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Top management involvement in project management

Exclusive support practices for different project scenarios

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Abstract

Purpose – As top management support is considered one of the critical success factors in project management, effective executive involvement can significantly improve project success. However, the literature does not provide organizations with a clear list of effective top management support practices to achieve this type of support. Hence, the purpose of this paper is to highlight the top management support processes, which highly contribute to project success.

Design/methodology/approach – As it is expected that results vary among different project scenarios, data were collected from 700 project managers and their supervisors in seven industries and three countries – Japan, Israel, and New Zealand.

Findings – Results reassure that top management support is significantly correlated with project success. Results also show that different top management support processes should be implemented in any industry and culture.

Originality/value – The paper introduces and discusses a detailed list of critical top management support processes for each industry and country, and concludes with introducing best practices to support these processes.

Keywords Project management, Critical success factors, Senior management, Decision support systems

Paper type Research paper

Introduction

Most projects fail (Luna-Reyes *et al.*, 2005; Johnson *et al.*, 2001). As a result, many studies have identified critical success factors (CSFs), which managers should focus on (Pinto and Slevin, 1987; Cooper and Kleinschmidt, 1995; Turner, 1999; Lester, 1998; Johnson *et al.*, 2001; Abdel-Hamid *et al.*, 1999). The most cited CSF in the project management literature is "top management support" (Fortune and White, 2006).

The high importance of top management support in project management should encourage senior managers to actively engage with projects. For example, Kerzner (2006) suggests that top management should take action on request, assist in conflict resolution, and provide continuous feedback. However, "top management support" is not a specific enough factor to provide senior managers with information of HOW to better support projects, as the literature does not provide a list of agreed top management support practices that can be implemented in organizations.

As a result, this paper suggests the use of a more detailed approach, which identifies critical success processes (CSPs) for top management support in project management. This approach supports managers with a short list of critical processes and best

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practices that most contribute to effective top management support, and hence to project success. Focusing on the managerial processes included in such a list, can help senior managers in investing their limited time and budget more effectively.

Top management support

Top management support is critical for project success (Fortune and White, 2006). For example, it has been found that the majority of senior executives perceive that organisational issues are more important for organizational success than technical issues (Doherty and King, 2001; Luna-Reyes *et al.*, 2005; Doherty and King, 1998). Top management support has become even more important in projects with the introduction of organizational maturity models, such as capability maturity model, capability maturity model integrated, and OPM3 – organizational project management maturity model (Paulk *et al.*, 1995; Project Management Institute – PMI Standards Committee, 2003). These models describe a framework used for evaluating the maturity level of an organization in supporting and managing projects (Paulk *et al.*, 1995). Improving the maturity of an organization was found to be highly correlated with project success (Harter *et al.*, 2000).

Although the vast literature and the high importance of this area, the literature does not provide project managers and executives, a detailed top management support process list. This paper identifies a list of specific top management support processes, which most contribute to project success in different industries and cultures. These processes may support senior managers with limited time and resources in decision making, by choosing to focus on the most important processes.

However, it is not expected to find one list of top management support processes that will be applicable to all projects (Dvir *et al.*, 2006). Hence, the objective of this paper is to identify CSPs for top management support in different project scenarios, e.g. in different industries and national cultures. These CSPs will be called in this paper "critical success top management support processes." The paper starts with the presentation of the relevant literature in the area, raises hypotheses to test, describes the research configuration, analyzes data, and makes specific practical recommendations. As the paper aims at providing recommendations to projects in different industries and cultures, the literature in these areas will be analyzed first.

Project management in different industries

Different industries face different challenges while managing projects. For example, software development organizations have to deal with high-technology uncertainty, while construction organizations are usually more troubled with engineering and financial problems. The literature found that industry type has great influence on project management, greater even than project type (Zwikael and Globerson, 2004). For example, a software development project that is executed in a bureaucratic government agency has more management processes in common with other government projects, than with management processes in a private sector software project.

