

The bureaucratization of the project manager function: The case of the construction industry

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Received 12 April 2005; received in revised form 25 November 2005; accepted 10 January 2006

Abstract

Project management work has been widely portrayed as something representing a post-bureaucratic form of organizing. However, some authors contest this view and claim that the professionalization of the project management function implies an adherence to, or even a rediscovery of, conventional management wisdom. This paper presents a study of how project managers in the production phase of construction projects, known as site managers, conceive of their work as becoming increasingly concerned with administrative matters. The study suggests that the critique of project management work, in terms of being less aimed at creative and innovative activities and more concerned with administration, needs to be further explored and debated.

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Keywords: Construction industry; Site managers; Critical view of project management

1. Introduction

The contemporary management doctrine emphasizes flexibility, temporal organizations, and a number of organizational features which have been jointly labelled the post-bureaucratic organization (see, for instance, Heckscher and Donnellon [1]). While the traditional organization form is regarded as becoming slowly adapted to external changes and overtly oriented towards its own enacted routines and processes, the post-bureaucratic organization is exemplary of organized activities continuously undergoing changes and modifications. However, the line of demarcation between bureaucratic and post-bureaucratic organization forms is not as decisive and clearly marked as some authors suggest. Instead, bureaucratic forms of organizing are rediscovered and re-formulated in order to fit into new settings and respond to new conditions. For instance, Hodgson [2–4] and Räsänen and Linde [5] have suggested that project management work

is no longer the explorative and unstructured endeavour it was initially designed to be; i.e. organizing and undertaking activities too complex or multifaceted to be fruitfully managed within the functional line organization. Instead, these authors claim that conventional management thinking, emphasizing a variety of instrumental practices and predefined management tools and techniques, is rediscovered here and translated into new conditions. One may then speak of a “bureaucratization of the project management function”. Such bureaucratization of the project management function is by no means possible to reduce to single causes but should be regarded as the outcome of a variety of changes in industry, e.g. market pressure caused by new market entrants, new demands for organization learning in repetitive routine tasks, and other relevant factors. Nevertheless, the project management function is subjected to translation from what is by definition is dealing with non-standardized tasks to more routine-like endeavours. The effects of such translation are examined in this paper. The paper reports on a study of how site managers in the construction industry, i.e. project managers accountable for construction projects, normally the

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construction of a building, are increasingly being expected to deal with a number of administrative duties which are essentially separated from the production work of the construction project. Site managers tend to deplore this gradual shift in their duties and think of such changes as partially due to the de-centralization of the organization structure, but also in terms of the immediate effect of new management doctrines regarding environmental concerns and quality issues which impose new demands concerning documentation and protocol writing. The case study support the thesis that project management work no longer is – possibly it was never the case – an organic form of organizing detached from bureaucratic procedures and routines, as suggested by proponents of project management practice. In addition, the paper also suggests that project management work can be examined in terms of bureaucratization as a fairly distinct process of imposing demands regarding formal reporting and documentation. Expressed differently, the literature on bureaucracy and bureaucratization, essentially published during the period 1950–1980, can be rejuvenated by means of paying closer attention to new and supposedly “post-bureaucratic” modes of organizing such as project management work.

2. Project management and the rediscovery of bureaucratic procedures

The project organization form has become a popular organization form during recent times (Söderlund [6]; Sahlin-Andersson and Söderholm [7]; Lundin and Söderholm [8]). Even though certain industries, such as the construction industry, have always been organized into temporal organizations, the interest in project work has virtually exploded during the last decade. For instance, the membership levels of professional project management associations such as the PMI (Project Management Institute) have recently grown substantially. In addition, management researchers have discovered project management work qua organization form and a number of journals, conferences, research communities and so forth have been initiated. Even though the bulk of the literature consists of handbooks and practitioner’s manuals (see, for instance, Keeling [9]), project management is becoming a sub-field of management studies. To date, however, there are few examples of studies and accounts of project management work that are more critically oriented. Hodgson [2–4] has suggested that one must not confuse project management work with preceding organization forms but must instead recognize the continuity and even re-discovery of old management ideas in project management practice. Hodgson even claims, somewhat provocatively, that project management today is largely a matter of applying bureaucratic principles to the temporal organization form:

Project management can be seen as an essentially bureaucratic system of control, based on principles of visibility, predictability and accountability, and opera-

tionalized through the adherence to formalize procedures and constant written reporting mechanisms. At the same time, however, project management draws upon the central rhetoric of empowerment, autonomy and self-reliance central to post-bureaucratic organizational discourse (Hodgson [3, p. 88]).

