The impact of organizational culture on project management in matrix organizations

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This research empirically examined the relationship between organizational culture and the effectiveness of project management. The study made use of two conceptually developed constructs. The one, a framework of organizational culture, consists of twelve dimensions that emerged from a study of the project management literature as important organizational conditions for effective project management. The second construct, project management effectiveness, comprises eleven dimensions constituting the persistent leading and outcome indicators of project management success, similarly based on literature. The research found a statistically significant relationship between the two constructs in a sample of matrix organizations. Each of the twelve dimensions of organizational culture also correlated significantly with project management effectiveness. A total of 29 organizations, operating within the boundaries of South Africa, took part. Although generalizability is not possible, given the sample size, the study nevertheless takes a substantial step forward in this important context of project management. Pointers are offered for future research, and for organizations that find that project management fails to perform in accordance with their expectations.

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Introduction

Project managers in organizations across the globe must overcome, besides the technical challenges of their projects, numerous other difficulties in executing their project responsibilities. Typical examples are: unrealistic time and budget constraints; conflicts in project teams; the fluctuating availability of organizational resources; competition with line priorities; delays in project decisions owing to the cumbersome decision-making modus operandi of senior management; and the constrained communication flow between project team members coming from different functional departments. To add to these woes, many project managers have too little authority to resolve problems of this, sometimes, delicate nature. A substantial body of project management research provides evidence of such problems, for example Pinto (2000: 85,86), and this list of examples given is by far not exhaustive. What is more, these frustrating experiences are encountered also in organizations with proper project management systems in place and with project managers well-trained in the required methodological skills.

The cited problems will more than likely cause projects to be late, and/or over budget, and/or short of meeting technical expectations. Why is it that some organizations, despite having the necessary project management systems and people in place, fail to accomplish the benefits that are so widely advocated for the project management approach?

The scope of difficulties experienced during project execution has increasingly convinced project management analysts that part of what is wrong should be investigated externally to project management. As an example, well-known project management advocates and authors have more and more asked questions about the suitability of the organizational culture and its influence on project management. In a particular study (Kerzner, 2001: 81), the conclusion was made that organizations that were proficient in project management appeared to have cooperative cultures where the entire organizational environment was in support. In principle therefore, organizational culture could be conceptualized as varying in its degree of supportiveness of project management.

This article reports on empirical research undertaken to explore this premise, and to examine whether the notion of an organizational culture that varies in its degree of supportiveness for project management exists in the empirical world. In other words, is the concept definable, can it be measured, and does it impact on the effectiveness of project management?

The research focused chiefly on project management in matrix organizations because it is in this hybrid coexistence of line-managed and project-managed work that project management is argued to be particularly vulnerable to a non-supportive organizational culture (Morrison, Brown & Smit, 2006: 40).

Background

Project management, a topic originally studied mostly in the context of its planning, costing and engineering procedures, has gradually broadened its research agenda in recognition of the many behavioural issues that have become characteristic of leading project teams (Kloppenborg & Opfer, 2000: 54; Project Management Institute, 1999: xv). The increasing popularity of project management to manage portfolios of projects in organizations has also resulted in another interest. The question is not only how to manage a particular large project, but also how to establish a capability for running projects continuously and with an acceptable degree of predictability (Morrison & Brown, 2004: 73). The quest for project management maturity in organizations is further evidence of this interest (Kerzner, 2001: 42-43).

Several project management authors have acknowledged organizational culture as a likely influence on the success of project management (Brown, 1999: 37; Cicmil, 1997: 394; Elmes & Wilemon, 1988: 62; Gray & Larson, 2000: 243; Gray, 2001: 106; Johns, 1999: 50, 53; Kerzner, 2001: 81). However, there has been rare evidence of systematic studies of organizational culture from a project management perspective or of empirical findings to shed light on this supposed relationship (Morrison, *et al*., 2006: 39; Wang, 2001: 5; Kloppenborg & Opfer 2000: 55; Henrie & Souza-Poza, 2005: 13).

Organizational culture, as an academic topic, has been linked to a range of phenomena in organizational functioning. Some of the examples are: the forces that create patterns of "coherence and consistency" (Pettigrew, 1990: 424); a system of informal guidelines (Deal & Kennedy, 1982: 15); a tacit social agreement that informs employees what will be rewarded and what gets punished (Wilkins, 1983: 30); preferences about strategically influential mechanisms such as the hierarchical structure and control and reward systems (Pettigrew, 1990: 415); and a form of social control that keeps people in step with the norms of the group (O'Reilly, 1995: 318).

