Project Culture as a Key Project Success Factor: The Perspective of Polish Project Managers

JOANNA MOCZYDŁOWSKA
Engineering Management Department
Bialystok University of Technology
2 Ojca Tarasiuka, 16-001 Kleosin, POLAND

JOANNA SADKOWSKA
University of Gdansk
Management Department
101 Armii Krajowej, 81-824 Sopot, POLAND

Abstract: - Project management has the potential to play a key role in the effective functioning of a company. In spite of the intensive development of project management knowledge and tools, however, the ratio of projects which fail is still very high. For the above reason, interest in research dedicated to project success determinants has been increasing. Although existing empirical studies provide numerous evidence on project key-success factors, rrelatively little research has been devoted to examination of project culture in the context of its impact on the final results of projects. The study's objective entails analysis of how project culture mediates the relationship between project characteristics and project outcome. For this purpose, a questionnaire has been developed, which was distributed among 138 project managers representing Polish enterprises. A theoretical model has been proposed, linking project attributes and project culture to project outcome. The results of the empirical studies indicate that inclusion of project culture, with special attention paid to its openness, significantly contributes to the clarification of the way project attributes affect project outcome.

Key-Words: - project culture, project management, project outcome, project managers, Poland

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1 Introduction

Currently, business owners and managers are confronted with a rapid growth of requirements. The sources of the aforementioned requirements are growing needs and expectations of both internal stakeholders and the external ones 'located' in the environment of those businesses. As a result, in order to fulfill rising expectations and to increase the probability of success managers 'are in a constant process' of looking for solutions which facilitate process of reaching the objectives. One of the potential solutions is the implementation of the concept of project management with the techniques and tools it offers. In this context the literature [1,2] sees project as a unique set of more or less complex and interdependent activities. It is characterized by a unique life cycle, individual product/service/solution, temporary character and determined delivery date

Project management is to a high extent recognized as a solution enabling gaining higher effectiveness by the implementing companies. However, in spite of an intensive development of project management techniques and tools, there is still a high number of projects which fail. For the above reason, a numerous number of studies dedicated to project success determinants have been conducted. In particular the following factors have obtained researchers attention and as a result have been deeply recognized: senior management support [3], risk management [4], effective communication [5], project capabilities [6], past experience [7], the size of a project [7], effective leadership [8], good plan [9], setting realistic objectives [10].

As a result the complete lists of project success factors were prepared and developed [3].

Although past empirical studies have provided numerous evidence on project key-success factors, relatively little research has examined the cultural aspects of projects in terms of its influence on projects' final result. In 2008 Brown [11] has emphasized that organizational culture does have an impact on project performance. The organisational culture, in spite of definitely having and influence on the way project management activities are organized and implemented can not be treated as the only variable explaining project performance and final result. Chow [12] confirmed that organizational culture being too political or too traditional might be responsible for project failure. In similar Dingle [13] emphasized the role of cultural aspects in project management processes, with special attention paid to planning. Another study worth attention is the one by Wei and Miraglia [14] who confirmed an important relationship between organizational culture and particular cultural elements in terms of their influence on the processes of knowledge building and transfer. Another substantial study was that by Fellows and Liu [15] who investigated the cross cultural context of projects. The authors emphasized the role of cultural schemas and the processes of sense making, both individual and those taking place in groups.

While the project management literature acknowledges the significant role of organizational culture in shaping projects success, the less often research has been the one dedicated directly to project culture as a phenomenon present in every project independently of the culture of the 'base organization'. In 2011 Stare [16] for example has found that project organizational culture exerts a strong impact on project performance. In the research performed in Slovenian enterprises the authors confirmed the strong impact that culture factors had on project performance. In similar Marrewijk [17] analysed whether and how project culture developed and changed according to the project life cycle. Wang [18] in his studies for example created a model of project culture. The model comprised dimensions such as professional commitment, project team integration, work flexibility and work performance.

The studies performed by the aforementioned authors are examples of the still relatively rare research solely dedicated to the phenomenon of project culture. In addition, most past studies were conducted in the context of well developed Western European and American economies. This factor is of importance, as the insights from studies which such a profile should not be directly transferred onto the research area of projects in Eastern European economies.

This paper aims at analyzing how project culture mediates the relationship between project characteristics and project final outcome. The authors building on previous research e.g. Stare [16] have proposed a conceptual framework enabling the identification of the type of project culture and measuring its impact on the success of the implemented projects. The contribution of the paper is threefold. First, it contributes to traditional project management literature by developing the research area of project culture. Second, from academic perspective it provides empirical work on how project culture might affect project outcome in terms of its success or failure. Third, by performing the research in the Eastern European economy, it enriches both researchers and practitioners point of view regarding the studied element.

