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# Managing Knowledge in the Construction Industry

Alexander Styhre



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# Managing Knowledge in the Construction Industry

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Alexander Styhre



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# Preface

As all practising researchers know, it is in many cases very complicated to determine *ex post facto* when a research project starts and ends. There are naturally starting and termination dates for projects being granted research funding, but in day-to-day work things tend to get more complicated. At times, the reading of a paper, meeting with a person or some other memorable event may be regarded as the starting point for a particular endeavour, but in most cases the memory is just of a vast number of days filled with reading, writing, interviewing and other similarly tedious and/or insignificant activities filling up the social science researcher's everyday work life. This book is the outcome from one such long-term research project, devoid of an exact starting point and – as it may turn out – a proper ending.

As academic researchers in the management disciplines, we are at times critical of colleagues in industry who fail to evaluate their activities properly and systematically. But we often do not practise what we preach, and are left with only a series of scattered memories and a few notes to collect and account for when the empirical material is being used later on. What I *do* recall, however, is that I have been interested in the concept of knowledge for a long time, starting in the mid-1990s when I did my Ph.D. thesis on the application of the then-fashionable Japanese management principles in Swedish manufacturing industry. When I began conducting research in the construction industry at the beginning of the new millennium, the concept of knowledge seemed to lurk in the background every now and then. As a consequence, in 2006, I was granted research money for a project on the management of knowledge in the construction industry. This book is the outcome of that project, but it is also strongly influenced by previous research work. In my mind, this book is an attempt at summarizing a series of projects and bringing them together under the umbrella of knowledge management.

As always, the author of the book is heavily indebted to a number of people. Hans Trulsson, PEAB, and Ronald Caous have strongly influenced the study of the coaching of site managers. Lars-Göran Dahlquist, the CEO of ConCo, helped me arrange interviews in the company and provided



valuable insight into the world of rock construction workers. Fredrik Nilsson at Chalmers University of Technology and Brown Architects provided invaluable help in the study of the work at the architect's office accounted for in Chapter 4. Pernilla Gluch and Per-Erik Josephson at Chalmers University of Technology have served as my colleagues and discussants in the knowledge management research project. I would also like to thank the members of the scientific board of the Center for Management in the Construction Industry (CMB) at Chalmers University of Technology for insightful comments on the order of things in the construction industry. My friend and former colleague Mats Sundgren conducted most of the data collection in the architecture work study, and also contributed with helpful comments and remarks on the text in various drafts. Some of the ideas presented in this book were presented at the seminar at Scancor, Stanford University, in October 2007, and I am grateful for comments from Ester Barinaga, Claes Bohman, Geerte Heslen, Maria Jarl, Erik Piñero, Anne Reff Pedersen, Eero Vaara, Nina Veflen Olsen, and Karl Wennberg. I am also grateful for valuable comments on the concept of aesthetics from Erik Piñero. In addition, I would like to thank all those construction industry representatives who have in various ways contributed with their insights, experiences, life stories or opinions to this book. Finally, a thank you goes to my family, Sara, Simon and Max, for being around in good times and bad.

Alexander Styhre  
Gothenburg, August 2008

# Introduction

## Entering the knowledge society

To ward off potential future criticism and disappointed readers, it deserves to be pointed out right away that this monograph is not intended to serve as a 'how to' book in the field of knowledge management; it is not anchored in the engineering sciences with their insistence on solving the problems at hand. Instead it is an attempt on the basis of a variety of social sciences critically to discuss and examine how knowledge can be addressed, managed and developed in the construction industry. The literary corpus addressing the management of the construction industry tends at times to enact an instrumental and functionalist perspective, thereby reducing inherent complexities to linear relationships and uncomplicated facts of the matter. Such a perspective is enormously rewarding in terms of bracketing off the full complexity of social and ordinary life, and focusing exclusively on solving pressing problems. However, operating exclusively on the basis of what has been called 'downstream' theory (Nayak, 2008) eliminates some of the more elementary assumptions within a discipline or field of investigation. Therefore, this book has the ambition to think not only of 'knowledge management' as a fixed or uncomplicated set of practices, models, concepts and tools, but to think equally of 'management' as a social practice and 'knowledge' as an epistemological category as embedded in social, economic and cultural relations that strongly shape and form how these terms are used. That is, 'knowledge management' does not fall from the sky but instead denotes a series of social practices in organizations that in various ways are contingent on historical and social contexts. Taking such an 'anti-essentialist' view of knowledge management is a complicated task because it does not assume that there is some transcendental idea or commonly shared model of what knowledge management is prior to actual practices. Instead, knowledge management becomes the emergent practice wherein various forms of skills and know-how are treated as an organizational resource