Hodgson concludes: “[W]hat distinguishes project management as of particular relevance to 21st-century organizations is its rediscovery of a very 19th-century preoccupation with comprehensive planning, linked to a belief in the necessity of tight managerial control” (Hodgson [3, p. 86]). Project management means, then, little more to Hodgson than the re-packaging of a series of established management tools and techniques and their application to temporal organizations. In a previous paper, Hodgson ([2, p. 812]) has argued that project management has established itself as a legitimate professional discipline by adhering to the “positivist, functionalist values” manifested in both bureaucratic procedures and Taylorist management principles. Hodgson [2] provides evidence that project managers tend to regard their work as a series of checking points which must not be sidelined or ignored. Hodgson writes: “In practice, [the] planning/monitoring model is experienced by many members of project teams as a totalizing bureaucratic control system; as one team member. . . complained: “It’s all ‘have you done this?, have you done this?, have you done this?, have you got signed off’” (Hodgson, [2, p. 812]).

Räsänen and Linde [5] examined Swedish telecom giant Ericsson’s project management model PROPS (PROject for Project Steering). Similarly to Hodgson, Räsänen and Linde regard the PROPS model as a condensed form of bureaucratic procedures and routines that project managers must adhere to. Therefore, project managers are subjected to a variety of “technocratic planning and reporting tools” which “ensure that projects are run rationally according to set budgets, goals, and time schedules” (Räsänen and Linde [5, p. 103]). In conclusion, they write: “In multi-project organizations today, projects are no longer the exceptional, unique and innovative work form of a new work order. Instead, project management is being subjected to the forces of organization rationalization, resulting in a bureaucratization of projectified activities” (Räsänen and Linde [5, p. 117]).

For both Hodgson [2–4] and Räsänen and Linde [5] the notion of bureaucratization is invoked when portraying project management work as something that is increasingly being formalized and structured in accordance with predefined standard operating procedures and routines. In other words, the critics of project management work suggest a continuity between the bureaucracy literature and more recent organization forms. The notion of bureaucracy is closely associated with the writings of Max Weber [10,11] and is, as Blau and Scott ([12, p. 27]) suggest, “[u]ndoubtedly the most important general statements on formal organization”. In the post-World War II period, organization theory dedicated a significant amount of research to explor-

ing the bureaucratic organization form, and a number of seminal and foundational works were published (see, for instance, Merton [13]; Crozier [14]). Today, comparatively little interest is being shown in the bureaucratic organization form, short of serving as some kind of “degree zero organization” against which new organization arrangements are benchmarked. However, during the period between World War II and the late 1970s, the notion of bureaucratization was explored by numerous writers (Jacoby [15]; Clawson [16]; Eisenstadt [17]). Maniha ([18]: 182) argues that “a bureaucratizing organization is, among other things, a record-keeping, report-writing organization”. Roy [19], examining the Department of Commerce of the US administration, speaks of bureaucratization as “three related trends”: “(1) growth in size, (2) appointment and promotion of the basis of merit, and (3) organizational differentiation” (Roy [19, p. 424]). Gouldner [20] conceives of bureaucratization in looser terms as the enactment of and adherence to rules and routines, and the delimitation of the local application of such rules. In what follows, we will adhere to Maniha’s [18] idea that bureaucratization entails a stronger emphasis on written reports and other forms of formal documentation. In the following section, the work of the site manager – i.e. managing the production process during construction projects – will be examined in terms of becoming increasingly involved with formal documentation and being less concerned with production and technical matters. In 1959, Arthur Stinchcombe [21] argued that the construction industry differed from the manufacturing industry in terms of maintaining a “craft organization” resisting bureaucratization and Taylorization. Even though both the construction and manufacturing industries have changed greatly since the late 1950s, and manufacturing industry has, in many cases, implemented advanced management practices and techniques that have not yet been applied to the construction industry, several researchers support Stinchcombe’s ideas and suggest that the construction industry is conservative and only shows limited examples of radical change in terms of work organization and construction technologies (Dubois and Gadde [22]; Kadefors [23]). As the study shows, there is no clear difference today between craft production and other forms of production on the level of the project management function. Instead, certain management ideas and practices entail normative and coercive isomorphisms (DiMaggio and Powell [24]; Mizruchi and Fein [25]) between different industries. This implies that the work of the site manager is no longer being sheltered from a more bureaucratized work role.