The structure of the paper is as follows. The next section reviews the previous literature in the research areas of project success factors, project cultural aspects and project culture. In section 3, methods, sample, variables and data collection processes were presented. In section 4 results were presented, while section 5 provides a discussion. The paper ends with concluding comments. In similar limitation and implication for further research were indicated.

2 Theoretical Background

Increasingly, top managers are recognizing benefits that project management can bring to their businesses. What is crucial however is the fact that in spite of a rapid advancement in the project management tools and techniques the rate of projects which fail is very high [19]. This refers to all types of projects including large scale projects [20]. From this point of view it is crucial to recognize factors co-responsible for projects success or failure.

2.1 The Determinants of Project Success

As mentioned in the introduction, the determinants of project success and failure have obtained wide attention from both researchers and practitioners. Key project success determinants can be classified in two main groups. The first one can be linked with project management processes, while the second one refers to project stakeholders, both internal and external ones, in terms of their influence on project performance and result.

Fortune and White [21] in their studies compared different projects identifying factors which had a critical influence on their result. The authors confirmed that project success is influenced by a wide spectrum of factors. The following processes were found among others to have a crucial impact: senior management support, communication, effective change, resource and time management, client involvement. The second group of factors was related to the environmental influences and factors related to political stability.

An important finding was made by Andersen [22] who studied the perspectives of project managers. The author found that project managers while managing projects might take different perspectives in projects. Two main perspectives were identified: task perspective and organizational perspective. From the point of view of project success factor the finding by Andersen [22] is of significance as it directs attention to the question whether critical success factors differ based on the perspective taken by a project manager in particular projects.

Due to the fact that project management processes are not run in isolation, more attention has to be paid to project environment as a source of data of information. Mazur et al [23] in their studies emphasized the role of stakeholder relationships. Relationships with internal and external stakeholders were found to play mediating role in building project success. The authors set hypotheses that the quality of relationships that project managers build with both internal and external stakeholders have positive effect on its final result in terms of success.

An interesting finding have been made by Aaltonen [24]. The author has expressed the opinion that active projects search environment for an answer, while passive projects accept any information given to them. This relationship can be broadened onto the field of project teamwork. Active project managers should constantly look for and identify whether project teams encounter any problems that can negatively influence their work and at the same time generate risk for the project.

The crucial role of stakeholders in terms of their influence on project final result has also been confirmed in a number of other studies. Stakeholders were found to have impact on how value is created in risk management processes [25]. In other studies the significance of role of preparing stakeholder analysis in terms of project success was confirmed [26]. Other authors [27] emphasized the role of engaging stakeholders in projects. In similar stakeholder resistance was diagnosed as a critical organizational risk in projects [28].

A landmark study has been then performed by Davis [29]. The main finding highlighted by the author was that different stakeholder groups might have a radically different perception of project success. Davis has emphasized in particular that for many pairs of project stakeholders either very few or even no common success factors have been identified [29]. Lack of agreement on what a success is might appear among the groups of senior management, project core team and project stakeholder groups [29]. Finally such a situation might lead to difficulties regarding preparing one exhaustive list of project key-success factors.

2.1.1 Cultural Aspects in Project Management-The Perspective of Project Success

Although relatively little research has been dedicated to cultural aspects of projects, those authors who performed studies in this area have confirmed the significance of cultural aspects in terms of their influence on both project management processes and project result [3].

In his study Karlsen [30] confirmed, that what a project needs in order to more effectively manage uncertainty issues is a 'supportive culture'. Such type of culture is characterized by: commitment of time and resources, positive attitude openness and respect. Another important elements are: proactive uncertainty management, setting clear responsibility areas and engagement and support of senior management. The results by Karlsen [30] have been to an extent confirmed by Gu et al [31]. The authors studied the effects that organizational culture and environmental pressures might have influence on the performance of IT projects. The results indicated that environmental pressure are an important moderator between organizational culture and project performance. What is important is the fact that organizational culture does have influence on project performance independent of project type. Effects of organizational culture on projects final result have also been confirmed in the study referring to construction projects [32]. The authors found a key relationship between organizational culture and the magnitude of delays.

Andersen et al [33] formulated a research question whether organizational culture of the 'base organization' affects the way of managing projects. The results indicated the importance of the factor of organizational rationality in terms of its influence on project perspective (task or organizational one). The study by the cited authors confirms why the finding made by Ajmal and Koskinen [34] who emphasized

the significance of understanding organizations culture in the context of its impact on successful project management. This issue seems to be very difficult, especially taking into consideration that the fact that organizational culture in majority 'consists of' a number of subculture. Ajmal and Koskinen [34] put it in this way: '(…) organizations can seldom be categorized into one particular type of organizational culture because they typically represent mixtures of several cultural patterns'.