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that is contributing to the firm's long-term competitiveness and sustainable competitive advantage. Given the substantial heterogeneity of the forms of knowledge mobilized in the construction industry – ranging from the architect's vision of how social spaces can be transformed into build environments to the carpenter's ability to use various mechanical tools to produce actual buildings – knowledge management in the construction industry will of necessity become a rather amorphous term. It contains a wide range of activities, practices, tools, procedures and systems.

This book addresses the management of knowledge in the construction industry. This declaration immediately calls for a more thorough examination of highly malleable – some would say fuzzy – terms such as 'manage', 'knowledge' and 'construction industry'. The concept of management, whose etymology enables diverse interpretations and meanings, may include terms such as 'control', 'guidance', 'surveillance', 'direction' and so forth; knowledge is a term that includes a whole set of cognitive, embodied and emotional skills, capacities and insights; the construction industry is constituted by a multiplicity of professions, occupational groups, firms, corporations and enterprises, mobilizing and using various aesthetic, symbolic and material resources. In other words, to claim that one will discuss how to manage knowledge in the construction industry is either to assume that the reader shares a significant number of assumptions and beliefs, or is wholly ignorant of the ambiguities involved when making such a declaration. Anyway, one must not be overwhelmed by the complexity of linguistic resources; most practical things do work fine when all the theoretical and epistemological intricacies are bracketed and ignored. The point is that the management of knowledge in the construction industry is too vast a subject to be addressed in a single volume of a research monograph. Rather than taking on the burden of capturing the very essence of knowledge management in this particular industry (in a sense a 'grand theory' project as persuasively refuted by Charles Mills Wright in his *The Sociological Imagination*), the book seeks to examine some relevant aspects pertaining to the use of intellectual resources in building and architecture work. At the same time, as scholars of science and technology and actor-network theorists teach, neither nature nor society speaks for itself. Any 'empirical entity' (e.g. an observation, an interview excerpt) is theoretically 'overdetermined'; it can be examined in many different ways (Becker, 1992). Therefore, the empirical studies reported in Chapters 2–5 are accompanied by theoretical frameworks that enable a more detailed analysis of the empirical material. In so doing, the book attempts to navigate in the space between construction engineering books providing advice and recommendations on how to manage the construction project, and the more interpretative and analytical literature in the field of organization theory in general and knowledge management more specifically. The book does not seek to formulate answers to questions, but rather grapples with the questions themselves, and thereby hopefully is capable of pointing

to some useful aspects of the management of knowledge in the construction industry.

The term 'knowledge management' is a product of the 1990s and the substantial growth of jobs in the technical and professional sectors at the expense of, primarily, the manufacturing industry. For instance, Robertson and Swan (2004: 129) point out that there is little doubt that sectors characterized by 'knowledge work' are growing, and they report that the science and technology sector has grown between 4 and 16 per cent annually over the last 15 years. Barley and Kunda (2006: 55–6), speaking about the United States (US) economy, defuse the myth that clerical and service work has mitigated the decline in manufacturing jobs. Clerical work peaked in 1970 at 18 per cent of the workforce and has subsequently declined by a percentage point. Service employment has only grown by about 4 per cent since 1960 and accounts for about 16 per cent of the US workforce. In addition, managerial positions and sales work have grown by 1.5 and 4 per cent, respectively, since 1950. Instead it is white-collar employment that stands for the largest growth in the US economy: 'Since 1950 professional and technical employment more than doubled, growing from 8 percent to 18 percent of the workforce. In fact, by 1991, professional and technical workers had become the largest sector surpassing even clerical workers and operatives', Barley and Kunda (2006: 55–6) conclude. Frank and Meyer (2007: 289) point at the explosive growth of university education in virtually all parts of the world, another indication of the alleged 'knowledge society': 'In 1900, there were about three tertiary education students per 10,000 worldwide. By 1950, this number had increased eight-fold to 25. By 2000, it had increased another six-fold to 166'. In a hundred years, the number of university students per capita grew 55 times.