Organizational culture has also been associated with perceptions about the distribution and legitimacy of authority in an organization (Pettigrew, 1979: 574). It is especially this connection that suggests that organizational culture could be a powerful influence on project management performance. Several past project management studies, such as Pinto (2000: 86) and Nicholas (2004: 484), draw attention to the vulnerable authority position of the project manager.

The power of organizational culture as a source of resistance to change is another threatening aspect. Organizational culture is known to preserve past behaviours and practices, often to the detriment of an organization in a changing environment (Deal & Kennedy, 1982: 136; Kotter & Heskett, 1992: 24). Because the cross-functional nature of project work is a significant departure from routine functional processes, project management may encounter unexpected resistance from subtle efforts to uphold the functional mind set in an organization (Ford & Randolph, 1992: 282; Tichy & Devanna, 1990: 108; Schein, 1992: 140, 141; Majchrzak & Wang, 1996: 95).

Research objectives

This study set out to empirically examine if a relationship exists between organizational culture and the effectiveness of project management practices in an organization. Two constructs had been conceptually developed by Morrison & Brown (2004) and by Morrison, *et al*. (2006) to use as variables for comparing the relative effectiveness of project management against varying profiles of organizational culture.

The main objective was to establish whether such a relationship, as had been broadly suggested by previous authors, could be found in practice. It was also important to examine whether the selected framework of dimensions, which was derived from a study of the project management and organizational culture literature (Morrison, *et al*., 2006), is a sufficiently accurate model for profiling the organizational supportiveness for project management.

Research methodology

The research approached the problem from a functionalist perspective of organizational culture research (Denison, 1996: 620) by viewing organizational culture as the independent variable against an index of project management effectiveness as the dependent variable. The relationship between the two was investigated by surveying a sample of organizations meeting the research population criteria, as will be further explained below.

The culture construct

The definition of the culture construct is given in Table 1.

The twelve dimensions were measured by a 77-item questionnaire that had been developed for this purpose from the conceptual framework in Morrison, *et al*. (2006). In its development stages, it started as a 95-item questionnaire that was refined by inputs from business school colleagues and by administering it to a small sample of MBA students. As a further test, the revised questionnaire was sent out to a sample of 337 persons in 60 different organizations. A total of 107 persons responded. Cronbach alpha and item variance checks were used to check the reliability of the items and to weed out unreliable (items that lowered alpha) and redundant items (items that showed little variance). The scale was, as a result, shortened from 95 to 77 items with between five and eight items per dimension; Cronbach alphas ranged from 0,73 to 0,90 for the twelve dimensions based on the revised items and the test sample data.

The index of project management effectiveness

The definition of the project management effectiveness construct is given in Table 2.

Table 1: Definition of the organizational culture construct

No	Dimension	Orientation that is supportive of project management
1	Organizational direction	Presence of longer-term strategic direction that is shared across the organization.
2	Competitiveness orientation	Focus on the market and external environment as opposed to an internal, product-focused orientation.
3	Decision-making rationale	Fact-based, rational as opposed to serving personal political interests.
4	Cross-functional integration	Well-integrated, comfortable with teamwork as opposed to a departmental (working in 'silos') focus.
5	Communication philosophy	Open and transparent in all directions, information is freely available.
6	Locus of decision-making	Well-decentralized and delegated as opposed to highly centralized.
7	People management style	Participative, supportive (leader-oriented) as opposed to a directive, command and control style (manager-oriented).
8	Flexibility	Flexible, innovative, and open to change as opposed to rigid, bureaucratic and resistant to change.
9	Philosophy about people	Theory Y (warm personal atmosphere) as opposed to Theory X (coercive, task only atmosphere).
10	Personal competency	Oriented towards specialized training and personal excellence.
11	Process and systems support	Oriented towards providing standardization and support through strong processes and technology
12	Performance management	Oriented towards a proactive, performance-driven culture as opposed to a reactive or laissez faire approach to tasks and goals.

Source: Summarized from Morrison *et al.*, 2006: 43-47.