As a result, managers from different industries focus on other project management processes, and complete projects with a different level of project success, as is demonstrated in the following paragraph. Engineering and construction organizations have been found to have high-maturity levels and capabilities of performing project processes (Pennypacker and Grant, 2003; Ibbs and Kwak, 2000). The main reasons for these results are leadership,

information sharing, and degree of authorization (Cooke-Davies and Arzymanow, 2002). High-tech manufacturing and telecommunications organizations also score high in project management capabilities (Pennypacker and Grant, 2003; Ibbs and Kwak, 2000). Telecommunication organizations especially excel in managing multi projects (Cooke-Davies and Arzymanow, 2002). The findings regarding the information systems industry are ambivalent. In some studies, organizations belonging to that industry score the lowest (Pennypacker and Grant, 2003); while in others, they achieved high-project management performances (Ibbs and Kwak, 2000).

Because of these differences among industries, the first hypothesis claims that top management support processes have different impact on project success. As a result, senior managers should focus on top management support processes that better work in their industry. The first hypothesis is phrased as follows:

H_1 Senior managers from various industries should support project managers in different ways.

H_0 Senior managers from various industries should support project managers in the same way.

Cultural diversity

Culture influences project management, top management support, and even project success. Culture may vary within the organization (e.g. for operator, engineering, and executive culture, see Schein (1996)), among organizations (e.g. for organizational culture, see McShane and Travaglione (2005)), among industries (see previous section), or among nations. This section focuses on the national culture.

Project managers in different countries run projects of similar nature, but in different ways. Differences may derive from cultural distinctions, as well as unequal importance given by project managers and their customers to the various success measures of the project. Since many projects have international stakeholders, it becomes very important to identify cultural differences, which may have to be bridged when executing such projects.

The national culture is defined as a collective phenomenon, because it is at least partly shared with people who live or lived within the same social environment where it was learned (Hofstede, 2001). Mismanaging cultural differences can render otherwise successful managers and organizations ineffective and frustrated when working across cultures. When successfully managed, however, differences in culture can lead to innovative business practices, faster and better learning within the organization, and sustainable sources of competitive advantage (Hoecklin, 1996).

The task of comparing organizational performance in different countries attracts a lot of attention, as can be traced in the management literature. For example, Toren *et al.* (1997) compared managerial task preferences and evaluation of work characteristics in the USA, Japan, Israel, Italy, and Australia. Nijkamp *et al.* (2001) compared environmental quality in 12 European countries. Jackson and Artola (1997) initiated a cross-cultural empirical study, which examines ethical beliefs and behaviors among French and German managers, and compared results with previous studies of American and Israeli managers. Igbaria and Zviran (1996) examined the effect of national environments on end-user computing characteristics in American, Israeli, and Taiwanese companies. Koschatzky *et al.* (1996) compared sensor technology processes in the USA, Europe, and Japan.

Cultural differences have been found in all these studies, indicating different behavior and decision making patterns in different countries.

The largest cultural diversity study has been conducted by Hofstede (2001), who surveyed 100,000 IBM employees from 50 countries. His study includes five cultural dimensions: power distance, individualism vs collectivism, uncertainty avoidance, masculinity vs femininity, and long-term vs short-term orientation. However, global leadership and organizational behavior effectiveness (GLOBE) is the most updated study (House *et al.*, 2002, 2004). The GLOBE study involved 18,000 middle managers from 62 countries. This model includes the following nine dimensions: future orientation, power distance, uncertainty avoidance, in group collectivism, gender egalitarianism, performance orientation, humane orientation, institutional collectivism, and assertiveness. As all these studies find significant differences in behavior among people from other nations, it is also expected to find differences in the top management support processes that senior managers from different countries decide to adapt. As a result, the second hypothesis claims that different critical top management support exist in each country, as follows:

H_2 Senior managers from various countries should support project managers in different ways.

H_0 Senior managers from various countries should support project managers in the same way.

This paper does not only test the hypotheses, but also identifies the specific critical top management support processes in each industry and culture.

Research configuration

This section examines the influence of project top management support processes on project success in different industries and countries. In order to test the research hypotheses, a model has been designed. In this research, a CSP is defined as a top management support process which is found to be more common in successful projects, as compared to unsuccessful ones. In other words, project managers who invest more effort in these CSP will succeed more in their projects.