Studying the relationship between cultural patterns in an organization and project management performance the study by Yazici [35] is worth citing. The research performed by this author confirmed that organizational culture is a crucial factor in how the author put it 'dealing with project time, budget and expectations'. Additionally Yazici [35] confirmed that in order to effectively support effective project management, a transfer of the organizational culture towards collaboration, sharing as well as empowerment is necessary.

In summary, the role of organizational culture has been confirmed not only as a factor contributing to project management processes and result but also to the competitiveness of the organization as a whole. The stimulating influence that result oriented organizational culture has on the above is supported by increasing project management maturity [35]. Although the literature started to recognize the significance of organizational culture in terms of its influence on project management, some writers [17, 36] have started to argue that the factor that needs a particular attention is project culture.

2.1.2. Project Culture

Opening the discussion on project culture and its role in both project and organization as a whole, the study by Marrewijk [17] is worth citing as a first one. The author argumented against the approach in which culture has been perceived in an instrumental way with attention paid mainly to: artifacts, practices and values. On the cited author has stressed the importance of seeing project not as 'having a culture' but rather 'as being culture'. This approach is a reflection on the approach towards organizational culture where organization can be seen as "having a culture' or as 'being a culture itself' [37 citing after 17]. In the studies performed, the researcher indicated that project culture might 'transform' according to the particular stages of project life cycle. Analyzing the case of Environ Megaproject the researcher identified two 'project culture transformation episodes' during which main value orientation have changed.

Dvir and Shenhar [38] in their studies confirmed that successful projects are characterized by a revolutionary culture. Project culture is not only needed in order to execute particular projects [39]. It can also spread from one project to the whole organizations [39]. From this perspective it is important to address what in fact is project culture and highlight the way researchers defined the studied phenomenon.

An interesting way of understanding the essence of project culture is the one by Ruuska [40]. Is has been depicted in figure 1.

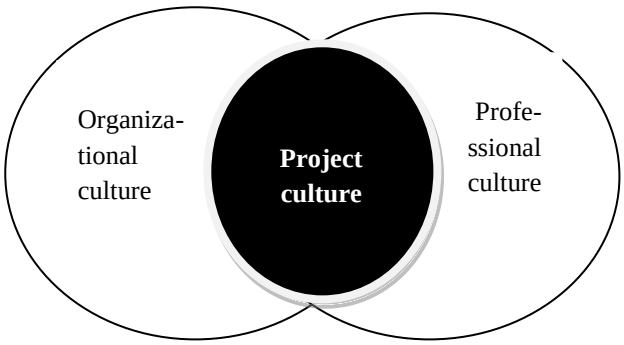

Figure 1 - Project culture as an interplay between organizational culture and professional culture
Source: [40 citing after 34].

Perceiving project culture as a kind of interplay between organizational culture and professional cultures which exist in a company is one of the possible approaches that can be identified in literature. Another one has been proposed by Du Plessis and Hoole [41]. Based on the literature studies, the authors summarized elements that constitute 'project management culture'. At this point it has to be added that literature [41] notes the definition of 'project culture', 'project management culture', 'project climate' and 'project environment'. However as the cited authors note, these expressions are often used in the same context.

Due to the fact that project culture has been found to strongly influence project success [42], it is of significance to identify its 'components'. In one of the studies [41] the following elements have been included: interpersonal relationships, team emphasis, management/stakeholder commitment, interdependence control/discipline, risk orientation, learning, conflict tolerance, results orientation, open system focus, open communication. Following this, the authors based on the results of their studies, compared the elements of project management culture that have been identified in literature with

finding resulting from their study. The elements which have been identified by the cited authors can be grouped in 4 main categories which have been depicted in table 1.

Table 1 – The elements comprising project culture

Project culture	
Area	Elements
People	Interpersonal relationships
	Team emphasis
Processes	Management/stakeholder commitment and support
	Learning
	Open communication
	Project methodology and process
Relationships	Interdependence
	Control/discipline
	Conflict tolerance
Orientation	Results orientation
	Risk orientation
	Open system focus

Source: own study based on [41].

The approach presented in the table above reflects both the 'depth' of project culture and at the same time the wide range of influence it might have on project itself and on the organization as a whole.

The studies conducted have confirmed the importance of project culture in terms of its impact on a number of different processes taking place in project and in the whole organization. An important study was performed by Shore [19] who confirmed that project culture does have a direct or indirect influence on a number of project management areas. The following were identified: systematic biases, project planning and execution processes, project outcome, processes related to management and team decisions.

This aspect has been emphasized by Ajmal and Koskinen [34] who stressed the importance of recognizing the organizational culture of an organization in order to align the project culture with it. Taking the perspective by the cited authors, it is crucial to identify the essence and type of project culture that is dominant in an organization. The conceptual framework of this research is depicted in figure 2.