Table 2: Definition of the project management effectiveness construct

Category	No	Dimension	Explanation
Organizational input dimensions	1	Supportive organization	The degree to which the organization, in general, is perceived to be supportive of project management.
	2	Rational project decision-making	The degree to which the organization sets realistic targets for its projects.
Project management process dimensions	3	Effective tools and systems	The degree to which each of these process factors are perceived by project participants to be adequate for carrying out their project responsibilities.
	4	Effective procedures and disciplines	
	5	Effective project leadership	
	6	Effective project communication	
	7	Resources adequacy and competency	
	8	Customer integrated in process	
Short term project management outcomes	9	Meeting project management operational objectives consistently	The degree to which projects are delivered within time, budget, quality and customer requirements.
Strategic impact dimensions	10	Organization's strategic considerations	The degree to which the strategic decision to establish project management can be justified for the organization.
	11	Project management integration	The degree to which project management is smoothly integrated into (not disrupting) the organization's workflow.

Source: Summarized from Morrison & Brown, 2004: 85-91.

The operationalization of this project management effectiveness construct and the process of verifying the items chosen to measure the concept of project management effectiveness are addressed in Morrison and Brown (2004). In the process of further refining its operationalization, it was obvious that the diversity of items could not be accurately measured by one questionnaire. The concept views project management from the perspectives of different stakeholders: the degree of *senior management* satisfaction with project management; the way *project team members*

experience their participation in project management; and the degree to which *project managers* feel confident about the project management infrastructure for accepting their project responsibilities.

Three different questionnaires were therefore drawn up to represent the items of the project management effectiveness construct. As a measure of testing the internal consistency of the items, the combined project management effectiveness scale was administered to a sample of 16 MBA students that, at the time, were taking project management as a subject. Cronbach alpha checks revealed a satisfactory instrument, with coefficients ranging from 0,726 to 0,905 for the 11 dimensions.

The survey design

The unit of analysis. The unit of analysis was the organization. The research focused on the capability of the organization to manage its projects on an ongoing basis; it was not about the performance of selected projects or selected project managers. Therefore, the measurement of organizational culture as well as of project management effectiveness was aggregated to organizational level before analyses were done.

The population. The research was concerned about a specific population of project management organizations, namely organizations that: a) are involved in managing projects in a substantial way; b) follow a matrix organization approach to assign resources and manage its projects; c) practice project management in a formalized way by using recognized project management methods; and d) do a substantial portion of its project work with in-house resources and not through subcontractors (i.e. most resources function within the same organizational culture). Organizations could be in any industry.

Domains of measurement. The survey measured the two constructs separately. *Organizational culture* was measured in the organizational environment outside of project management. It thus examined that part of the organization from where project management draws its resources, such as specialist expertise, administrative support, and management decision-making processes. The 77-question organizational culture questionnaire surveyed this domain of the organization.

Project management effectiveness was measured closer to project management. It targeted those people regularly involved in project execution, namely, regular project managers, regular project team members, and senior management members standing in a direct relationship with project management. The three project management effectiveness questionnaires targeted these categories separately.
Thus, the total survey comprised four questionnaires that had to be completed by different categories of staff in each organization.

Survey implementation. To improve the accuracy and reliability of the measurements, organizations were encouraged to make a number of people available in each category of the survey. All the questionnaires made use of 7-point Likert scale ratings ranging from Strongly Disagree (1) to Strongly Agree (7) with a neutral point (4).

Organizations were requested to provide the e-mail addresses of the people they nominated in each category. Questionnaires were mailed directly to each person as an MS Excel file, which facilitated the electronic completion and submission, by e-mail, of questionnaires. Manual questionnaires were available on request.

Sampling

Finding a representative sample framework from where to draw a sample was not straightforward. The target population is a diverse group of organizations in a diverse number of industry sectors. They are not represented by a single professional body or interest group which could be contacted for a membership list. Therefore, an exploratory technique was followed. A number of organizations that were known to meet the criteria, as well as individuals knowledgeable in this field, were approached and requested to supply references to other qualifying organizations that they were aware of. The process resulted in a “quasi list” (Babbie, 1989: 181) of 131 organizations across South Africa, which was deemed a reasonably representative sample frame of the population.

