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ENTERPRISE-LEVEL PROJECT MANAGEMENT CAPABILITIES: A COMPARISON OF THE CONSTRUCTION AND IT SERVICES INDUSTRIES

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Abstract

The Australian construction industry's record of improved project performance indicates that it may hold lessons for the IT industry. We suggest that these lessons are more likely to be at the enterprise-level rather than the project-level. An exploratory study confirmed this, finding differences in a number of areas of management practice affecting organizational and individual capabilities and their relationship to project performance. The design of a two-level survey comparing the two industries is described. This is the first such study of its kind. Initial findings from questionnaires completed by managers of project managers in both industries are described. They suggest that the performance difference across industries is real, that the degree of task certainty is different, and that some of the performance differences may be attributable to organization and management.

1. RESEARCH OBJECTIVES

Information systems (IS) projects are notorious for poor performance against objective targets such as budget and schedule as well as the more subjective targets of quality and customer satisfaction. Worse, despite IS professionals' continuing efforts there is little sign of consistent improvement throughout the industry (Johnson 1995; Sauer 1999). In Australia, this contrasts with the construction industry, which 20 years ago had a poor reputation for project performance but where today the best companies are widely perceived to consistently meet most project targets. Not only have prestige projects such as the Sydney Harbour Tunnel been successfully delivered, the leading companies also appear to deliver smaller, bread-and-butter projects equally successfully.

The IT industry has been aware of the construction example and has borrowed, and then extended and developed, its project management tools and techniques. Some leading scholars of project management consider the IT industry as among the most advanced in the use of project management techniques (Morris 1996). Therefore, the fact that IS project performance has not shown consistent improvement suggests that either construction's advantage lies in more than its application of technique or that the IS project task is substantially harder to manage than that of construction.

We do not challenge the claim that IS projects are harder to manage because of factors such as continually changing technology, difficulty of fixing user requirements, high staff turnover, and the intangibility of the software product. Rather we argue that because construction's performance has improved and become more consistent where IT's has apparently not, and since few industry observers would suggest that IS project performance is as good as it could be, the construction example may offer useful lessons.

One possible source of lessons lies in the fact that building contractors conduct their business solely through projects. By contrast, many IS projects are carried out either by in-house IS functions in businesses where project activity is not the principal source of revenue or by IT service firms whose main business often includes non-project activities such as facilities management and product sales. We surmise that construction firms' exclusive focus on projects may have resulted in their introducing organizational innovations to support project management to a greater degree than firms that conduct IS projects. In short, this insight constitutes the motivation for this study.

Our initial objective, therefore, is to study how building contractors organize and manage so as to achieve consistently high project performance and to compare this with the IT industry. Our ultimate objective is to identify organizational and management changes that a company can make at the enterprise-level so as to improve its performance on IS projects.

2. THEORETICAL FOUNDATIONS

While numerous fields of study bear on IS project performance, there is a paucity of directly relevant theory at the enterprise-level. Most research on IS implementation has been conducted at the individual-project-level aimed at identifying success and failure factors. Although some project management factors such as goal-setting, planning and control, team behaviors and team management are commonly identified as influencing performance (e.g., Barki , Rivard and Talbot 1993; Keider 1984; Schmidt et al. 1999), the target of such research is the project manager rather than enterprise-level management. Both the generic project management literature (Cleland and King 1983; Frame 1994; Kerzner 1995) and the IS project management literature (Hallows 1998; Kirsch 1997; McLeod and Smith 1996) are likewise almost exclusively focused on project-level variables. Recent exceptions include work on corporate project offices (Frame and Block 1998) and on the management of project managers (Graham and Englund 1997). Such work is based on informal case studies and experiences, but while these provide useful insights into enterprise-level management practice they do not constitute rigorous empirical support.

Research on organizational design might have been expected to be more helpful. However, it has largely been directed toward volume production and continuous process industries. Where researchers have recognized the importance of projects in industries such as heavy engineering, they have typically studied matrix management largely from a structural perspective (Galbraith 1973, 1977). Today matrix management is an unfashionable area of research because in practice it has been distinguished more by the problem it creates for project managers—insufficient control of necessary resources and the resultant conflict—than by any solution it provides to the problem of integrating differentiated functions. A particular weakness of this literature has been that its focus on individual projects has resulted in the exclusion of longer-term organizational-wide improvement in project performance.