Project culture

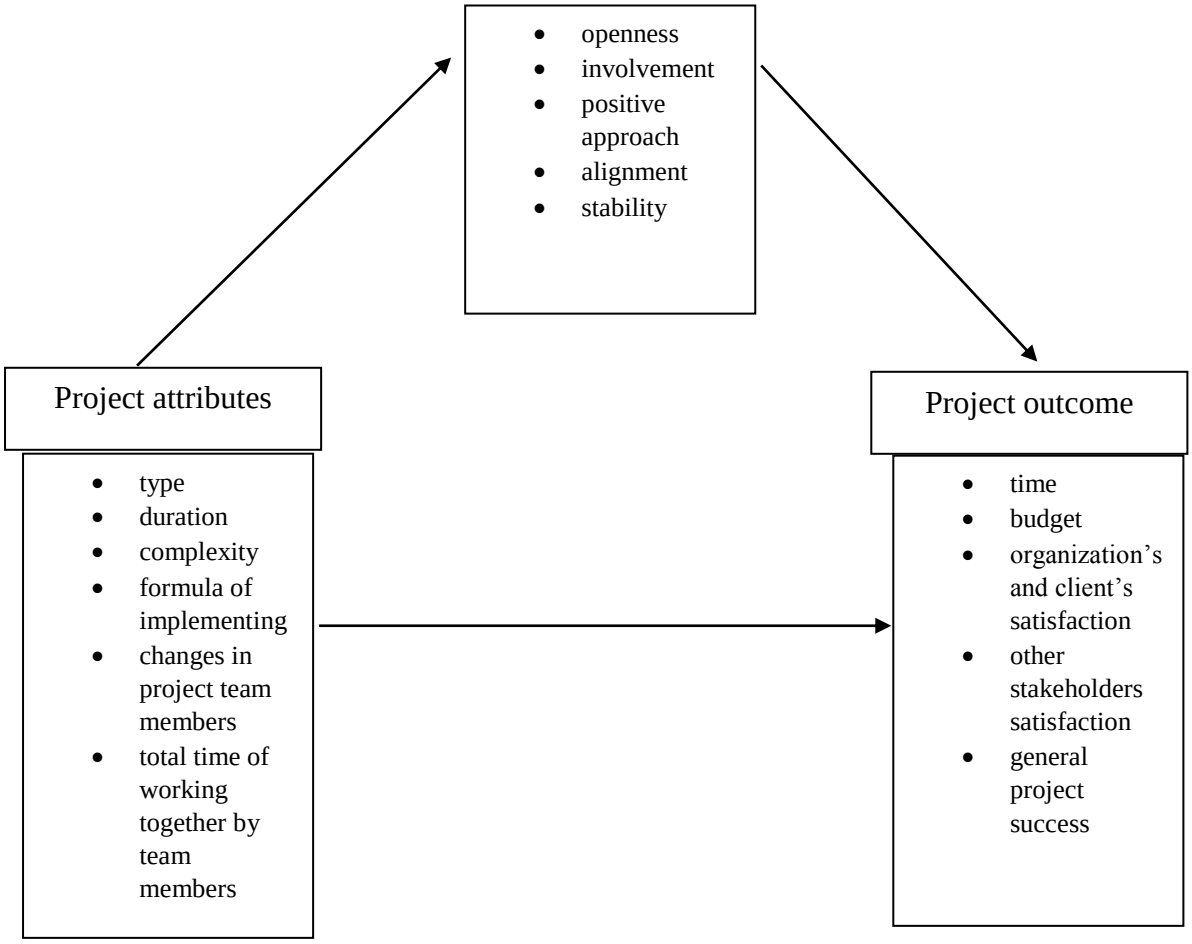

Figure 2 - Graphical representation of the research model

Source: own study.

The research model presented in figure 2 follows the research framework by Karlsen [30] and Du Plessis and Hoole (2006). In particular the components of project culture identified by Du Plessis and Hoole [41] have been incorporated into the study. While the cited researchers identified 11 core elements comprising project culture (depicted in table 1), in this study they have been grouped into broader categories such as: openness, involvement, positive approach, alignment and stability. This action has been aimed at enabling categorization of project cultures identified in the studied organizations.

In this paper the proposed research model is tested as a first step into the research of project culture from the perspective of Easter European managers. The model will be then further developed, as to explain other contexts of the studied research problem.

3 The Research Methods

In 1995 Packendorff [2] in his landmark study wrote that the main source of information regarding what was happening in a project should be those individuals who are involved in its activities. Taking into consideration the above 'call' for researchers', in this paper the following methodological steps were taken.

In the theoretical part, structured literature review was used. Analyzing the literature in 4 steps: planning the review, clarifying the scope and the topic conceptualization, searching, analyzing the selected papers [43] it allowed us not only do deeply understand the studied phenomenon [44]but also to discover additional research paths worth exploring.