The dependent variable, "project success," is traditionally measured using the "golden" or the "iron" triangle, i.e. that the project be completed in time, within budget, and to specification (PMI Standards Committee, 2004; Bryde, 2005). This is the operational mindset, which is influenced by the "get the job done" approach (Dvir *et al.*, 2006). However, several studies support the inclusion of customer satisfaction as a fourth dimension of success (Lipovetsky *et al.*, 1997; Lim and Mohamed, 1999; Zwikael and Globerson, 2006; Kerzner, 2006; Voetsch, 2004; Bryde, 2005). Consequently, four project success variables were used as the dependent variables of this research:

(1) Schedule overrun – answers the question "did we deliver the committed outputs within the agreed timeframe?"

(2) Cost overrun – answers the question "did we produce the committed outputs within the agreed budget?"

(3) Project performance – answers the question "did we deliver all committed outputs and did those outputs meet agreed quality standards?"

(4) Customer satisfaction – answers the question "did the project customer achieve all the targeted outcomes?"

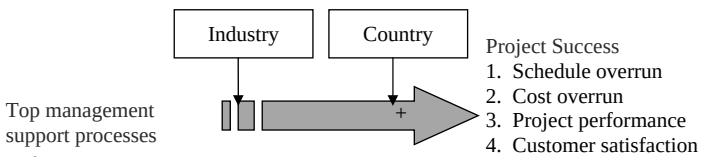
The independent variable is top management support. Relevant top management support processes have been identified from dozens of maturity models (Paulk *et al.*, 1995; Zwikael and Globerson, 2004; PMI Standards Committee, 2003). Analysis of these maturity models ended with over 100 project management processes identified. Other support processes have been identified from the Project Management Body of Knowledge (PMI Standards Committee, 2004), e.g. establishing a Project Management Office (PMO). Canceling out overlapping processes among all models reduced the number of top management support processes to 17, which are shown in Figure 1, alphabetically sorted.

Finally, industry and country are also included in the model, as variables which potentially influence the relationship between top management support and project success. The research model is shown in Figure 1.

This research framework includes several limitations that have to be stated. The study focuses on only one CSF (top management support), hence recommendations may relate to only a narrow area in project management. Further research may use the same research approach to identify CSPs in other related areas. A delimitation of this study is with the limited number of industries and countries in this study. As a result, recommendations deriving from this study are relevant only to the scenarios investigated and generalization of results may be immature, before more studies are taken in different project scenarios.

Data collection

Based on the research model, a questionnaire was developed, and distributed to project managers from three countries (Japan, Israel, and New Zealand), and seven industries (engineering, software, production, construction, communications, services, and government) during the years 2002-2007. In the questionnaires, project managers have



1. Appropriate project manager assignment
2 .Communication between the project manager and the organization
3. Existence of interactive inter-departmental project groups
4. Existence of project procedures
5. Existence of project success measures
6. Extent of use of standard project management software
7. Involvement of the project manager during initiation stage
8. On going project management training programs
9. Organizational projects quality management
10. Organizational projects resource planning
11. Organizational projects risk management
12. Project office involvement
13. Project-based organization
14. Refreshing project procedures
15. Supportive project organizational structure
16. Use of new project tools and techniques
17. Use of organizational projects data warehouse

Figure 1.
The research model

been asked to estimate the frequency of use of top management support processes in their organization, using a 1-5 Likert scale (where 1 indicates very low and 5 indicates very high). In order for the project managers to make accurate estimates, a full explanation about each top management support process was introduced to all project managers participated in this research. While the independent variables have been collected from project managers, the dependent variables have been collected from their supervisors to avoid "same source bias". Hence, project success results have been reported by the supervisors of the project managers using the following four project success dimensions:

(1) Schedule overrun was measured in percentages from the original plan.

(2) Cost overrun was measured in percentages from the original plan.

(3) Project performance was measured on a scale of 1 to 10, with "1" representing low performance, and "10" representing high performance.

(4) Customer satisfaction was measured on a scale of one to ten, with "1" representing low-customer satisfaction, and "10" representing high-customer satisfaction.