3. Site managers as project leaders in the construction industry

In Sweden, construction companies distinguish between the *design phase* and the *production phase*. Under the *total contracting* project form, as it is known, one single construction company is responsible for both phases, while under the *general contracting* project form, the client sepa-

rates the design phase from the production phase and assigns two different subcontractors for each of the two phases. When we speak, in what follows, of site managers qua project leaders, it needs to be noted that the function of the site manager is to serve as a project leader during the production phase and not for both phases. While there are project leaders at construction companies who manage the integration between the design and production phases, the site managers are nevertheless regarded to occupy a central position within the industry, strongly affecting the performance of construction projects. Needless to say, the production phase includes a number of interrelated practical, administrative, legal, and leadership activities which the site manager is held accountable for. Therefore, the role of site manager in the construction industry constitutes an adequate professional group when it comes to examining the shift from non-standardized and explorative to more routine-based and exploitative project work.

In the construction industry, most activities are organized in project form. In most cases, the site manager serves as project leader and is responsible for a number of different activities and processes including production planning, procurement, administration, staff management activities, leadership work, and meetings with stakeholders such as clients, end-users and customers, and so forth. In general terms, the site manager is the hub of a multiplicity of processes and activities which constitute the construction project (Edum-Fotwe and McCaffer [26]; Fraser [27]; Rowlinson, Ho and Po-Hung [28]). This multiplicity of responsibilities exposes the site manager to stress and other forms of socio-psychological pressure (Djrbani [29]). Since every construction project involves a number of subcontractors and different groups of workers, a great deal of coordination, planning, and activity monitoring is necessary in order to make activities run smoothly. It is the role of the site manager not only to monitor the progress of construction work but also to take full responsibility for administrative matters. One of the foremen interviewed thought of the site manager function in terms of being similar to that of the CEO of a smaller firm. “Every project is like a firm in its own right ... He [the site manager] is almost like a CEO for this ‘firm’” (Foreman, #10). During recent times, the construction industry has streamlined its organization and time-compressed its projects. As a consequence, the new lean production organization has imposed additional coordination demands on the site manager. One of the foremen pointed to the potential sources of conflict between groups of construction workers when time is starting to become a major issue: “It’s pretty much like when you’ve done the last screw, then the painter comes in and wants to start working on the walls” (Foreman, #9). For the site manager, such conflicts were rather infrequent but acknowledged the need for more detailed planning and a closer monitoring of production under the new time-compressed regime. Of more significant concern to the site manager was the growth in administrative routines that he or she was expected to deal with. One of the site

managers pointed to his workload and felt that administrative work is really not an attractive part of the role of site manager: “A lot of administrative work. It’s just too much . . . We’re better suited to other things, you might think at times” (Site manager, #8). He continued:

Q: What do you think of the tendency that more and more administrative work is being included in the function of site manager?

A: I would say I have mixed feelings. We’re not here to deal with paper. Then we would have chosen a different career. We’re here because we enjoy construction work (Site manager, #8).

Another site manager claimed that the administrative tasks might even inhibit the recruitment of new, qualified site managers: “A lot of people really do not want to deal with paperwork; they want to spend their time on site. They may have the expertise to build houses but not to take care of paperwork” (Site manager, #4). The site managers thought of the growth of the administrative work as the outcome of both the will to decentralize specific activities to local construction sites, rather than locating them at head office, and of the new management ideas regarding quality and environment that have been established within the industry. One of the site managers, with more than twenty-years’ experience of the site manager function, pointed to the differences between today and the mid-1980s: “A big difference. A real big difference. In the first place, the paperwork has increased. You could easily have one of your co-workers dealing with quality and environment issues on a full-time basis” (Site manager, #10). Demands by the authorities for the detailed reporting and evaluation of environmental and quality issues has thus imposed new forms of paperwork, essentially excluding production-related activities. This need to make trade-offs between different objectives was a constant source of concern for the site managers:

You are always split between production and administration. I think, in spite of everything, that I enjoy a bit of both, but what’s demeaning is that you are always split in half. Often, you do not have time to engage thoroughly with either activity; instead you make both equally mediocre. (Site manager, #1)

In such situations, when one has to make priorities between dealing with production-related issues and administrative work, it is always the former concern that is prioritized. The site manager continued:

What I prioritize most of all is that work continues. If that is ok, we keep a time schedule and everybody gets the chance to do their work. Administration is prioritized less. I’d rather take complaints because of that than because of production delays. Administration can always be dealt with afterwards. You need to deal with what is happening here and now. If that doesn’t run as intended, you cannot catch up (Site manager, #1).

Nevertheless, site managers disliked accumulating a backlog of administrative work and were already working long hours, in many cases 50–60 h per week, in comparison to the 40-h working weeks of most of their colleagues. Therefore, administrative work was often treated as an additional burden which, in many cases, stole time and energy from production-related matters and the social responsibilities of the leadership role. Some site managers also pointed to how their role used to be in the industry:

The old site manager role, back then, put more emphasis on production management. I know that, back then, you didn’t even see any invoices out there. Somebody else took care of them. What has happened over the years is that more and more administrative work has been transferred, while an equal amount of production management work is still being expected of us. This makes your work fragmented (Site manager, #1).

In summary, the site managers were dedicated to their work and appreciated the change inherent in their work whereby new construction projects came in tight succession and whereby you were given reasonable freedom to act independently of line managers. However, long working hours and, in many cases, long commuting distances were common in the industry and the site manager role was, in many respect, similar to that of the CEO of a smaller firm with a broad range of assignments and responsibilities along with production-related matters. The decentralization of administrative work and increased demands regarding primarily environmental and quality issues have contributed to the reshaping of the site manager role. Site managers thought of their workday as consisting of 80–90% office work, with the remainder of their time being spent on the construction site talking to the construction workers and engaging in problem-solving. The site managers tended to think of this ratio as too low and were concerned about the heavy emphasis on what they thought of as “administrative issues”. One of the site managers estimated that about 30% of his workload was dedicated to things he did not really care about or saw the point in doing. Nevertheless, the site managers were generally satisfied with their role and position even though they saw significant possibilities for improvement in terms of delegating certain tasks to support staff.

4. Discussion

For Arthur Stinchcombe [21], the construction industry is separated from the manufacturing industry in terms of maintaining its long-standing tradition of being a craft rather than subject to the reduction of complex work assignments to single operations. Representatives of the construction industry tend to support this idea and claim that there is (rather limited) progress in the industry in terms of working methods, organization, and construction technologies. Still, other industries have developed and implemented a great variety of management systems and

techniques since the end of the 1950s and, in some cases, such managerial innovation has penetrated the supposedly conservative construction industry. Today, the site manager's traditional job, that of leading production work, has essentially been delegated to the foreman of the construction site, with the site management role instead being more dedicated to a variety of planning procedures and procurement activities, as well as forms of documentation and reporting. Adhering to Maniha's [18] view of bureaucratization as the increased emphasis on report-writing and documentation, one may argue that the site management function is being bureaucratized, i.e. that site managers are today dedicating more time to providing adequate protocols and documents than was previously the case. For site managers, this new work role is cumbersome since they are having to invest more and more time in administrative work, with less time thus going into production management work, leadership activities, and other forms of social involvement with their co-workers. Since site managers are already working between 25% and 50% overtime, there are few opportunities, they would argue, for giving them any further assignments. Instead, most of the site managers argued that they would have appreciated some additional support in order to manage all their operations. Both organizational and institutional factors are serving to bureaucratize the function of project manager. Organizationally, construction firms have tended to de-centralize some of their administrative routines, e.g. human resource management work, to the workplace. Although the intention is to make local managers responsible for the day-to-day management of their co-workers, the consequence is that project managers are working less and less with the core activities of the project. The institutional factors include increased regulatory demands from the authorities, in terms of quality assurance and environmental systems. Of course, it is the task of the construction firms to decide how to manage regulatory demands, but historically and practically, much of this additional administrative work has been assigned to the project leaders, the site managers.