The studied literature was grouped into four categories: project management, organizational culture, cultural patterns in projects, project culture.

Such an approach enabled us to identify the existing research niche as well as 'extract' the most important research plots.

In the empirical part an exploratory approach has been used.

3.1. Questionnaire Development

For the purpose of this research, as Salant and Dilman [45] suggest, we employed a structured on-line questionnaire survey. A survey instrument was then developed. It comprised 29 questions referring to the studied problem. Another part of the questionnaire included questions enabling the identification of the respondent, company this person represented and type of projects implemented.

In the next step the questionnaire was tested in a pilot study. Minor changes were incorporated into the final form.

3.2. Sample, Inclusion Criteria and Data Collection

For the purpose of the research, the study was carried out among Polish project managers representing different companies. A convenience sampling was used [46].

Following the suggestions by Neubaum et al. [47]. the authors took the following steps so as to increase the reliability of the results obtained. First, in the questionnaire the information quarantining the respondents full confidentiality of the study was included [48]. The questionnaires were distributed to 250 Polish project managers. 140 questionnaires were returned with a response rate 56%. Finally 138 correctly filled questionnaires were included in further studies.

The research sample was constituted by the following respondents.

Table 2 - The demographic characteristics of the sample of surveyed firms (N=138)

Variable	Frequency	Percentage
The range of business activities:		
Local	9	6.5
Regional	14	10.1
Domestic	59	42.4
Global	56	40.3
The number of employees:		
9 employees and fewer	10	7.2
10-49 employees	14	10.1
50-249 employees	33	23.7
250 employees and more	81	58.3
The age of the company- presence in the market:		
Less than 1 year	--	--
1-5 years	7	5.0
6-10 years	11	7.9
11-20 years	26	18.7
21 years and more	94	67.6

Source: own calculations.

In the structure of the studied enterprises the dominant group was constituted by mature businesses being presented in the market longer than 20 years, with the employment level exceeding 250 employees. They are characterized either by domestic or global range of activities. Such a research sample which is constituted in majority by mature companies creates an interesting opportunity to answer the research questions.

In every company one project manager has been chosen as a respondent. The structure of the studied managers is depicted in table 3.

Table 3 - The demographic characteristics of the respondents (N=138)

Variable	Frequency	Percentage
The experience in managing projects:		
No experience	4	2.9
Shorter than 1 year	2	1.4
1-5 years	39	28.1
6-10 years	36	25.9
Longer than 10 years	57	41
The number of years spent in this company:		
Shorter than 1 year	9	6.5

1-5 years	48	34.8
6-10 years	28	20.3
Longer than 10 years	53	38.4

Source: own calculations.

The majority of the respondents have been working in their current companies longer than 10 years. In similar, the surveyed managers have gained a significant experience in the area of project management.

3.3. Measure Development

The measures in this study involved one exogenous, one endogenous and a mediator.

3.3.1. The Exogenous

The exogenous employed for the purpose of this study referred to the characteristics of the projects implemented in particular companies. Particular project attributes were measured by: their type, risk level, complexity, and specificity of organizing work in project teams.

3.3.2. Mediator

The mediator in the study is project culture. It has been defined following Hobbs and Menard [49] as 'a system of attitudes and behaviour patterns'.

Project culture was measured in five categories: openness, involvement, positive approach, alignment and stability.

Openness was evaluated based on the factors related to scanning the environment in search for the necessary information, faith in new, not previously known situations, active approach towards new situations, and an ability to adjust to changes.

Involvement was evaluated based on the criteria such as: 'providing resources' to newly started projects, regular meeting dedicated to discussing problems and progress in projects, project members involvement in communication processes.

While evaluating the type of project culture approach, the criteria of perceiving new situations (either as a threat or as a chance as well) were taken into consideration. Other elements were: treating threats as an opportunity for development and trust among project members.

Project culture alignment was evaluated based on whether the knowledge gained in previous projects is collected and effectively used. Other criteria were the support from top management and the support of the Project Management Office.

The elements used to evaluate project culture stability were: learning based on the collected experiences and knowledge, concentrating on long-term objectives as well as employing good practices in the future projects.

3.3.3. The Endogenous

Project outcome has been employed as the endogenous in this study. It has been measured by the following elements:

- completing the project on time,
- completing the project with the budget not exceeded
- meeting organizations and clients expectations
- delivering satisfaction to other stakeholders
- evaluating project completion as a general success

3.3.4. The Control Variables

In order ensure that the results of the research are not confounding, the control variable referring to company characteristics was employed in the study. It was measured by: the company's age, the level of employment as well as the range of business activities.

3.4. Analytical Procedures

The data obtained was coded. No procedural errors were identified. In order to analyze the indirect effect of project culture on the relationship between project and company characteristics and project outcome, the data preparation procedure proposed by [50] was employed.