Powell and Snellman (2004) examine patterns in patenting in the US and Europe to find evidence for what they call the 'knowledge economy'. They report that, even though the period from 1963 to 1983 did not show any particular growth in patents, after 1987 there is a substantial growth in registered patents, from 80 000 to 170 000 patents annually. 'Clearly', Powell and Snellman (2004: 202) contend, 'patent trends suggest a recent marked acceleration in the production of new knowledge'. Powell and Snellman (2004: 204) also make reference to a study published by Jason Owen-Smith finding an eightfold increase in university patents in the period 1976–98. Moreover, Powell and Snellman (2004: 205) found a strong increase in non-academic science and engineering (S&E) jobs between 1980 and 2000. S&E employment increased by 159 per cent in the 20-year period, corresponding to an annual growth of 4.9 per cent, in comparison to 1.1 per cent growth in the entire US labour force. In summary, there is ample evidence that today's labour force is more specialized and conducts more advanced and knowledge-intensive work than in the 1970s and earlier. Powell and Snellman (2004) reserve

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the term 'knowledge economy' to denote this new economic regime that is under way:

We define the knowledge economy as production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence. The key components of a knowledge economy include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements in every stage of the production process, from the R&D lab to the factory floor to the interface with the customer.

(Powell and Snellman, 2004: 201)

However, the knowledge economy, and as Knorr Cetina (1997: 8) argues, the *knowledge society* is not only a society of simply more experts, of technological infra- and informational structures, and 'of specialist rather than participant interpretations', but is a society where 'knowledge cultures' have 'spilled and woven their tissues into society, the whole set of processes, experiences and relationships that wait on knowledge and unfold in its articulation'. By this formulation, Knorr Cetina (1997) suggests that knowledge is not 'additional to' or optional in contemporary society, but that the knowledge society evolves on the basis of the very production and circulation of knowledge; knowledge is infrastructural rather than ornamental – it is the very fabric of society rather than its *Über-bau*. In such a society and economy, essentially based on intellectual capital (here used as a formal concept denoting a stock of know-how), the concept of knowledge management quickly becomes a distinct research domain in the field of management research. The term today denotes a rather diverse and heterogeneous field of research, sharing the basic assumptions that it is knowledge that is the single most significant factor when explaining differences in performance between different firms and industries. While knowledge management has primarily focused on traditional knowledge-intensive sectors of the economy such as new product development and innovation work, and various domains of professional work, the construction industry has been (perhaps) surprisingly little examined from this theoretical perspective. One of the explanations may be that while, for instance, manufacturing industry and innovation work have been dominated by engineers, a professional group established since at least the few last decades of the nineteenth century (Shenhav, 1995, 1999), construction firms tend to hire occupational and semi-professional groups of workers and engineers whose status as knowledge workers are somewhat ambiguous. Already Stinchcombe (1959) had emphasized that construction work has maintained a craft-like production form (a position thoroughly criticised by Eccles, 1981) as opposed to manufacturing industry, which was essentially restructured during the 'rationalization movement'

orchestrated by the emerging group of professional engineers (Guillén, 1994; Shenhav, 1995). Therefore, speaking of construction companies as being ‘knowledge-intensive’ is problematic if that term is reserved to denote the work of, say, lawyers, laboratory researchers or mechanical engineers. At the same time, such a declaration calls into question what the very term ‘knowledge’ is supposed to or may denote: is it a term reserved for prestigious professions (e.g. medical doctors and university professors) or can it be used to capture any social practice that mobilizes a certain degree of specialized knowledge in its pursuits? In this book, knowledge is used pragmatically as a portmanteau term denoting all sorts of cognitive, emotional and embodied skills and capacities that are used in a social practice. Knowledge is then not a term privileged with mythical or extraordinary qualities but is instead a ‘knowledge of everyday life’.

