commercial function is to be consulted in the various phases.

Even though the principles are of a “generic” kind, a “project should have a clear and agreed reason to depart from the principles contained herein” (Internal document, “Pharma R&D: Process, Responsibilities and Decisions Points”). Reviews of projects are done by “corporate management boards” that decide on corporate priorities among projects.

Centralization and the emphasis on management control

The standardization of the research process has been accompanied by attempts at centralization in areas where the former independent subsidiaries had a larger scope of action, namely investments, recruitments, and project priorities. As previously mentioned, a framework was created and issued, supposedly to facilitate a common understanding, promote collaboration and communication, and enhance flexibility by enabling the transfer of people and projects among research groups. Thus, as one respondent put it:

There are three components in this organization: One is that it is dispersed on several units; the other is that it is international, it is dispersed over several countries and cultures; and the third is that it is global, which is another dimension. Global means that you somehow try to implement programs that simultaneously can be applied all over Europe, in contrast to international, which mean that you have experiences from different backgrounds.

There is a feeling among many of the employees that the centralization might alienate the well-educated people, the Ph.D.s with strong demands for challenging tasks. A researcher said: “The new organization means that one is trying to slim the company—those that are good at doing a certain thing are supposed to be best at doing that”; and he explained that such differentiation might very well lead to a narrower, and hence alienating, view of the research: “One misses the whole.”

Conclusions

As in the case of Beta, Pharma clearly has incorporated, or is in the process of incorporating, key bureaucratic features. However, it is important to keep in mind that Pharma, rather than already operating in a bureaucratic mode, is moving in the bureaucratic direction. This means that bureaucratic protocol and modes of operation currently are incomplete and limited in practice. Still, much managerial talk is clearly based on the assumption that it is possible to formalize, and subsequently more consciously manage, the research—hence, the objective to create a standard model supposedly implemented by managers in all research sites throughout the corporation. The R&D processes are now also usually coined “management processes” of various kinds, thereby signifying and elevating the managerial aspect in the research processes. The various research sites are also commonly referred to as “industry hotels,” signaling a machine-like delivery status.

It is notable that many managers support the present development of formalization—arguing against the popular discourse about brains, creativity, and innovation. The belief in technology and the ability to speed up the search for new radical breakthroughs are connected to production-line ideas of mechanization and specialization. The new operative model—with its standardized organizing principles and procedures for work processes and responsibility, organizational structure (e.g., job design and reporting relationships), and other tasks—is a significant industrialization of the former, rather organizationally diverse and disparate, “university institution.” One manager explained:

Machine-bureaucracy fits perfect as a description of research here. And now when we changed one could say that what we have now is an extremely more tightly held machine bureaucracy as compared to what we had earlier.

Although several managers have subjected themselves to the industrialization ideas in a positive manner, there are also comments that suggest another direction. Many scientists and some managers express fear when talking about the rather pervasive systems and processes aimed at industrializing the R&D processes in a machine-like manner. A few managers have suggested that a too-controlled and tightly held organization rather weakens the possibility to create what is usually termed “research blockbusters.” Confronted with the question of whether the standardization trend really supports radical innovations, several managers contend that they really do not think so.

To sum up, it is possible to say that there are several indications that the organizational change following the acquisition is directed toward standardization practices, in order to “tailor” the organization in a fashionable modern manner of management control. This development is strongly facilitated by the use of modern technology in “rational drug discovery” that downplays the importance of specific individuals. But, independent of whether or not managers and research-

ers support and/or subject themselves to these principles, they all agree that the trend and direction is present, contrary to what many spontaneously would connect to such a research-intensive industry.

Managerial claims and communal understanding through ideas and practices of machine bureaucracy

The examples of Beta and Pharma show that knowledge-intensive firms might not necessarily break dramatically from bureaucratic modes of operations. At least, they demonstrate that this idea, interpreted as KIFs being the antithesis of bureaucracies, is too broad-brushed, and needs to be elaborated and modified. Beta and Pharma have some similarities, which might point to a general, although hardly universal, pattern. In particular, bureaucratization in both Beta and Pharma appears to be a response to the inherent ambiguity in knowledge work discussed above. We will address this issue more generally below.