Attempts were made to contact all the organizations on the list and invite them to take part. As far as possible, an effort was made to identify a senior person close to project management to negotiate participation with. As an incentive, a comprehensive company report containing the overall survey results, plus an analysis of the organizational culture and project management effectiveness profiles of the organization, compared to the survey, was promised to each participating organization.

Survey response analysis

During the contacting phase, it was found that 21 organizations on the list were not meeting the research criteria and had to be left out from further consideration. A total of 45 organizations initially responded favourably about participating. Of the remaining 65 organizations, 11 organizations declined to take part, 14 remained non-committing, while 40 organizations ignored all attempts to establish contact.

Of the 45 organizations, which initially indicated that they would participate, 31 organizations eventually took part. Two of these organizations failed to complete all the questionnaires; valid responses were thus received from 29 organizations. Based on the number of organizations that qualified (131 - 21, i.e. 110 organizations), the participation response rate by organizations was 26%.

The response rates to the four different questionnaires are shown in Table 3.

Table 3: Survey response analysis

	Organizational culture	Project management effectiveness			Total
		Senior manager	Project manager	Team member	
Questionnaires sent out	191	45	169	198	603
Questionnaires received	117	37	108	113	375
Response rate	61%	82%	64%	57%	62%
Average No of questionnaires per organization	4,03	1,28	3,72	3,90	12,93

The organizations that took part came from a wide variety of industry sectors. The majority of organizations were civil engineering consultancy businesses (28%). Other organizations that took part were from the defence industry (17%); the government sector (14%); the industrial engineering and manufacturing sector (14%); the finance and insurance industry (10%). The rest of the participants (17%) came from the mining, national parastatal and telecommunications and IT industries.
The majority of organizations (55%) had more than 10 years experience in project management. Only 24% had been in project management for less than 5 years.

Results

Statistical analyses

The research examined the proposition that the defined construct of organizational culture would show a systematic relationship with the effectiveness of project management.
It was thus firstly hypothesized that the culture construct as an aggregate measure would show a significant positive correlation with the aggregate score of project management effectiveness. Secondly, it was hypothesized that each dimension of the culture construct would positively correlate with the aggregate score on project management effectiveness.

Before the final results were evaluated, the reliability of the instruments was checked. Cronbach alpha tests were done to check the items of all the dimensions of the two constructs. These tests were done by using the aggregate item scores per organization (n=29).

The table below shows the internal reliability of the project management effectiveness scale.

Table 4: Reliability coefficients of the project management effectiveness survey scales

Dim	Description	Cronbach alpha (n=29)
1	Supportive organization	0,84
2	Rational project decision-making	0,85
3	Effective tools and systems	0,90
4	Effective procedures and disciplines	0,86
5	Effective project leadership	0,81
6	Effective project communication	0,85
7	Resources adequacy and competency	0,79
8	Customer integrated in process	0,78
9	Meeting project management operational objectives	0,93
10	Organization's strategic considerations	0,88
11	Project management integration	0,83

To further examine the instrument as a reasonable measure of project management effectiveness, it was argued that it should, within itself, behave consistently with theoretical expectations. It was therefore expected that the leading indicator dimensions (1 to 8) would correlate significantly with the operational outcomes dimension (dimension 9). The Spearman rank order correlation test was done to test this assumption. The test showed a relatively strong correlation (r = 0,81), statistically significant at below the

1% level (p <0.01), and provided further evidence for trusting the validity of the scale as the dependent variable. Spearman rank order correlation tests were performed to test the relationships between organizational culture and project management effectiveness, and between each dimension of organizational culture and project management effectiveness. The results, as well as the corresponding reliability coefficients, are shown in Table 5.

Based on these results, all null hypotheses, which would imply no relationships between the tested variables, should be rejected at the 5% significance level or better. The findings, thus offer reasonably good evidence that organizational culture has a significant relationship with the effectiveness of project management in an organization.

In particular, one should point out the relatively strong correlations, as well as the p-values of below 0.01, found in respect of the dimensions examining cross-functional integration, communication philosophy, and people management style.

What adds to the credibility of the results is the fact that the two main constructs were measured independently from each other, as previously explained. Organizational culture was measured external to the people regularly involved in project management. This research strategy was followed to avoid the possibility of retrospective bias (March & Sutton, 1997: 701). Such bias could be induced, in a case like this, if project participants were to perceive the organization's culture as more negative purely because of negative experiences with project management, or *vice versa*. Therefore, if project participants had to complete the organizational culture questionnaire, these ratings could have been pulled towards the project management effectiveness ratings, which would have artificially increased the correlation between the two sets of data.