### **The size and impact of the construction industry**

To start off, a formal definition of the construction industry is provided:

The construction industry comprises all those organizations and persons concerned with the process by which building and civil engineering works ... are procured, produced, altered, repaired, maintained, and demolished. This includes companies, firms, and individuals working as consultants, main and sub-contractors, material producers, equipment suppliers and builder’s merchants. The industry has a close relationship with clients and financiers.

(Hillebrandt, 2000: 4)

Eccles (1981: 451) emphasizes four characteristics of the construction industry: (1) it has a ‘small degree of diversification’, that is, construction firms deliver approximately the same products and services; (2) construction firms operate on ‘geographically limited markets’, often in just one country or region; (3) there are relatively low entry barriers; and (4) there is a ‘lack of concentration’ in the industry, that is, there are large numbers of actors in the industry.

A knowledge-management perspective is of relevance for the construction industry, if not in terms of its inherent qualities and skills, then in terms of its sheer weight and influence in the economy. The construction industry accounts for about 10 per cent of gross domestic product (GDP) in the world as a whole (Hillebrandt, 2000: 19). In the UK, the construction industry is the largest sector in terms of both its proportion of GDP and the number of people it employs (Agapiou, 2002: 697). In the UK, the construction industry employs 1 169 000 people, of which 154 500, or 13.2 per cent of the workforce, work in the largest firms employing more than 1200 people (Construction Statistics Annual Report, 2006: table 3.4, p. 50). In total there

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are 182 644 registered construction companies in the UK, but only 56 firms hire more than 1200 employees (up from 33 in 1995). The entire industry has an annual turnover of £22 654 million, of which £4489.4 million, or 19.8 per cent, is accounted for by the largest firms (Construction Statistics Annual Report, 2006: tables 3.1 and 3.4, pp. 45, 48). In Sweden, the construction industry is the second largest sector of the economy, outnumbered only by the large public health care sector. The construction industry is a major industry in all Organisation for Economic Co-operation and Development (OECD) countries, and employs a great variety of professional and occupational groups. In addition, the construction industry is labour intensive in comparison to, for instance, manufacturing (Hillebrandt, 2000: 187), and what economists call *multiplier effects* generate additional work in other industries and sectors of the economy. It is therefore tempting for governments to use the construction industry to 'manage the level of demand in order to reduce short-term fluctuations in the economy' (Hillebrandt, 2000: 187). In general, the construction industry is susceptible to swings in the business cycle and therefore economic fluctuations are endemic in the industry (Hillebrandt, 2000: 26).

In addition to its sheer size and importance for global, national and regional economies, there are numerous studies pointing at the lower productivity growth and a limited degree of innovation in the construction industry (Dorée and Holmen, 2004; Harty, 2005).<sup>1</sup> Gann provides some figures emphasizing the comparatively lower productivity growth in construction:

Lower rates of productivity growth in construction compared with manufacturing have contributed to a relative increase in construction costs ... data suggests that construction has failed to keep pace with performance improvement realized in other sectors. In the period 1970 to 1985, productivity in European construction increased at an average of 0.9 per cent per annum which was low in comparison with other industries ... Construction in a number of countries including the United States, experienced negative productivity growth [in 1970–93]. This compares with labour productivity growth of between 3 per cent and 4 per cent annually between 1985 and 1995 in high and medium-high technology industries.