Initial data collection involved project managers who are members in the PMI, which has supported this study in each of these countries. Yet, recognizing the danger of a "convenience sample" as a sole source, the other half of questionnaires have been collected from organizations selected and personally visited by the research team. The two groups were compared to make sure that they both lead to similar conclusions. A questionnaire was included in the final data analysis, only if at least 80 percent of the questions are answered. According to this criterion, 10 percent of the questionnaires have not been used in this study due to lack of data. As a result, the number of valid questionnaires in this study is 700. Table I presents the distribution of these questionnaires according to industries and countries.

An analysis of data that appears in Table I shows that there is a good representation of all seven industries included in the study with more than 50 responses from each industry (except construction). In addition, the number of responses from projects in Japan, Israel, and New Zealand is also satisfactory and allows a detailed analysis of project management in these countries.

Reliability and validity

The reliability of the model has been measured using Cronbach's α. Results are considerably higher (0.91) than the minimum value required by the statistical literature

	Country			
Industry	Japan	Israel	New Zealand	Total
Engineering	1	44	45	90
Software	78	95	44	217
Production	33	15	15	63
Construction	0	5	15	20
Communications	1	37	59	97
Services	10	10	31	51
Government	2	69	91	162
Total number	125	275	300	700

Table I.
Distribution of projects included in the study by industries and countries

(Garmezy *et al.*, 1967). The validity of the model has been evaluated by measuring the impact of the 17 top management support processes (independent variables) on each project success measure (dependent variable), using four multiple linear regressions. A summary of these analyses is presented in Table II.

Table II shows that top management support processes impact on each of the four project success measures. All results are statistically significant with significance levels under 0.001. These results reassure the findings from the literature that top management support processes positively improve project success (Fortune and White, 2006; Lester, 1998; Whittaker, 1999; Johnson *et al.*, 2001). The next section includes hypotheses testing and discussion.

Results and discussion

Once confirmed that top management support has a positive influence on project success, this section identifies which top management support processes have particular impact on project success in different industries and countries:

H1. Critical success top management support processes in different industries.

This section identifies those top management support processes, which higher frequency of their execution improves project success in different industries. In order to examine this hypothesis, the impact of all 17 top management support processes on project success was analyzed. All 700 projects were divided into "successful" and "unsuccessful" projects. A successful project was identified as one that scored the highest possible result in at least one of the four success dimensions, i.e. a project with no schedule overrun, no cost overrun, maximum level of project performance (ten out of ten), or with maximum level of customer satisfaction (ten out of ten). As the correlation among success measures is usually high (Müller and Turner, 2007; Zwikael, 2006), an excellent result in one success measure comes together with good results in other success measures as well. For example, if a project is completed in time, but with low-quality level, the funder will insist that more re-work should be done before the acceptance of the project's outputs. Such a decision improves the quality of the project, but at the same time, increases project duration. As a result, both measures will be in a moderate level.

Based on this criterion, Table III introduces the number of successful and unsuccessful projects in each industry type. Table III also presents the average top management support effort for each industry, calculated as the average frequency of use of all 17 top management processes.

As can be seen in Table III, only 240 successful projects have been found in the study sample, as compared to 460 unsuccessful projects. According to the right column of this table, projects executed in the engineering and construction industries receive

Project success measure	R^2	F-value	Significance level
Schedule overrun	0.11	4.95	$< 0.001^{**}$
Cost overrun	0.09	3.95	$< 0.001^{**}$
Project performance	0.27	15.07	$< 0.001^{**}$
Customer satisfaction	0.23	12.00	$< 0.001^{**}$

Notes: $^{*}p < 0.05$; $^{**}p < 0.01$

Table II.
A validity test for the model

the highest support from the organization, while projects managed in production organizations receive the poorest support. These differences among industries were found to be significant ($p < 0.01$), hence results from previous studies have been reconfirmed (Pennypacker and Grant, 2003; Ibbs and Kwak, 2000).