The analyses were carried out in this SPSS ver. 25. The linear regression was employed. The first step was conducting data validation analysis using the Cronbach's alpha in order to verify the reliability of the data obtained. The Cronbach's alpha for the particular project culture dimensions is:

- project culture openness .734,
- project culture involvement .570,
- project culture positive approach .832,
- project culture alignment .631,
- project culture stability .835.

These results suggest that the items have relatively high internal consistency [51]. Analysis of the reliability using Cronbach's alpha revealed only one marginally reliable construct which is project culture involvement. The above is most probably caused by the length of the scale which was used in the questionnaire.

4 Results

In order to answer the research question the series of linear regression analyses were conducted. The first analysis explores the direct relationship between project characteristics and project outcome (table 4). The second analysis is dedicated to exploring relationship between project culture and project outcome (table 5), while the third analysis explores the indirect effect between project characteristics and its final outcome with the mediating effect of project culture (table 6).

Table 4 - Summary of the linear regression- direct effect of project attributes on project outcome (model 1)

No.	Predictor	Beta	SE	p	r_p
1	Project type	.047	.298	.596	.049
2	Project risk	-.027	.532	.760	-.028
3	Project duration	-.203	.632	.051	-.0179
4	Project complexity	.109	.738	.308	.094
5	Number of projects started per annum	-.045	.312	.618	.046
6	Formula of managing projects (project teams)	.113	.432	.202	.117
7	Top management support	.188	.311	.032	.196
8	Rotation of people working in project teams	-.017	.527	.843	-.018
9	Size of project teams	-.015	.382	.872	-.015
10	The total time of common cooperation of project team members	.336	.509	.001	.328
11	The presence of Project Management Office	.056	.541	.545	.056
12	The nationality of project team members	.078	.610	.389	.079

Beta- standardized regression coefficient.
SE- standard error of the regression coefficience.
p- probability value used to make statistical decisions.
r_p- partial correlation between predictor and outcome variable controlling the effect of other predictors.
Source: own calculations.

The results of the regression analysis revealed that the model 1 explains 19.3% of the variance of project outcome which is a significant value [F(12;118)=2.359;p=.009]. The analysis of regression coefficients revealed that 3 out of 12 predictors characterizing project are significant predictors of project outcome. The most significant correlation has been confirmed in case of the total time that team members have worked together in terms its influence on project outcome [rp=.328;p<.001].

Another significant predictor was the support from top management [rp=.196;p=.032]. The last marginally significant predictor was the total project duration [rp=-.179; p=.051], where the projects lasting longer have been characterized by lower efficiency.

The next table shows the relationship between project culture and project outcome.

Table 5 - Summary of the linear regression- the effect of project culture on project outcome (model 2)

Predictor	Beta	SE	p	r_p
Openness	.226	.112	.057	.170
Involvement	-.028	.123	.803	-.022
Positive approach	.019	.132	.892	.012
Alignment	.077	.125	.521	.058
Stability	.135	.124	.288	.095

Beta- standardized regression coefficient.
SE- standard error of the regression coefficience.
p- probability value used to make statistical decisions.
r_p- partial correlation between predictor and outcome variable controlling the effect of other predictors.
Source: own calculations.

The results of the regression analysis revealed that this model explains 13.9% of the variance of project outcome which is a significant value [F(5;124)=4.012;p=.002]. The only marginally significant predictor is project culture openness [rp=.170;p=.057].

Table 6 presents the results of the regression analysis testing the relationship between project characteristics and project outcome with the mediating effect of project culture (table 6).

Table 6 - Summary of the linear regression- the project outcome predicted by project attributes and project culture (model 3)

Predictor	Beta	SE	p	r_p
Project type	-.063	.298	.487	-.057
Project risk	-.047	.529	.613	-.041
Project duration	-.167	.625	.111	-.131
Project complexity	.071	.753	.516	-.053
Number of projects started per annum	-.091	.312	.325	-/080
Formula of managing projects (project teams)	.167	.419	.062	.154
Top management support	.070	.338	.470	.059
Rotation of people working in project teams	-.029	.519	.742	-.027
Size of project teams	-.012	.372	.896	-.011
The total time of common cooperation of project team members	.306	.508	.001	.272
The presence of Project Management Office	.098	.532	.302	.084
The nationality of project team members	.028	.616	.762	.025
Openness	.211	.117	.095	.159
Involvement	-.076	.125	.506	-.064
Positive approach	.078	.131	.587	.052
Alignment	.029	.137	.823	.021
Stability	.108	.125	.410	.079

Beta- standardized regression coefficient.
SE- standard error of the regression coefficience.
p- probability value used to make statistical decisions.
r_p- partial correlation between predictor and outcome variable controlling the effect of other predictors.
Source: own calculations.