(Gann, 2000: 6)

Concerning innovative capabilities, Drejer and Vinding (2006: 928, n. 1) reports a survey study in Denmark showing that, while 58 per cent of the firms in the manufacturing industry and 44 per cent of the trade and services firms in the study had introduced new products or services during a particular period, the corresponding figure for the construction industry was a meagre 22 per cent. The relatively weak innovative capabilities of the construction industry have been explained by its relatively fragmented

industry structure, organized into loosely coupled networks of firms (Dubois and Gadde, 2002), the project organization (Drejer and Vinding, 2006), or more generally in terms of a general scepticism towards new materials and techniques. Moreover, Agapiou (2002) points at a number of problems facing the construction industry: 'It is widely accepted that the UK construction industry often falls short of meeting the needs of its clients, the developers, in terms of construction times, costs, predictability, quality, defects, safety, waste minimization' (Agapiou, 2002: 698). In the widely discussed Egan report (1998), commissioned by the British Construction Industry Council, it is stated that 'The industry as a whole is underachieving ... Too many of its clients are dissatisfied ... projects are widely seen as unpredictable in terms of quality on time, within budgets and to the quality expected' (cited in Agapiou, 2002: 698). In another official report, it was found that '73 per cent of projects over tender prices; 70 per cent deliver late' (Report on Modernizing Construction, National Audit Office, UK, cited in Agapiou, 2002: 698).

Taken together, the construction industry is in great need of optimizing the use of its intellectual resources. In addition, since the built environment is what strongly influences everyday work-life in contemporary society, and the cost of living and housing accounts for a substantial part of the private and public economy, the ability to exploit existing bodies of know-how more effectively is a widely desirable objective.

## **Purpose and outline of the book**

Given the strong emphasis on the production and circulation of knowledge in today's society, and the importance of the construction industry, the purpose of the book is to discuss knowledge-management practices within this industry. Rather than assuming it is possible to formulate a unified, universally applicable theory about 'how to manage knowledge in the construction industry', the book looks at three different research projects in the construction industry over the period 2004–9. The studies include research in both conventional construction firms and in architecture bureaus. Moreover, the four empirical chapters of the book (Chapters 2–5) are not structured in accordance with a single integrated analytical model; instead, a heterogeneous body of literature is used in each chapter, applicable in individual studies. Expressed differently, it may be argued that the approach to the four individual studies is synthetic rather than analytical; the chapters do not seek in the first place to provide an answer to the question 'how to manage knowledge', but to show how local and contingent practices in different domains of the heterogeneous construction industry demand different approaches and need to be examined from alternative theoretical perspectives. However, this does not mean that the book is wholly devoid of managerial implications and suggestions for practices pertaining to knowledge work in the construction industry. In the final chapters, some of



the arguments and findings are summarized and further discussed. The book is thus structured accordingly.

In Chapter 1, the analytical framework for studying the use of knowledge in the construction industry and companies is developed. First, occupational and professional groups define and structure what are legitimate and useful forms of knowledge in a particular field of expertise. In the construction industry, a wide number of occupational groups are involved in the work, ranging from architects and designers to carpenters and electricians. An understanding of how occupational groups conceive of their roles, duties and privileges is very helpful for gaining insight into how knowledge is mobilized and used *in actu* and *in situ*. Next, the sociological concept of practice is introduced, serving as an intermediate analytical level between occupational and professional groups and everyday practice. The concepts of knowledge and knowledge management, central to the whole book, are then discussed. Thereafter, the literature on knowledge management practices in construction industry is reviewed.

In Chapter 2, a study of how executive coaching can be used to support and help site managers in major construction projects is reported. The chapter is based on a three-year study of the changing conditions for site managers' work and how executive coaching can be used as an approach to help site managers handle all their day-to-day assignments.

In Chapter 3, a study of work in architecture, a quintessential knowledge-intensive domain of the construction industry is presented. Making a comparison with scientific laboratory work, the everyday work-life of practising architects is conceived of as sharing a basic morphology of work with laboratory scientists. In this chapter, a body of literature commonly known as 'science and technology studies' is referenced.