In order to identify critical success top management support processes for each industry, the average effort invested in each top management support process in all successful projects was calculated (on the 1-10 scale). This value is presented in the third column of Table IV, and was compared with the average effort in unsuccessful projects (presented in the fourth column). Then, ANOVA was conducted and the significance level of the difference in means between successful and unsuccessful projects was calculated for each top management support process using an *F*-test. Table IV presents only the significant cases of top management support processes that have been performed more frequently in successful projects, with comparison to unsuccessful projects. In these significant cases, the name of the relevant industry, the average frequency of use in successful projects, the average frequency of use in unsuccessful projects, and the significance level of the difference are introduced.

According to Table IV, different top management support processes have significant impact on project success in each industry. There is no one top management support process that was found to make a difference between successful and unsuccessful projects in all industries. These results allow us rejecting the first null hypothesis, meaning that exclusive CSPs can be identified for projects in different industries.

A total of 12 top management support processes were found to be critical factors in only one industry each. However, some top management support processes are executed significantly more frequently in successful projects only in some industries. For example, supportive project organizational structure is a critical success top management support process in three industries – engineering, production, and government:

H2. Critical success top management support processes in different countries.

This section identifies critical top management support processes in the three countries that participated in the study – Israel, Japan, and New Zealand. This section uses the same successful/unsuccessful project grouping described earlier. Table V presents the distribution of these projects, and the average top management support effort in these three countries.

An interesting result in Table V refers to the Japanese culture. The relative high percentage of successful projects is not because of effective top management support,

Industry	Number of successful projects	Number of unsuccessful projects	Average top management support effort
Engineering	27	63	3.55
Construction	9	11	3.52
Communications	29	68	3.30
Services	22	29	3.30
Software	82	135	3.29
Government	42	120	3.10
Production	29	34	2.90
Total	240	460	

Table III.
Successful and unsuccessful projects in different industries

Top management support process	Industry	Average frequency of use of top management support processes in... Successful project	Unsuccessful project	Significance value
Project-based organization	Software	4.18	3.83	0.017*
Existence of project procedures	Production	3.76	2.97	0.017*
Appropriate project manager assignment	Production	3.52	2.91	0.025*
Refreshing project procedures	Engineering	4.03	3.02	0.000**
	Production	3.10	2.41	0.019*
Involvement of the project manager during initiation stage	Construction	4.27	3.42	0.025*
Communication between the project manager and the organization	–	–	–	–
Existence of project success measures	Engineering	4.31	3.83	0.039*
	Production	3.97	3.18	0.003**
Supportive project organizational structure	Engineering	4.14	3.38	0.001**
	Production	3.24	2.32	0.001**
	Government	3.58	3.14	0.037*
Existence of interactive inter-departmental project groups	Engineering	3.86	3.30	0.012*
Organizational project resource planning	Software	3.48	3.03	0.006**
Organizational project risk management	Production	2.93	2.38	0.038*
Organizational project quality management	Software	3.23	2.88	0.032*
On going project management training programs	Engineering	3.25	2.26	0.001**
PMO involvement	Engineering	4.10	2.38	0.000**
Use of standard project management software	Engineering	4.54	3.24	0.000**
Use of organizational projects data warehouse	Engineering	3.24	2.38	0.008**
	Production	3.07	2.24	0.012*
Use of new project tools and techniques	Engineering	3.62	2.23	0.000**

Notes: *$p < 0.05$; **$p < 0.01$; frequency of use scale: 1 – very low, 5 – very high

Table IV.
Critical success top management support processes in different industries

but due to other reasons, such as individual effort and hard work. The poor top management support in Japan can be explained using the GLOBE study (House *et al.*, 2004), as Japan has a relative high-power distance between employees and senior managers in organizations.

Table VI presents the critical top management support processes that have been performed more frequently in successful projects, in comparison to unsuccessful projects, in each of these three countries. Only significant cases are presented in the table: for each case, the name of the relevant country, the average frequency in successful projects, the average frequency in unsuccessful projects, and the significance level of the difference are introduced.

According to Table VI, the frequency of use of 14 top management support process is significantly higher in successful projects, than in unsuccessful projects. These 14 processes are critical in one or more countries, meaning they make the difference between successful and unsuccessful projects. From these 14 critical top management support processes, three processes are executed more frequently in all three countries. These processes are supportive organizational structure, organizational project quality management, and the use of new project tools and techniques. In addition, unique critical top management support processes can be identified for each country.