Another similarity is that both companies are big and highly international—thus posing problems of coordination on the grounds of sheer size, as well as and cultural and geographical diversity—and both companies have entered environments that, to some extent, seems to be manageable in terms of turbulence and dynamics. Thus, from the perspective of contingency and configuration theorists (e.g., Donaldson 1985; Lawrence and Lorsch 1974; Mintzberg 1983) Beta and Pharma are simply organizations that have developed from organic organizational forms to exhibit stronger features of bureaucratization due to specific contingencies such as size and environmental stability.

This point is valid. There is, however, no automatic relationship between size and bureaucratization. There are several fairly large knowledge-intensive companies that do not show particularly strong bureaucratic characteristics (Kanter 1983; Kunda 1992). One could well imagine less significant efforts to standardize and centralize, although we must be cautious in not exaggerating these efforts at the two companies. The fairly strong feelings of hierarchy in Beta are not an outcome of a necessity to differentiate between employees based upon corporate size. As the partners are relatively autonomous on the national level, and there are just thirty to forty subordinates per partner, the perception of juniors to being very distant to partners at the national organization is not a simple effect of large size. Actually, global size doesn't matter that much regarding this issue.

Even though increased size and its potential usefulness for synergy effects—a stronger brand name, more resources, and accumulated experiences to draw upon in Beta; greater resources for marketing, a better mix of products, and some rationalization possibilities in Pharma—may call for some efforts to reduce variation, these circumstances only moderately mean that the work is affected by bureaucracy.

Although the similarities in the significance of bureaucratization between the cases are clear and important, the differences are perhaps even more interesting.

The prime difference lies in that bureaucratization in the case of Beta appears to point to a general and widely shared cultural phenomenon, while bureaucratization at Pharma seems to be more specific and primarily linked to managerial efforts rhetorically to justify and legitimate the implementation of managerial control systems. We will develop these aspects below.

Bureaucracy as shared meaning

Although organizational members acknowledge the bureaucratic “nature” of many aspects of work at Beta, it is quite clear that bureaucratic features are typically viewed as providing support, rather than as a constraint determining appropriate action. Core work processes in the team are exercised in an organic and flexible fashion, which puts an effective limit on the influence of bureaucratic modes of operations, from a production viewpoint. In many ways, the elements of bureaucracy present at Beta appear to have a cultural and symbolic significance, rather than a practical and material one. In the end, the actual substance of work methodologies and hierarchical position seems less significant. It is rather their symbolic value that matters. They provide shared meanings. As Werr (1999) pointed out, consultants do not use methods primarily as guidelines for action. They use them as a language—that is, as a way of communicating their particular point of view and establishing their domain of expertise. For example, manuals and work methodologies are standardized, but often include more than one way of doing a particular task. The main point is thus not to prescribe the most efficient operations, but rather to establish a code that allows organizational members to communicate about the task. Thus, the bureaucratic features at Beta are not primarily geared toward optimizing work procedures through the detailed regulation of behavior, but toward providing a particular understanding of what is important and shared. Bureaucracy implies that the collective means more than individuals, the expectation that people throughout this large international company belong to the same tribe, and that everyone supports and cares for each other, although in a peculiar and technocratic circumscribed way. Bureaucracy informs organizational members how to operate instrumentally inside as well as outside of teams. Hierarchy provides information on organizational status and presumed competence, but also emphasizes the importance of long-term membership in the company. Standardized work methodologies provide a common language and frames of reference.

The use of bureaucracy as a way of expressing a common understanding in a management consultancy firm can be interpreted as an exercise in reflexivity. To the extent that Beta consultants draw from a recognized body of knowledge, this body consists of knowledge about managerial and bureaucratic protocol and procedure. Management control and bureaucratic modes of operation are, in this sense, not only ways of organizing work, but they are also particular professional tools, closely linked to the occupational identity of management consultants. Managerial

knowledge, ultimately rooted in the bureaucratic phenomenon, is thus used to create a shared universe of understanding. As most members were familiar with managerial knowledge even before they entered the firm, bureaucracy emerges as something familiar and well understood, thus reducing its alienating effects.