Based on these results the influence of organizational culture on project management can certainly not be ignored. Furthermore, the dimensions that were tested have gathered reasonably strong empirical evidence that they represent the core dimensions of a project management supportive organizational culture.

One must be cautious, however. The causal direction of this relationship, although it is theoretically argued that organizational culture influences project management effectiveness, cannot be deducted from the results of this survey. The findings only confirm a relationship, not the direction.

Visual presentation of the results

A visual presentation of the results provides further insight into the relationships between the constructs and the profiles underlying each construct.

Project management effectiveness. Figure 1 illustrates how the sample of organizations scored on the project management effectiveness scale. The top three and bottom three organizations are those that scored the highest and lowest based on the aggregate score on all dimensions of the project management effectiveness scale. The solid black line represents the average project management effectiveness profile of the top three organizations, the broken line represents the average profile of the bottom three organizations, and the solid shaded line in the centre shows the overall average profile of the sample.

Table 5: Results showing the relationship between organizational culture and project management effectiveness

No	Organizational Culture	Cronbach alpha (n=29)	Correlation coefficient (r)	p	
	Aggregate culture score		0,53	< 0,01	* * *
Dim 1	Organizational direction	0,90	0,42	0,02	* *
Dim 2	Competitiveness orientation	0,93	0,45	0,01	* *
Dim 3	Decision-making rationale	0,79	0,51	0,01	* *
Dim 4	Cross-functional integration	0,88	0,52	< 0,01	* * *
Dim 5	Communication philosophy	0,93	0,54	< 0,01	* * *
Dim 6	Locus of decision-making	0,84	0,42	0,02	* *
Dim 7	People management style	0,92	0,57	< 0,01	* * *
Dim 8	Flexibility	0,85	0,43	0,02	* *
Dim 9	Philosophy about people	0,91	0,37	0,05	*
Dim 10	Personal competency	0,88	0,45	0,01	* *
Dim 11	Process and systems support	0,88	0,47	0,01	* *
Dim 12	Performance management	0,92	0,50	0,01	* *

* * * Significant at better than 1%
* * Significant at better than 5%
* Significant at 5%