In New Zealand, six top management support processes are executed more frequently in successful projects. These CSPs in New Zealand include:

(1) supportive project organizational structure;

(2) inter-departmental project groups;

(3) organizational project quality management;

(4) PMO involvement;

(5) use of project management software; and

(6) use of new project tools and techniques.

In Japan, the update of project management procedures has been found to be a CSP. This finding is in line with the Japanese need for a clear line of command, with formal communication, which is a major attribute of the Japanese culture (Zwikael *et al.*, 2005). Organizational project quality management, which also reflects the Japanese tradition of high-quality achievement, has also been found to be a CSP in Japan. As a result, it is important that senior managers in Japan make sure that project management procedures regularly updated, especially those related to quality management. Another CSP in Japan is project management training programs. The high importance of this process is probably because of the fact that most project managers have a strong technical background. Therefore, senior level management in Japan should initiate training programs, which include both general managerial skills, and project specific managerial skills to new project managers.

In Israel, the existence of project success measurement system has been found to be a CSP. This reflects the Israeli desire to leave some room for on going negotiation, so objectives can be changed throughout the project (Zwikael *et al.*, 2005). These results however, suggest that project objectives should be clearly stated at the beginning of a project.

In this section, exclusive top management support CSPs have been found in different countries. For each country, some top management support processes have higher impact on project success than others do. These results allow us to reject the

Table V.
Successful and unsuccessful projects in different countries

Country	Number of successful projects	Number of unsuccessful projects	Average top management support effort
Israel	60	215	3.35
Japan	81	44	3.01
New Zealand	107	193	3.23
Total	248	452	700

Top management support process	Country	Average frequency of use of top management support processes in... Successful project	Unsuccessful project	Significance value
Project-based organization	Israel	3.90	3.51	0.023*
	Japan	3.84	3.30	0.012*
Existence of project procedures	Israel	4.08	3.65	0.012*
Appropriate project manager assignment	Israel	4.03	3.49	0.000**
	Japan	3.09	2.61	0.011*
Refreshing project procedures	Japan	3.67	3.30	0.050*
Involvement of the project manager during initiation stage	–	–	–	–
Communication between the project manager and the organization	–	–	–	–
Existence of project success measures	Israel	3.58	3.18	0.015*
Supportive project organizational structure	Israel	3.73	3.35	0.028*
	Japan	3.14	2.52	0.001**
	NZ	3.74	3.36	0.002**
Existence of interactive inter-departmental project groups	NZ	3.34	2.89	0.001**
Organizational project resource planning	Israel	3.43	2.95	0.005**
	Japan	3.26	2.50	0.000**
Organizational project risk management	Israel	3.23	2.71	0.002**
Organizational project quality management	Israel	3.37	2.91	0.005**
	Japan	2.95	2.36	0.006**
On going project management training programs	Japan	2.88	2.39	0.006**
PMO involvement	Israel	3.15	2.63	0.020*
	NZ	3.48	2.70	0.000**
Use of standard project management software	Israel	4.53	4.05	0.008*
	Japan	2.85	2.34	0.014*
	NZ	3.99	3.59	0.024*
Use of organizational projects data warehouse	–	–	–	–
Use of new project tools and techniques	NZ	2.64	2.34	0.032*

Notes: *$p < 0.05$; **$p < 0.01$; frequency of use scale: 1 – very low, 5 – very high

Table VI.
Critical success top management support processes in different countries

second null hypothesis, meaning that unique CSPs can be identified for projects in different countries. One managerial conclusion deriving from these findings is that more effort and budget should be spent only on these CSPs. As a result, performing these processes with higher frequency may improve project success.

As expected, this analysis shows that the cultural differences among nations, also impact the way senior managers behave in organizations while supporting projects.

Conclusion

Organizations spend much effort and resources in supporting projects in different ways. However, they are not always aware to the different effect various supporting processes have on project success. As a result, they sometimes pay similar attention to effective support processes, as to support processes that have low impact on project success. In this paper, different critical top management support processes have been

found for different industries and countries. These processes are called CSPs. The results of this study confirm that unique CSPs exist in different industries and cultures. As a result, one should tailor the type of project involvement to the industry and culture involved in the project, instead of implementing generic best practices.