The results of the analysis presented in table 6 indicate that in particular openness as a project culture dimension might be significant predictor of project outcome. The comparison of the partial correlation coefficients for project attributes in model 1 and in model 2 revealed significant indirect effect of project culture on the relationship between project attributes and project outcome.

In the next step, the Sobel test analysis was conducted to verify if change in values of particular correlations in the presence of project culture is significant (table 7).

Table 7 - Summary of the linear regression- the indirect effect between project characteristics and its final outcome with the mediating effect of project culture (model 3)

No.	Predictor	Direct effect		Indirect effect		Sobel test	
		r_p	p	r_p	p	Z	p
1	Project type	-.012	.886	-.057	.487	-.74	.23

2	Project risk	-.068	.417	-.041	.613	-9.19	<.01
3	Project duration	-.139	.101	-.131	.111	-.10	.46
4	Project complexity	.113	.182	-.053	.516	1.94	.03
5	Number of projects started per annum	-.036	.666	-.080	.325	.51	.30
6	Formula of managing projects (project teams)	.148	.081	.154	.062	-.07	.47
7	Top management support	.137	.106	.059	.470	.92	.18
8	Rotation of people working in project teams	-.006	.945	-.027	.742	.24	.40
9	Size of project teams	-.041	.626	-.011	.896	-.35	.36
10	The total time of common cooperation of project team members	.313	.000	.272	.001	.52	.30
11	The presence of Project Management Office	.082	.331	.084	.302	-.02	.49
12	The nationality of project team members	.054	.525	.025	.762	.34	.37

The direct effect of project attributes on project final outcome.
The indirect effect of project attributes on project final outcome with the mediation of project culture.
p- probability value used to make statistical decisions.
Z- Sobel test statistics.
r_p- partial correlation between predictor and outcome variable controlling the effect of other predictors.
Source: own calculations.

The results of the regression analysis revealed that model 3 explains 27.8% of the variance of project outcome which is a significant value [F(17;109)=2.473;p=.003]. The results revealed that including project culture in a model explaining project outcome, adds 8,50% [DF(5;109)=2,583;p=.030]. The above means that the factor of project culture explains a significant "part" of the variance which was not explained by project attributes.

The results of the detailed analysis of the relationship between project attributes and project outcome with the mediating effect of project culture with the usage of the Sobel has been depicted in table 8.

Table 8- Summary of the mediation effect of project culture on the relationship between project attributes and project outcome

Predictor	Direct effect		Indirect effect		Sobel test	
	r_p	p	r_p	p	Z	p
Project risk	-.068	.417	-.041	.613	-9.19	**<.01**
Project complexity	.113	.182	-.053	.516	1.94	**.03**
Top management support	.137	.106	.059	.47	.92	.18
Project type	-.12	.886	-.057	.487	-.74	.23
Number of projects started per annum	-.036	.666	-.08	.325	.51	.30
The total time of common cooperation of project team members	.313	<.01	.272	.001	.52	.30

Size of project teams	-.041	.626	-.011	.896	-.35	.36
The nationality of project team members	.054	.525	.025	.762	.34	.37
Rotation of people working in project teams	-.006	.945	-.027	.742	.24	.40
Project duration	-.139	.101	-.131	.111	-.10	.46
Formula of managing projects (project teams)	.148	.081	.154	.062	-.07	.47
The presence of Project Management Office	.082	.331	.084	.302	-.02	.49

The direct effect of project attributes on project final outcome.
The indirect effect of project attributes on project final outcome with the mediation of project culture.
p- probability value used to make statistical decisions.
Z- Sobel test statistics.
r_p- partial correlation between predictor and outcome variable controlling the effect of other predictors.
Source: own calculations.

The results presented in table 8 have revealed significant, direct effect of two factors on project outcome. The first factor is the total time of common cooperation of project team members while the second factor refers to organizing project works in the formula of project teams. The significance of the second factor is however marginal. The aforementioned effect is not mediated by project culture due to insignificant indirect effect.

On the contrary, two other project attributes such as project risk and project complexity influence project outcome both directly and indirectly through the influence of project culture.

5 Discussion

The cultural context of projects has been gaining importance as an important research area in the field of project management. Cultural aspects might significantly impact different project management areas, including organizational commitment [52] as well as the project's final result [53].

Building on prior research addressing the influence of organizational culture on projects [3, 11], project culture [54], its subcultures [55] as well as the role of the managerial perspectives [56], we examined whether and how project culture mediates the relationship between such project attributes as project type, complexity, duration and project outcome. Following Packendorff [2], who stated that the main source of information on what is happening in a project should be those individuals, who are involved in its activities, we surveyed Polish project managers representing mature, in majority large, companies.

Project culture plays a significant role in terms of mediating between project attributes and project outcome. The above impact, however, mainly refers to the dimension of project culture openness.