In Chapter 4, which reports another study of an architect's office, the concept of visual artefacts and what has been called 'professional vision' are examined. Conceptualizing professional vision in terms of what Jacques Lacan calls 'the gaze', architects' professional know-how is embodied and part of their ability visually to inspect and conceive of possible solutions to perceived problems and challenges.

In Chapter 5, a study of a specialized construction company, ConCo, using expert know-how in rock construction, including techniques such as spray concrete and rock injection, is reported. In this chapter, the concept of social capital is invoked to understand how site managers in the construction company are capable of sharing knowledge on a day-to-day basis through verbal communication and relatively mundane media, such as telephones and a few diary notes from individual projects.

In Chapter 6, the final chapter, a few concluding remarks are made and some practical implications addressed. The book finishes with a few suggestions for further research and alternative routes to explore in how to manage knowledge in the construction industry.

# 1 Occupational groups and professions, practices, institutions and knowledge in construction work

## Introduction

The construction industry is constituted by a plethora of social practices and materialities, and involves a long series of occupational and professional groups (Bowen, Pearl and Akintoye, 2007). In order to understand how knowledge is formed, articulated and circulated in such heterogeneous environments, a number of analytical concepts need to be brought into discussion. In this chapter, some of the central concepts of the theoretical framework guiding the empirical studies are introduced and discussed. Such concepts include *occupational and professional groups, practice, routines, rules* and *standard operation procedures*, and they form a theoretical framework underlining the actual day-to-day practices in construction projects as the constitutive components of any knowledge-management initiative in the industry. To put it differently, the perspective taken in this book is essentially ‘bottom-up’, emphasizing the everyday work procedures in knowledge work rather than a ‘top-down’, information-management perspective where knowledge management systems are defined a priori and practices are located within a determining system. In the latter half of the chapter, the literature – or rather *some* of the literature belonging to the fast-growing corpus of texts – addressing the intersection between knowledge and management is reviewed. The chapter thereafter addresses some of the central characteristics of the construction industry, pointing towards the more empirically oriented parts of the book.

## Professions, occupations and practice: analytical tools for understanding construction industry work

In order to examine how various forms of knowledge are mobilized in the construction industry, a few analytical tools are needed. In the following, two theoretical domains will be examined in some detail.

First, the concepts of occupations and professions are elaborated upon and thereafter the concept of practice, here conceived of as an analytical category, is discussed.

### *Occupations and professions: sorting out and demarcating terrains*

Studies of occupational identities and professions represent a classical field of research in sociology and neighbouring disciplines in the social sciences (Illich, 1977; Larson, 1977; Freidson, 1986). Professional groups have organized themselves into guilds and other professional communities since at least the middle-ages (Braudel, 1992), and with the emergence of a modern society, professional identities were even more accentuated. In the modern period, professions have been defined and credentialized by the state or organizations – Freidson (1986) here talks about ‘institutional credentializing’ – being given the legitimate right from the state to organize the production of particular kinds of services to the public, including ‘training or education or prospective members of an occupation’ (Friedson, 1986: 64). In addition, professional expertise and legitimacy have been strongly tied to the institution of the modern university, the predominant institution in contemporary society producing, regulating and controlling systematic and scientific knowledge.

However, for emerging professions that has not always been the case. Prior to the modernization of universities and the establishment of proper scientific procedures, Larson (1977) argues that, in some cases, the university actually hindered rather than helped the production of systematic scientific and technical knowledge. For instance, in the case of medicine, hindered in its development by incumbent doctrines and beliefs at the universities and various guilds’ claims on jurisdiction, in the nineteenth century, new medical practices were largely developed at the hospitals, amidst the everyday medical practice. Larson (1977: 24) argues that one of the main reason for Paris being the world’s capital of medical science during the first half of the nineteenth century was its large number of hospitals and that these hospitals were bringing surgeons and physicians together, thereby overcoming the *ancien régime* of guild barriers. When surgeons and physicians collaborated, physicians started to incorporate the localized structural pathology that surgeons had spontaneously applied in the scientific study of specific diseases. The emergence of modern professions and professional authority and credentializing systems is one example of the effects brought by organizational capacities. Larson (1977) emphasized this organized nature of professions:

[T]he professional project is an organizational project; it organizes the production of producers and the transaction of services for a market; it tends to privilege organizational units in the system of stratification;

it works through, and culminates in, distinctive organizations – the professional school and the professional association.