The results from this study are now linked back and can be explained using the GLOBE study (House *et al.*, 2004), which is the cultural diversity theoretical framework of this study:

- *Japan.* According to the GLOBE study, Japanese have the highest future orientation score among the three countries. Since Japanese managers tend to make decisions that support them in the long term, it has been found in this study that investing in project management training is a unique critical success top management support process in Japan.
- *New Zealand.* According to the GLOBE study, New Zealanders have the highest performance orientation score among the three countries. Since New Zealand managers tend to make decisions that support excellence in the organization, it has been found in this study that implementing new project tools and techniques is a unique critical success top management support process in New Zealand.
- *Israel.* According to the GLOBE study, Israelis have the lowest power distance score among the three countries. Since Israeli employees tend to ignore the power distance in the organization, it has been found in this study that defining project success measures by senior managers is a unique critical success top management support process in Israel, in order to overcome this lack of power distance.

The major results of this study, presented in Table VII, include the most critical top management support processes for each industry and country included in this study. A " + " sign in this table represents that this specific top management support process is critical in this industry or country, in a sense that higher frequency of execution of this process is significantly more common in successful projects, as compared to unsuccessful projects.

Table VII presents major differences among industries and countries. These results reassure previous findings in the literature, claiming that different project scenarios require dissimilar treatment (Dvir *et al.*, 2006). Hence, it is suggested that managers in each industry or country first focus on the critical processes. Surprisingly, no critical top management support processes have been found in the communications and the services industries. Moreover, it has been found that developing and updating project management procedures significantly decrease project success in communications organizations. This may be related to the innovative approach required in such organizations, which can be interrupted by formal procedures.

In order to help organizations implement the results of this study, CSPs, which repeat in at least three industries and countries are further discussed. Specific recommendations for top management support best practices (Kerzner, 2006), which are related to these CSPs, are introduced in Table VIII.

Finally, further research should be conducted in other countries, aimed at deeper understanding of the cultural issues related to top management support. The affect of the best practices, recommended in this paper, on project success may also be investigated in future studies.

Table VII. Critical success top management support processes in different industries and countries

Top management support process	Engineering	Software	Production	Construction	Government	Israel	Japan	New Zealand
	Industry or country							
Project-based organization		+				+	+	
Existence of project procedures			+			+		
Appropriate project manager assignment			+			+	+	
Refreshing project procedures	+		+				+	
Involvement of the project manager during initiation stage				+				
Communication between the project manager and the organization								
Existence of project success measures	+		+			+		
Supportive project organizational structure	+		+		+	+	+	+
Existence of interactive inter-departmental project groups	+							+
Organizational project resource planning		+				+	+	
Organizational project risk management			+			+		
Organizational project quality management		+				+	+	
On going project management training programs	+						+	
PMO involvement	+					+		+
Use of standard project management software	+					+	+	+
Use of organizational projects data warehouse	+		+					
Use of new project tools and techniques	+							+

Table VIII. Specific recommendations for top management support practices

Critical top management support processes	Relevant industries and countries	Best practices
Supportive project organizational structure	Engineering Production Government Israel NZ Japan	1. Pure project structure when projects are a significant share of organizational processes 2. Matrix organization in a complex and dynamic environment 3. Carefully define level of power for line managers versus project managers in matrix organizations
Existing of project success measures	Engineering Production Israel	4. Define project success measures 5. Set project targets 6. Stakeholders to approve project targets
Refreshing project procedures	Engineering Production Japan	7. Frequently review project procedures with groups of project managers 8. Frequently update project management procedures
Organizational project quality management	Software Japan Israel	9. Establish a project excellence center 10. Involve the quality assurance department with project management 11. Improve cooperation between these departments and project managers
Standard project management software	Engineering NZ Japan Israel	12. Decide upon a project management software program to use 13. Purchase the software 14. Train project managers on how to use the software 15. Involve the PMO in supporting project managers using the software
Organizational project resource planning	Software Israel Japan	16. Manage project shared resources on the organization or department level 17. Use an intranet based project management software package

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