The results of the study indicate that such project attributes as project risk and project complexity influence project outcome directly. Nevertheless, after the project culture factor is taken into consideration when explaining this impact, the role these attributes play decreases significantly. In such case, it is the project culture which 'takes on the controlling function'. This allows an a statement that when a project is characterized by a project culture that is open, the project risk and project complexity factors start to lessen in terms of the threats they generate with regard to project management processes and outcome. Contrarily, when project culture lacks openness, then even a project characterized by lower risk and lower complexity might fail.

This finding seems to be consistent with the findings derived from other studies [57, 58], which confirmed the above relationship. The fact that the impact these two factors has been mediated by project culture is more significant. The dimension which particularly affected the above relationship was project culture openness. This factor was measured by performing activities such as environment scanning in search for the information needed, crediting new, not previously known situations, actively approaching new situations, including the ability to adjust to changes. It is important here to note that the openness factor, though not directly identified by Wang [18], was, to an extent, present in the dimensions identified by this author, i.e. professional commitment, project team integration, work flexibility and work

performance. Similarly, comparison of our results with the results of the study performed by Karlsen [30] is interesting. The author cited confirmed that what a project needs in order to more effectively cope with issues of uncertainty, is a 'supportive culture'. Karlsen [30] identified the following elements comprising this type of culture: commitment of time and resources, positive attitude, openness and respect. Other important elements are: proactive uncertainty management, setting clear responsibility areas and engagement and support of senior management. Project culture openness might also be 'reflected' in the organizational culture values, which are related to collaboration/cooperation, as per Yazici [35].

The fact that project culture openness is a significant mediator between project risk and project complexity supports our predictions that the phenomenon of project culture might help explain why project risk and project complexity affect project outcome. While analyzing this finding, it crucial to emphasize the results of the study by Belassi et al. [3], who in 2007 underlined the significance of cultural aspects, in terms of their impact on both project management processes and project result. The findings by Stare [16], who confirmed strong impact of project organizational culture on project performance, are in particular worth citing here. Particularly important here is the context in which the studies were confirmed in Slovenian enterprises, which might be, to an extent, similar to Polish enterprises, taking into consideration the pace of development of the Slovenian economy.

In summary, project culture openness is an important factor to be included in the search for key determinants of project outcome. Inclusion of this element specifically in research might radically help understand the phenomenon of projects success or failure.

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6 Conclusions

The importance of project culture as one of project management aspects is not to be doubted. The existing literature studies, however, do not explain its influence on both project management processes as well as project outcome to a satisfactory extent.

This study identified five main categories of elements comprising project culture, including: openness, involvement, positive approach, alignment, stability. A theoretical model linking project attributes and project culture to project outcome has been proposed. In the empirical study it has been demonstrated that inclusion of project culture in the above model significantly contributes to the explanation of final project outcome. These findings support the discussion on the growing role of cultural aspects in the area of project management.

7 Limitations and Directions for Future Research

Although the results of this study affirm the importance of project culture, the paper is not free from limitations. A first limitation is that the study has been conducted using the questionnaire. It would be highly beneficial for the results if qualitative methods were employed to broaden the results in terms of the studied managers perceptions on project culture.

A second limitation results from the geographical setting of the study. Although Polish managers quite rightly reflect the specificity of the Eastern European economies, the results may not apply to managers from other Eastern European countries. From this point of view, it would be interesting to study the phenomenon of project culture from the perspective of for example Lithuanian, Latvian, Estonian, Slovak and Czech managers.

Opportunities for further research have been shown in the table below.

Table 9 – Project culture- examples of opportunities for further research

Theoretical background	Improving and enriching theoretical understanding of the phenomenon of project culture
Project culture creation process	Key factors influencing the processes of creating and shaping project culture
The interplay among cultures- the perspective of non-family enterprises	The relationship between project culture and: • national cultures of particular team members and other members of an organization • professional cultures of team members and other members of an organization
The interplay among cultures-	The relationship between project culture and: • national cultures of particular team members and other

the perspective of family enterprises	members of an organization • professional cultures of team members and other members of an organization The role of business owners and family members in creating and shaping project culture The relationship between project culture and the cultures of owners and their families (symbiotic cultures, orthogonal cultures, countercultures)

Project managers are expected to constantly increase the rate of project success. From this perspective, the deepening of the understanding of how project culture affects these processes, in view of different management aspect as well as different types of ownership and control in organizations, might provide a better focused insight into the problem studied.

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Author Contributions:

Joanna Moczydłowska was responsible for the concept of the paper, developing the theoretical background and organizing the research.

Joanna Sadkowska was responsible for the concept of the paper, developing the theoretical part and designing the research.

The statistical analyses were carried out by both authors. The discussion in this paper as well as the conclusion were designed and written by both authors.

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