(Larson, 1977: 74)

Professions are thus defined, somewhat simplified, by their ability to monopolize specific domains of expertise, a definition that Attewell (1990) would refer to as being Weberian in term of emphasizing the struggle over power and prestige in a particular field rather than the nature of expertise *per se*. Herein lies also an important difference between professions (e.g. lawyers and medical doctors, the two most clear-cut and conventional cases, but also more ‘fuzzy’ professions, such as engineers or business school graduates) and the occupations. For instance, occupational groups do not of necessity make use of less esoteric or specialized knowledge and expertise (think, for instance, of a watchmaker or a midwife) than professional groups, but they belong to an occupational group less successful in defending and monopolizing the jurisdiction over their domains of expertise. The professional status is in this Weberian view ultimately a matter of power and the ability to establish monopolies or at least significant entry barriers. In the ‘grey areas’ where professional and occupational groups collaborate, there is a strong emphasis on what Gieryn (1983) calls the ‘boundary work’ between the two categories – the longstanding struggle over authority and the right to conduct certain operations among obstetricians and midwives is a well-known and representative case – safeguarding the authority of the privileged professional group. However, the distinction between professional and occupational groups is not a binary one, but is to be examined along a continuum ranging from the highly monopolized profession with high entry barriers (e.g. medical doctors) to occupational groups with relatively low or non-existing entry barriers (e.g. taxi-drivers or waitresses). [For a formal categorization of occupational and professional groups, see United States (US) Office of Personnel Management’s (1998) list of occupational groups.] Thus, studies of how professional groups define, develop and monitor their domain of expertise are also of relevance for occupational groups. Expressed differently, when taking away some of the specific features of the work of professional groups (see Attewell, 1990: 437–8), professional and occupational groups are defined on the basis of their social status.

In Hughes’s (1958) seminal text *Men and Their Work*, six different ideal-types of rationality guiding occupations are identified: (1) those guided by a mission, for instance, to engage in religious teaching or work to help the poor and needy; (2) professions and ‘near-professions’, that is, occupations sanctioned by the state authorities, for instance, medical doctors or lawyers; (3) enterprise, dealing with commodities; (4) arts; (5) trades – ‘very close to the arts’, Hughes (1958) remarks – and finally, (6) jobs. In this taxonomy, individuals engaging in various activities go from the fully committed and dedicated (as in the case of the religious preachers endowed with a calling) to a more detached attitude, primarily regarding