In the absence of a mature theoretical foundation as a platform for our research, we have been obliged to undertake exploratory research to formulate appropriate research questions.

3. RESEARCH QUESTIONS

Our research objectives were refined into specific questions through an initial qualitative investigation using case study methods. In view of the limited theoretical foundation for the study, this approach is widely viewed as appropriate (Benbasat, Goldstein and Mead 1987; Eisenhardt 1989; Yin 1994). This phase of the research draws on qualitative data gained from 28 unstructured interviews with members of four of Australia's largest and most successful construction companies. The research explored their organizational and management practices in relation to project management. Personnel interviewed included board directors, project managers, functional managers, and members of corporate-level project audit and process improvement teams. We used our existing understanding of IT project management, which is based on more than 20 years practical and research experience, as a benchmark against which to identify what was interesting and distinctive about construction industry practice. In addition, as a validity check, we conducted 10 interviews with senior IT managers in Australia and the United States.

From our initial research we derived a number of factors that appeared to influence project performance in construction but which when present in IT have a less active and important role. These factors included:

- Proportion of business conducted through projects
- Flat, project-centered structure
- Strong project performance focus
- Client focus
- Strong project director role
- Project manager responsibility and accountability matched to authority
- Frequent and effective formal and informal reporting
- Active involvement by senior managers
- Values support development and retention of project management knowledge
- Human resource systems and processes support recruitment and development of project managers and retention of project management knowledge
- Career structure to lead from project managers to senior executives
- High level of project management experience among senior executives

Our initial research also suggested that some other factors were not as important as might have been expected. These included:

- Formal project management methodologies, tools and techniques
- Performance-related pay

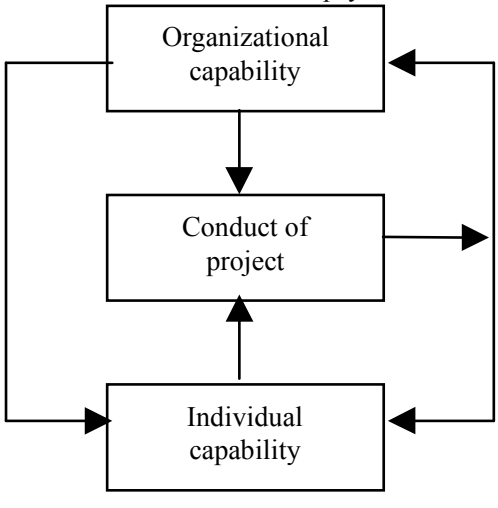

Figure 1. Building Project Management Capability Around Project Performance in Construction

Importantly, we found that the companies' organization and management practices were linked by a common organizing logic which we expanded into a description of a distinctive project-management-centered organizational form (Sauer, Johnston and Liu 1998). Figure 1 illustrates two important elements: the focusing of the bulk of the organization's resources in the form of individual and organizational project management capabilities on individual projects; and the continual improvement of these capabilities through learning from individual projects.

The initial phase, therefore, led us to the following research questions:

- What are the constituents of organizational and individual project management capability?
- How do these relate to project performance?
- What lessons does the construction industry's approach to organizational and individual project management capability offer for the IT industry?

4. RESEARCH METHOD

In order to address these questions, and to validate our initial findings, we chose to collect quantitative data through surveys designed to permit us to analyze organizational level determinants of project performance within the construction and IT industries separately, and to compare them. In the absence of many directly relevant prior studies, we anticipated that our subsequent analysis would be essentially exploratory although guided by the findings of the initial phase research.

4.1 Survey Design

We have designed, piloted, refined and administered four survey instruments: two for construction, two for IT services (in-house IS functions will be surveyed later). Within each industry, one instrument has been administered to project managers (PMs) and one to their superiors (managers of project managers—MPMs). Construction companies selected are general contractors, heavy construction contractors and special trade contractors within the definition of SIC code 1521-1799 and with annual turnovers of A$40 million. IT companies selected are IT services companies within the definition of SIC 7371-7379 and with a turnover of A$10 million or over. These turnover figures were chosen so that there would be a sufficient number of companies in the populations and so that smaller, less structured companies that were unlikely to have multiple project managers would be excluded. The MPM instruments were designed to permit us to relate factors to organizational project performance whereas the PM instruments were designed to relate factors to performance on recently completed projects. The total study was designed to permit comparison across industries at both levels and to provide cross-level validation. Such a comparison is justifiable despite differences in task complexity across the industries because our study is of the management of project managers and the project management process and is designed to reveal lessons about how to organize and manage at that level rather than about how project managers themselves should manage their projects.