Even though the case presented here originates from the construction industry and may, more specifically, be primarily representative of Swedish conditions, it is still possible to ponder the relevance to and implications for other industries. Studies in other knowledge-intensive industries, e.g. the telecom, pharmaceutical, and automobile industries, suggest that the project management function is becoming increasingly complex, including the coordination of more processes, communities and individuals, and material resources than previously. Furthermore, the amount of "paperwork" is growing as more regulatory and monitoring routines are enacted by the authorities. Seen in this light, it may be that the case presented in this paper is an idiosyncratic one, but the question regarding which routines and administrative assignments project managers should be held responsible for remains relevant to a broad range of industries and activities in the field of innovation and R&D. It may be that site managers in the construction industry rep-

resent an industry that is more exposed to the regulations and control of the authorities; however, similar mechanisms of control are observable in many industries and domains of expertise. For instance, in the pharmaceutical industry, another industry reliant on a project organization form and skilled project managers, regulatory requirements have increased substantially during the last 15 years. Pharmaceutical companies are dedicating more time and effort to handling demands for formal reporting to the authorities than ever before. Therefore, the case of the construction industry may not be entirely removed from broader organizational and managerial tendencies and debates.

In the literature on project management, there are surprisingly few discussions about the day-to-day administration work that the project manager is expected to carry out. In the normative project management literature – today the lion's share of this corpus of texts – project work is depicted as something dealing with exclusive and exciting activities unfit for the functional organization. Project managers are then portrayed as individuals who spend their working day managing their colleagues, listening to presentations, and contributing meaningful remarks and comments on how to solve various problems. The project manager, in this idealized view, is a *primus inter pares* who enjoys a great deal of authority and freedom to manage his or her project in accordance with professional beliefs and preferences. In contrast to this rosy image of the creative and exciting project, many project managers, and more specifically site managers, in the construction industry are exposed to a growing burden of documentation and reporting work deriving from a variety of managerial programmes such as TQM and environmental objectives. Needless to say, such programmes may entail significant and positive consequences both for society and for individual firms and their stakeholders, but they also impose an additional workload on already overworked site managers. The project management literature would then benefit from leaving the strictly normative view of project management work and engaging in studies of the day-to-day practices and operations of project managers in various industries. To date, much of the project management literature has overrated the degree of intellectual and practical freedom and the liberties of project work and does not pay sufficient attention to the continuity between traditional bureaucratic organizations and the post-bureaucratic organizations, whereof the project management model represents one particular post-bureaucratic form. This study thus supports the argument of Hodgson [2,3] and Räsänen and Linde [5] that project management does not represent a radical break with traditional management models but rediscovers and reuses some of the central bureaucratic procedures and practices, e.g. reporting, documentation, standardization, and so forth. Even though project management as a practice is by definition bound up with the notion of temporality, this does not imply that the bureaucratic forms of management control have been completely abandoned. Instead, as Hodgson [3] makes

clear, the professionalization of the project manager implies a return to past managerial virtues regarding transparency, predictability, and documentation.

In terms of practice, the study suggests that construction companies, and companies in other industries increasingly organizing their activities in the project form, need to evaluate the economic, social and emotional costs of decentralizing administrative work to site managers. In some cases, it may be that a certain amount of administrative work needs to be assigned to site managers. But in other cases, additional administrative support can be economically justified. All in all, the workload on project leaders may be substantial and thus social and corporate costs need to be carefully examined.

5. Conclusion

In much of the project management literature, project work is portrayed as an exciting endeavour wherein creative and innovative work is carried out. In many cases, such a romantic view of project work is an adequate image, while in other cases less spectacular activities fill the project leader's day-to-day work. In the critical literature on project management work, projects are bureaucratized not only in terms of increased market pressure and demands for systematic organization learning, but also in terms of being influenced by a variety of fashionable instrumental management tools structuring day-to-day work in accordance with bureaucratic procedures. This paper presents a study of site managers of construction projects which suggests that the work of the site manager has been substantially translated and redefined and today includes the responsibility for a significant amount of paperwork that site managers are only modestly interested in dealing with. The findings suggest that a more critical view of project management practices would help to overcome normative assumptions regarding the supposedly "creative" and "innovative" nature of project work per se that dominates the field. Instead, project management work should be explored as a practice that includes equally routine moments and explorative activities.

Acknowledgements

The author recognizes the financial funding of his research project by BIC/FORMAS, SBUF and CMB in Sweden. He also warmly thanks the company representatives participating in the study, as well as the two anonymous reviewers for their helpful comments on earlier drafts of this paper.