Although bureaucracy may operate mainly at a cultural and symbolical level at Beta, it still causes dysfunctional effects. Perhaps the most obvious example is the way bureaucracy fosters and encourages cold, calculative, and instrumental relations among organization members. Still, this dysfunction is part of a particular mindset and mentality, thus also operating at the cultural level.

Groping for control:

Bureaucracy as the extension of managerial control

Bureaucratization at Pharma is part of an overall ambition to rationalize product development; but it also operates as a vehicle for leveraging managerial influence and expertise. To a certain extent, this has been successful. Several of the managers and researchers at Pharma seem more or less to embrace the emergence of a more structured and regimented R&D process. Although the study is situated in a knowledge-intensive context, organizational ideas traditionally related to mass production thus seem to have a significant presence in the company. The organizational principles and procedures based on those ideas put a strong emphasis on the technical aspects of R&D processes and organization.

The assumption here seems to be that knowledge-intensive companies can be managed and organized by rather explicit technical principles. The creativity discourse is downplayed and made subordinate to the prevailing formalism and control reasoning. The case demonstrates that the rhetoric of creativity in pharmaceutical companies partly covers another, more surprising, interpretation of what contributes to successful product development, namely management control. After a few years of stagnating research, it is, of course, attractive to turn to the rational logic that, at least in the short term, relieves some of the managerial anxiety of not knowing what goes on. It symbolizes rejuvenation and increased, or re-inserted, rationality.

Thus, management can elevate its own significance and contribution. Since product development can be managed if proper management-control systems are used, managerial knowledge is recognized as important. As a consequence, the control systems are viewed as legitimate and potentially valuable, although there clearly are doubts about the positive effects of bureaucratic modes of operation.

Selective bureaucratization:

Understanding managerial control in KIFs

Ambiguity, as mentioned earlier, is one of the key features of knowledge-intensive companies; it is related to the nature of complex work, calling for the exer-

cise of judgment, and the difficulty of assessing what goes on and what are the outcomes during various phases of the work, sometimes even including the final products (Alvesson 1993; 2001). As frequently noted, ambiguity erodes and undermines bureaucratic decision processes. Complex tasks, complex environments, and complex organizational patterns cooperate to produce decision situations where the model of rational decision making that underpins the bureaucratic modus operandi breaks down, and is replaced with “garbage-can” decision processes (March and Olsen 1976).

Ironically, judging from our cases, ambiguity does not entirely rule out bureaucracy. In a way, it may even foster and encourage a particular version of it. The ambiguity intensity that is endemic to production processes at Beta and Pharma is not interpreted as incompatible with a context where standardization, hierarchy, and other bureaucratic procedures appear to be valid responses to some of the problems at hand for management. It could be argued that bureaucracy provides a sense of closure, control, and predictability in organizations and work relations, and thus makes them more manageable. In this sense, bureaucracy operates as an ambiguity-coping strategy: as a way of resolving ambiguity and creating a minimal sense of clarity and certainty. We may talk about “soft bureaucracy” or, perhaps more to the point, “selective bureaucratization.” This only indirectly and marginally affects core work, while administrative and planning matters are tightened up to a stronger degree. Selective bureaucracy may be said to, at best, compensate for the perceived uncertainty following from interaction over distance. The feeling of closure and familiarity following from the same structural arrangements creates an expectation of a certain degree of management control. For employees at less senior levels, the uncertainty-reducing elements of bureaucratization make it easier to recognize people and units in other parts of the company as belonging to the same tribe and, on somewhat superficial issues, to understand each other better. Bureaucracy can thus be seen as a diversity-reducing device, to some extent fuelled by the ambiguities involved. Since global size and international presence mean that culturally created shared understandings spanning the entire corporation become insufficient, structural measures become significant to a higher degree than in small organizations, where leaders and direct communication may build shared frameworks. This is not to say that culture does not matter as control mechanisms. Shared frameworks are vital and, particularly in Beta, these are shared broadly and have a rather strong penetrative capacity. Structural arrangements do not replace culture, but in certain ways complement it, and can also be seen as carriers and communicators of values and meanings: Rationality, subordination, and being part of a greater whole/machinery are orientations that balance flexibility, creativity, and autonomy as organizational features (Alvesson and Kärreman 2001).