4.2 Measures

Most posited factors are measured using multiple items on a five point scale. Standard dimensions of organization such as size, environmental uncertainty and task complexity are measured to enable control for organization and industry differences. Pre-existing measures have been used wherever possible. Measures have been developed for the key variables listed above under Research Questions. We believe overall firm performance is likely to be affected by many factors unrelated to the management of projects. As a result, we use only one dimension of organizational performance, i.e., project performance, as the dependent variable. This is measured on four dimensions, namely quality, cost, time and specification, according to the MPM's perceptions of overall project performance, relative performance with competitors, and satisfaction of the clients. At the individual project level, performance is measured by both perceptions and objective data on the same four dimensions.

5. INITIAL FINDINGS

Initial findings are based on those MPM questionnaires returned so far from construction (N = 42) and IT services (N = 18). These findings are based on tabulation of simple, descriptive statistics and some straightforward comparisons.

The data reveal a clear difference between construction and IT in relation to project performance. On an aggregated mean measure of eight items on a five point scale, construction performance rates 4.17 compared to 3.4 for IT services. This is consistent with our initial presumption of construction's superior project performance.

The initial data reveal some interesting possible reasons for the performance differences based on apparent differences between the two industries although until more questionnaires are received we cannot proceed to a reliable analysis. First, on four separate measures construction project task certainty is consistently higher than that for IT, suggesting that it is easier to manage construction projects because they are better understood. The data indicate that environmental volatility is not a bigger problem for IT than construction, just different, with each industry encountering different levels of volatility on different dimensions.

Second, consistent with the findings of our earlier qualitative study, whereas construction relies more on formal rather than informal reporting for project monitoring and control, the reverse is true for IT services. Also consistent with those findings, the data show the frequency of communication between senior managers and their project managers to be higher in construction than IT. This does not appear to be simply the result of greater formalization in construction because we find IT is more likely to have comprehensive formal project management procedures.

Third, in relation to our perception that construction is more likely to match responsibility, authority and accountability, our data show that IT firms are more likely to assign sole responsibility to project managers than they are to give them decision-making powers and control of resources, whereas construction is more likely to grant decision-making powers and resource control and less likely to assign sole responsibility to the project manager. This suggests that in both industries there may be asymmetry between the allocation of responsibility and authority but that in the construction industry it favors the project manager whereas in IT it is to the disadvantage of the project manager. On most measures, accountability is slightly higher in construction.

Fourth, the evidence so far indicates that training and development of project managers in IT is subject to greater formalization and standardization whereas it is more likely to be ad hoc and tailored to specific needs in construction. This is consistent with our view that development of construction project managers is a more personalized process.

A further area of difference relates to the acquisition of new project business and the setting of targets. In IT, sales and marketing personnel appear more influential than in construction, both in their role in acquiring new business and setting project goals. Conversely, top management in construction is more influential in acquiring new business and setting project goals than in IT. This is consistent with a common complaint of IT project managers that sales staff are motivated to close a deal rather than make projects achievable. The greater influence of top management in construction results in a better balance between winning business and delivering it successfully.

6. CONTRIBUTIONS

This study provides the first formal comparison between IT and construction industry project management at the enterprise level. The analysis will reveal the extent to which project performance is explained by project task factors and management factors, and whether a common model applies to both industries. The minimal outcome will be insight into whether management differences affect project performance and hence whether the IT industry can hope to improve its performance through learning about enterprise-level management of project management. We expect more substantial findings that some of the differences we have noted will prove to affect performance, and hence will suggest opportunities for improvement in IT. While it is possible that performance will be substantially explained by task certainty and that this will explain management differences, we anticipate some anomalies requiring further explanation. For example, it is not immediately obvious why sales staff would be more influential where task certainty is lower. Rather, one might expect that managers charged with responsibility for delivery would be more influential. Likewise, it seems anomalous that comprehensive formal project management procedures would be more common in the industry with the lower task certainty.

7. PRESENTATION AT ICIS

The presentation will provide an initial answer to our original research questions in terms of the elements of organizational capability. This will include results of a full statistical analysis of a more complete data set with a view to building one or more models of project performance in terms of project task factors and management practices. It will be explicit about what lessons are clearly indicated for the IT services industry. It will identify questions for further research.

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