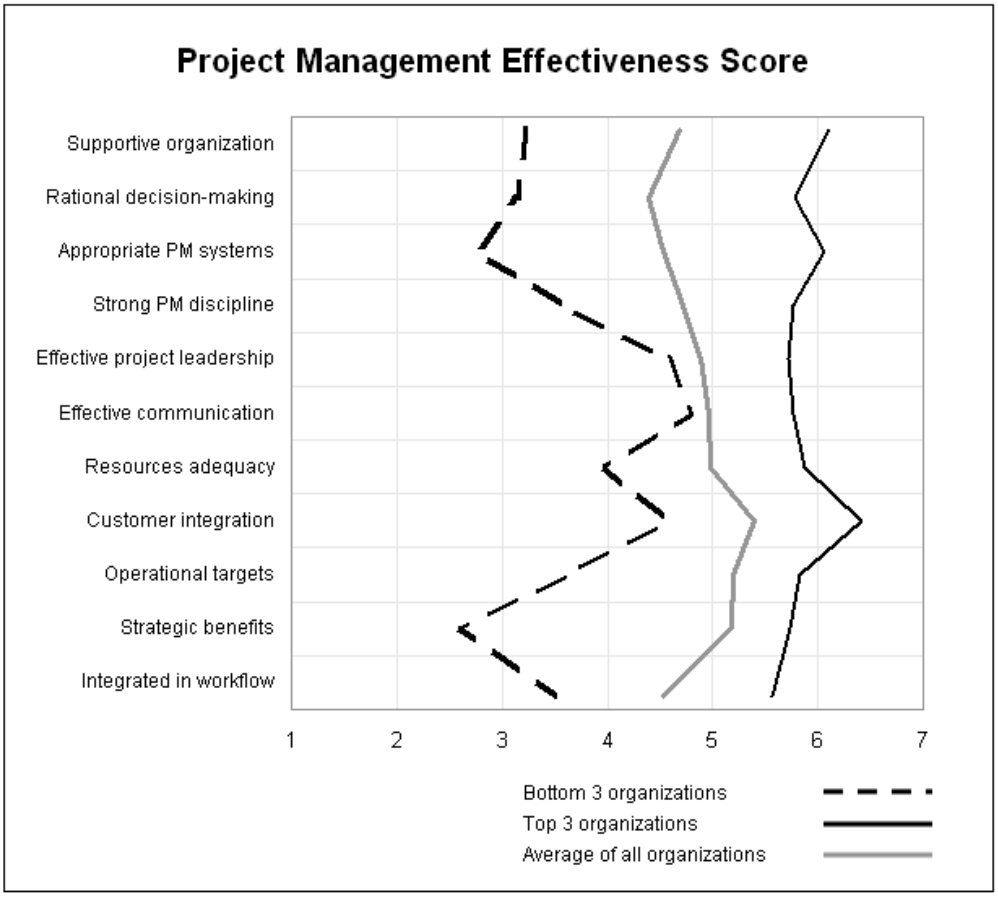

Figure 1: Average scores on project management effectiveness

This graph reveals some interesting patterns. Given the constraints of the small sample size, is not possible to make anything more than speculative conclusions about these patterns, but they nevertheless offer future researchers useful questions to explore.

The first three dimensions represent what the organization provides to project management, namely: the degree of basic support; the degree of reality in project decisions and objective-setting; and the suitability of project management systems. In the profile of the bottom three organizations these dimensions measure very low. These low scores are repeated in the operational target indicator score and on the satisfaction with project management over the longer term. The in-between dimensions, having to do with the quality of project leadership, communication in the team, and customer involvement, did not receive such low ratings. They were in fact much closer to the sample averages on those dimensions.

Thus, in the weak organizations, the problems with meeting delivery targets appear to flow more from the interface between the organization and project management than from how the project management process is conducted once the team is put together. These organizations, understandably, are also the least satisfied with the strategic benefits they gain from project management and with how project management is integrated into the general workflow.

Organizational culture. The next graph (Figure 2) refers to the same bottom three and top three organizations (based on their project management effectiveness scores), but now shows their average organizational culture profiles. The same line codes are used as in the previous illustration. This graph visually illustrates what the correlation coefficients in Table 5 imply, namely the relationship between the profiles of organizational culture and project management effectiveness.

The fairly large and consistent gap between the organizational culture profiles of organizations that are effective and those that are not effective in project management comes out rather clear.

The raggedness of the profiles – all three profiles follow a similar pattern of higher and lower scores across the dimensions – should raise questions about the presence of either systematic measurement errors or of other systematic influences. More research is necessary to investigate this matter. There could be several reasons why this irregular pattern is observed, including the following: the comparative sensitivity of measurement between different dimensions, the relatively small sample size (a characteristic mainly of the sample); the particular type of organization surveyed (typical of matrix project management organizations), or the fact that all organizations are South African (typical of South African organizations). Further research with larger samples could reveal whether this pattern maintains its shape or flattens out more.