the job as a source of income but little more. As Hughes (1958: 75) remarks, no line of work cannot be fully understood outside of the 'the social matrix in which it occurs or the social system of which it is part'. That is, the system includes not only the recognized institutional complex of the occupation but also 'reaches out to and down into other parts of the society'. Therefore, occupations and professions always contain ambiguities and 'apparent contradictions in the combinations of duties' (Hughes, 1958: 75). That is, occupations and professions are negotiated social orders depending on many intersecting factors and conditions. For instance, in the study by Strauss, Schatzman, Bucher *et al.* (1964) of professions and occupational groups in the psychiatrist health care sector in the US, professional groups are conceived of as the outcome from an 'emergent process' bound up with ideologies and treatment practices; 'Specializations are anything but stable entities with relatively fixed boundaries and tasks', Strauss, Schatzman, Bucher *et al.* (1964: 6) state. Professions and professional attitudes and beliefs are therefore never given as such but are instead the outcome from pre-existing ideologies that individuals converge to. The concept of ideology is here denoting an 'abstract system of ideas' that is mediated by 'operational philosophies'. The operational philosophies are in turn 'systems of ideas and procedures for 'implementing therapeutic ideologies under specific institutional conditions' (Strauss, Schatzman, Bucher *et al.*, 1964: 360). That is, ideologies are the overarching system of beliefs guiding day-to-day work, and the operational philosophies are the more down-to-earth actual practices engaging material resources. Studies of professional and occupational groups such as policemen and policewomen (Van Maanen, 1975), managers (Dalton, 1959; Jackall, 1988), fast-food restaurant workers and salesmen (Leidner, 1993), restaurant chefs (Fine, 1996), restaurant waitresses (Paules, 1991), copy-machine repair technicians (Orr, 1996) and manufacturing workers (Roy, 1952; Burawoy, 1979) suggest that ideologies, beliefs and norms guide and structure everyday work and set the boundaries for what qualifies as being legitimate work. However, studies of, for instance, police work (Jermier, Slocum, Fry *et al.*, 1992) show that there is substantial leeway between what policemen do and formally enacted procedures for police work. Under slogans such as 'serve and protect' or 'crime-fighting', there is substantial space for individual and local translations of such objectives into actual performances. Such interpretations are socially embedded, i.e. 'ideological', according to Strauss, Schatzman, Bucher *et al.* (1964). Lamont and Molnár (2002: 178) discuss the study of Collins (1979) who found a 'surprisingly weak correlation between the requirements of educational credentials and the skills/knowledge requirements of jobs':

Education is often irrelevant to on-the-job productivity, and is sometimes counterproductive. Specifically vocational training seems to be derived primarily from work experience rather than from formal

school training. The actual performance of school themselves, the nature of the grading system and its lack of relationship to occupational success, and the dominant ethos among students suggests that schooling is very inefficient as a means of training for work skills.

(Collins, 1979: 21)

On the basis of this empirical observation, Collins (1979) argues that education serves to 'socialize prospective professionals into status cultures by drawing a line between insiders and outsiders'. That is, one does not primarily attend tertiary schooling to learn practical skills but to be trained at thinking and behaving as a member of a particular social group. In fact, Larson (1977: 226) goes so far as to argue that professions are more often defined as being an occupation which tends to be 'colleague-oriented' rather than 'client oriented'. For instance, university professors tend to be more concerned about how colleagues, and especially leading researchers, regard their scientific contributions than how students perceive and evaluate their teaching. Similarly, Murningham and Conlon (1991) found in their study of 20 professional British string quartets that string quartets were more inward-oriented than oriented towards the audiences when seeking to accomplish musical performance at the peak of their capacity. In order fully to evaluate and appreciate the skills of the professional, you need to be a member of the professional community; professionals always and of necessity appreciate esoteric knowledge. It is part of their training, socialization and enacted ideology.

Several studies also show that professional and occupational ideologies are what are accommodated during secondary schooling (Willis, 1977), or in professional education and training in university programmes (Becker, Geer, Hughes and Strauss, 1961; Johnson, 2007). Schlee (2006), studying law and business school students – future 'managing elites' in Schlee's (2006) view – argues in line with Collins (1979) that becoming a professional is a processes wherein the student must actively resist elite ideologies in order to accommodate them. Rather than being passive recipients of predominant professional ideologies, students are trained to think critically and to question assumptions. In Schlee's (2006) view, students are not 'unwilling dupes of ideological indoctrination' but are self-reflective and capable of strategically accommodating and resisting ideologies of their education. Managing elites need to accommodate these ideologies because, in their future professional work, they 'need to believe in the higher mandate that the professionals are alleged to embody', Schlee (2006: 5) says. 'Elites-in-training' therefore undergo, Schlee (2006: 4) argues, a process where they 'contest, rationalize, and ultimately enthusiastically embrace their dominant position in society'. For instance, Danielle, a law school student who 'firmly believed during her first year of law school that most lawyers were overpaid and took advantage of their powerful position in society', now says, without criticism: 'Lawyers work really,