References

- [1] Heckscher C, Donnellon A, editors. *The postbureaucratic organization: new perspectives on organizational change*. Thousand Oaks, London and New Delhi: Sage; 1994.
- [2] Hodgson D. Disciplining the professional: the case of project management. *J Manage Stud* 2002;39(6):803–21.
- [3] Hodgson DE. Project work. The legacy of bureaucratic control in the post-bureaucratic organization. *Organization* 2004;11(1):81–100.
- [4] Hodgson D. Putting on a professional performance. *Performativity, subversion and project management*. *Organization* 2005;12(1): 51–68.
- [5] Räisänen C, Linde A. Technologizing discourse to standardize projects in multi-project organizations: hegemony by consensus. *Organization* 2004;11(1):101–21.
- [6] Söderlund J. Building theories of project management: past research, questions for the future. *Int J Project Manage* 2004;22:183–91.
- [7] Sahlin-Andersson K, Söderholm A, editors. *Beyond project management: new perspectives on the temporary–permanent dilemma*. Copenhagen: Copenhagen Business School Press, Abstract; 2002.
- [8] Lundin RA, Söderholm A. A theory of the temporary organization. *Scand J Manage* 1995;11(4):437–55.
- [9] Keeling R. *Project management*. London: Macmillan; 2000.
- [10] Weber M. Bureaucracy. In: Gerth HH, Wright Mills C, editors. *From Max Weber: essays in sociology*. London: Routledge and Kegan Paul; 1948. p. 196–244.
- [11] Weber M. *Economy and society: an outline of interpretative sociology*. Berkeley, Los Angeles and London: University of California Press; 1978.
- [12] Blau PM, Scott WR. *Formal organizations: a comparative approach*. London: Routledge and Kegan Paul; 1963.
- [13] Merton RK. Bureaucratic structure and personality, in *social theory and social structure*. Glencoe: Free Press; 1957.
- [14] Crozier M. *The bureaucratic phenomena*. Chicago: The University of Chicago Press; 1964.
- [15] Jacoby SM. *Employing bureaucracy: managers, unions, and the transformation of work in American industry, 1900–1945*. New York: Columbia University Press; 1985.
- [16] Clawson D. *Bureaucracy and the labor process: the transformation of the US industry, 1860–1920*. New York and London: Monthly Review Press; 1980.
- [17] Eisenstadt SN. Bureaucracy, bureaucratization, and debureaucratization. *Admin Sci Quart* 1959;4(3):302–21.
- [18] Maniha JK. Universalism and particularism in bureaucratizing organizations. *Admin Sci Quart* 1975;20:177–90.
- [19] Roy WG. The process of bureaucratization in the US State Department and the vesting of economic interests, 1886–1905. *Admin Sci Quart* 1981;26:419–33.
- [20] Gouldner AW. *Patterns of industrial democracy*. Glencoe: The Free Press; 1954.
- [21] Stinchcombe A. Bureaucratic and craft administration of production. A comparative study. *Admin Sci Quart* 1959;4(2):168–88.
- [22] Dubois A, Gadde L-E. The construction industry as a loosely coupled system: Implications for productivity and innovation. *Constr Manage Econ* 2002;20:621–31.
- [23] Kadefors A. Institutions in building projects: Implications for flexibility and change. *Scand J Manage* 1995;11(4):395–408.
- [24] DiMaggio PJ, Powell WW. *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press; 1991.
- [25] Mizuchi MS, Fein LC. The social construction of organizational knowledge: a study of the uses of coercive, mimetic, and normative isomorphism. *Admin Sci Quart* 1999;44:653–83.
- [26] Edum-Fotwe FT, McCaffer R. Developing project management competency: perspectives from the construction industry. *Int J Project Manage* 2000;18:111–24.
- [27] Fraser C. The influence of personal characteristics on effectiveness of construction site managers. *Constr Manage Econ* 2000;18: 29–36.
- [28] Rowlinson S, Ho TKK, Po-Hung Y. Leadership style of construction managers in Hong Kong. *Constr Manage Econ* 1993;11:455–65.
- [29] Djerbarni R. The impact of stress in site management effectiveness. *Constr Manage Econ* 1996;14:281–93.