Its quality of being an ambiguity-coping strategy also limits the degree of bureaucratization possible in knowledge-intensive firms. As soon as bureaucratiza-

tion becomes an ambiguity-reducing or ambiguity-eliminating strategy, rather than an ambiguity-coping one, organizations will leave the knowledge-intensive (i.e., ambiguity-intensive) domain, and enter the well-known territories of industrial manufacturer or service provider. Beta and Pharma may exhibit surprisingly strong indicators of bureaucratization; but it would be unreasonable to classify them mainly as machine-bureaucracies (Mintzberg 1983). Beyond—or beneath—the selective bureaucratization, vital elements exhibit different features. The complexity, uncertainty, and ambiguity inherent in their particular tasks and production processes still demand space for individual discretion, creativity, and improvisation. It allows for some, but not total, bureaucratization.

Conclusion

Contemporary writings on management and organization emphasize general trends such as organizational learning, knowledge management, flexibility, leaders, markets, reduction of hierarchies, networks, empowerment, innovation, feminization of management, and so on (Kane and St. Marceau 1996; Miles et al. 1997). Knowledge-intensive companies are frequently mentioned as the prototype of this development, and specific texts on these companies often confirm this picture. To some extent, the general trend overlaps with the somewhat more limited category of knowledge-intensive firms, as companies are seen as generally becoming more knowledge-intensive and less bureaucratic.

The two cases presented here give another picture: The two prominent examples of knowledge-intensive companies show significant features of bureaucracy, the emphasis on rules, standards, centralization of vital functions, fine-tuned hierarchical differentiation, and the like. Are these two organizations exceptions to the perhaps more common examples of this kind of organization being more “adhocratic,” led by visions and shared cultural orientations, and based on self-governing teams and/or highly committed individuals?

To some extent they probably are since the many studies of knowledge-intensive companies exhibiting “adhocratic” characteristics make it impossible to claim that the two cases are prototypical of the category (e.g., Alvesson 1995; Kanter 1983; Kunda 1992; Robertson 1999; Starbuck 1992). On the other hand, the two examples presented here cannot be dismissed as exceptions or as marginal. The two companies are very large and rank among the leading firms within their respective sectors. They represent a not insignificant share of the workers and workplaces within the KIF sectors.

It is sometimes claimed that manufacturing industries, and to some extent the services sector, are becoming more like the knowledge-intensive companies. This claim appears to be overstated; but it may be the case, to some extent, because some knowledge-intensive companies are becoming more bureaucratic-industrial in their functioning. This view is seldom espoused. Proponents of knowledge-intensive companies—their managers and other employees, as well

as the mass media and academic writers (like ourselves)—are more inclined to portray these companies in an exciting and positive way.

It seems important to avoid the temptation to describe social phenomena in dichotomous ways. This is very difficult in the area we are addressing. Our traditions are filled with dichotomies such as “managers-leaders,” “centralization-decentralization,” or “bureaucracy-adhocracy.” All complex organizations show a multitude of various characteristics. Complex hybrid forms may be, or become, more common than those more neatly described. Old typologies and standardized language for representing organizations may show an increasingly unfavorable ratio between what they reveal and what they conceal. The bureaucratization we found in our two knowledge-intensive firms is not directly “soft,” but neither is it all-embracing or penetrating, in many respects. We refer to it as “selective bureaucratization,” in order to indicate its limited effect on core work in the two companies, even though there have been some efforts to recycle similar knowledge, thereby displaying signs of standardization in that work as well.

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