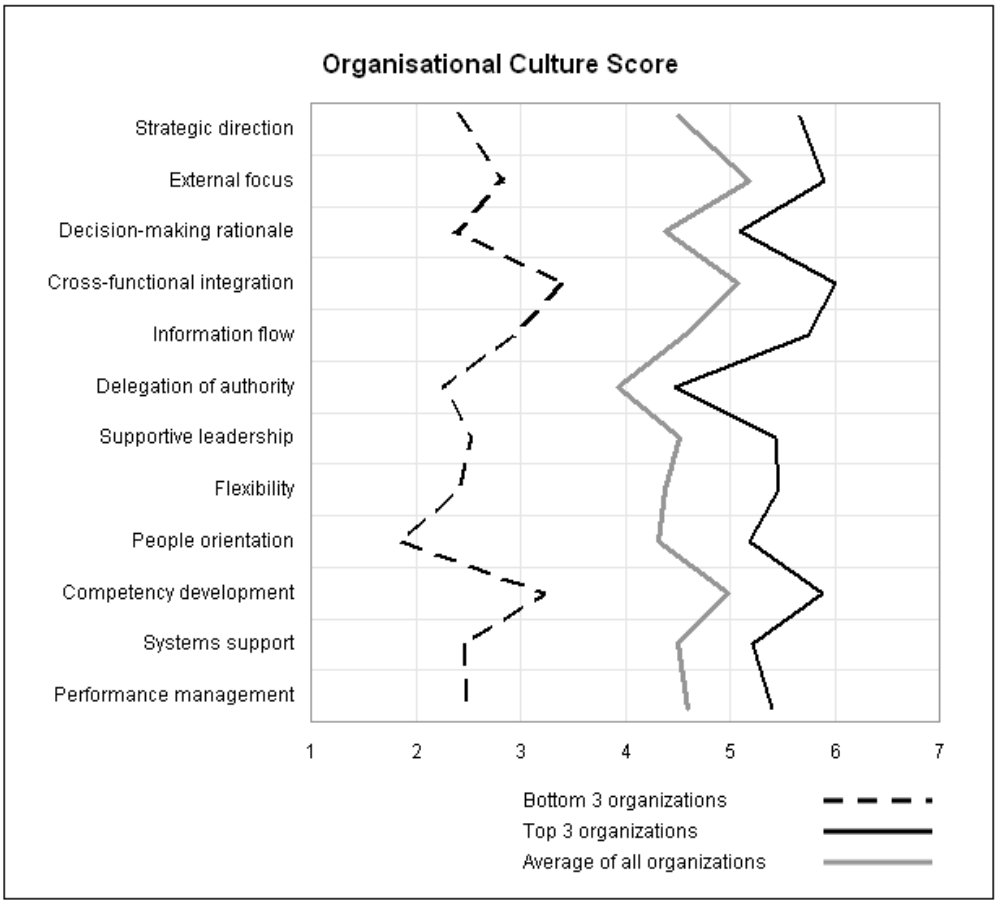

Figure 2: Scores on the organizational culture dimensions

Limitations and areas for further research

The findings must be viewed against the limitations of the research. Firstly, the limited sample size of organizations as pointed out in the previous section makes generalization of the findings premature.

Secondly, questions could be raised about how representative the sample is. The specialist nature of the target organization made it difficult to follow a truly random sampling approach. This limitation, together with the sample size and the geographical demarcation (only South African organizations), must be taken into account when judging whether the research is representative of a wider, especially global, population. Yet, the fact that both constructs had been developed from a wide body of international research, certainly suggests that the potential of wider extrapolation of the findings cannot be excluded. It is, however, recommended that studies of this nature be repeated with larger and more globally representative samples before making such inferences.

Lastly, there is the matter of construct validity. Although the internal consistency of all the constructs was verified (Cronbach alphas), it was not possible, with the sample size, to check construct validity comprehensively – especially not convergent and discriminant validity (Venkatraman & Grant, 1986:77-78), nor the uni-dimensionality of the factors. Tests of this nature require much larger samples (Kerlinger, 1986:593). However, because of the theoretically-grounded ways both constructs had been developed (Morrison & Brown, 2004; Morrison, *et al*., 2006), a fair argument can be made out for content validity. Similarly, the way correlations manifested as theoretically expected suggests some degree of nomological validity (Venkatraman & Grant, 1986:77-78). Therefore, progress has been made towards establishing construct validity, but there are still unresolved questions in this regard.

Although the research has particular shortcomings, the findings substantially strengthen the hypothesis that organizational culture can be supportive, or non-supportive of project management.

Follow-up research is strongly recommended to address the present limitations. Research with larger samples is needed to address both the matters of generalizability and construct validity. Confirmatory factor analysis techniques should be used to examine the constructs more carefully. The combined structure of the two constructs, especially the way the project management effectiveness construct is composed of stages of leading and outcome indicators, offers researchers a constructive foundation for applying structured equation modelling techniques.

Conclusion

What this study reveals is that training in project management and a set of systems and techniques may not be enough. If the culture of the organization is too bureaucratic,

hierarchical, and internally-focused, for instance, project management will hardly produce the results organizations hope for. To this end, the research accomplished to consolidate a set of diverse behavioural themes into a systematic model of organizational culture that could profile an organizations' supportiveness of project management.

Researchers are encouraged to further explore the organizational development (OD) component of project management. This study – in line with several preceding studies which focused more on single behavioural issues – has added strong evidence to the notion that project management is not simply a set of tools that can be utilized to solve a particular type of work. It is a different management philosophy that the whole organization must be aware of, and be comfortable with.

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