

# Research on the Impact Mechanism of Organizational Culture on Project Performance in Construction Projects

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**Abstract.** The existing literature shows that organizational culture has a significant impact on its performance. However, few studies probe into their relationship in the context of project. This study examines the impact mechanism of organization culture on project performance through organizational citizenship behavior (OCB) in the construction projects. A survey on 451 professionals served in the construction projects is conducted. The findings demonstrate that organizational culture influences project performance significantly. And clan culture has greater positive effects on project performance than other three culture domains. The results also indicate OCB partially mediates the impact of organizational culture on project performance. These findings suggest that organizational culture can be used by project managers as a lever to exert citizenship behaviors among project members and eventually improve project performance. The managerial implications are discussed.

## Introduction

Under the background of economic globalization and market competition, organizations have to confront rapid changeable environment. The need for organizations to remain successful and competitive in dynamic business environment has resulted in discovering novel approaches aimed at improving organizational and project performance [1]. Projects are temporary endeavors undertaken to create a unique product or service [2]. Even though the establishment of project management standards and availability of project management tools guided by Project Management Institute in the past two decades, the project failure is still very common in project management practices [3].

In the dynamic project environment, organizational structure becomes flatter. The changes require individuals' more spontaneous behaviors to implement the project successfully. Organizational citizenship behaviors (OCB) are discretionary, not directly or explicitly recognized by formal reward system, but in the aggregate expected to promote the effective functioning of the organization [4]. Empirical research indicates OCB can promote the effectiveness of permanent organizations [5]. But the related research in the field of project management is still lack despite Braun et al. [6] validated the positive impact of OCB on the effectiveness in temporary organizations.

Denison [7] asserted that organizational culture can promote the overall performance by spurring the extra-role behaviors of organizational members. Previous studies have verified the direct relationship between specific culture domains and organizational performance [8, 9]. But the empirical evidences on how citizenship behaviors can be triggered in project context and such behaviors can promote the project performance are still sparse. The purpose of this study is to extend the existing research on the possible impact mechanism of the culture on project performance through OCB in the construction projects.

## Theoretical Background and Hypotheses

**Citizenship Behavior in Project Context.** OCB is defined as discretionary work behavior that is promoting the organization functioning, but is not directly or explicitly recognized by formal reward system [4]. The existing literature on OCB shows a variety of dimensions. Podsakoff et al. [10] summarized the most representative dimensions of OCB in western cultural context, i.e. helping behavior, sportsmanship, organizational loyalty, organizational compliance, individual initiative, civic virtue and self development. The relevant research on the dimensions of OCB based on western culture may not applicable to Chinese cultural context completely due to distinct culture differences. Farh et al. [11] explored the ten dimensions of OCB in the context of Chinese culture, and found that two dimensions of interpersonal harmony and social welfare participation are not evident at all in Western literature.

Temporary organizations occur in various sectors, including traditional industries like construction and engineering, and in service industries such as consulting [12]. The characteristics of temporary organizations particularly projects distinguished from permanent organizations are limited time, interdependent teams, specific tasks and necessary transition [13]. Based on the findings of Farh et al. [11] and Braun et al. [6], this study identifies OCB into five dimensions in project context in China. *Helping behavior* describes actions towards individuals or the entire project team when solving project-related problems. *Project loyalty* describes endorsing and supporting behaviors towards the project. *Project compliance* describes actions adhering to the formal and informal rules and procedures established by the project management. *Interpersonal harmony* describes behaviors towards maintaining harmony and unity to avoid interpersonal conflicts in project context. *Individual initiative* describes the spontaneous behaviors performing the tasks with creative and innovative efforts.

**Organizational Culture and Its Impact on Project Performance.** Organizational culture has been one of hot topics in project management research in recent years. Organizational culture is defined as a pattern of shared values, basic assumptions and beliefs invented or developed by a given group to cope with problems of external adaptation and internal integration [14]. OCAI is extensively used in many industries and verified good reliability. Based on Competing Values Framework (CVF), Cameron and Quinn [15] conceptualized the differences of organizational cultures along two primary dimensions and generated four different culture domains as *Clan*, *Adhocracy*, *Hierarchy* and *Market* respectively. *Clan culture* tends to high flexibility and internal focus with main features of teamwork, and participation. *Adhocracy culture* tends to high flexibility and external focus with main features of creativeness and adaptability. *Hierarchy culture* emphasizes internal focus and high stability, and tends to rely on formal rules and procedures. *Market culture* emphasizes external focus and high stability, and tends to value productivity, competitiveness, goal clarity and accomplishment. Hence, we adopt OCAI to assess organizational culture in project context since several scholars have used it to assess the culture in project management research [3, 16].

The existing literature demonstrates organizational culture exerts positive influence on project performance. Yazici [3] validated that organizational culture has a significant influence on project performance and the long-term success of organizations. Belassi et al. [16] verified the direct significant effects of organizational culture on the performance of new product development projects, and asserted organizational culture could be the determining factor of success rather than project structure. Thus, we propose the following hypotheses:

**H1.** Organizational culture positively relates to project performance.

There are arguments that various culture domains may have different effects on project performance even though many scholars agree to the above assertion. Culture emphasizing group values is correlated with the effectiveness of an organization especially on openness, flexibility, responsiveness, and high growth [9]. Thomas et al. [17] examined the culture of thirteen Australian construction projects, and found clan type culture is correlated with better quality outcomes. Yazici [3] validated clan culture significantly relates to project and business performance, and market culture

combined with project management maturity significantly relates to business performance. Based on the literature reviewed, we propose the following hypotheses:

**H1a.** Clan culture positively relates to project performance.

**H1b.** Adhocracy culture positively relates to project performance.

**H1c.** Market culture positively relates to project performance.

**H1d.** Hierarchy culture positively relates to project performance.

**Linkage between Organization Culture and Citizenship Behavior.** Organ [4] asserted citizenship behaviors of individuals can be promoted when their values are consistent with shared values in an organization. Chen et al. [18] suggested that less group citizenship behaviors are expected in a competitive organizational culture, and more behaviors appear in a cooperative organizational culture. Little research on the impact of culture on citizenship behavior in project context is found in the existing literature. Based on the survey on the participants who worked in IT implementation and engineering projects, Aronson and Lechler [19] suggested that project culture can be used as an alternative lever to drive project partakers' citizenship behaviors. Taken together, we suggest the following hypotheses:

**H2.** Organizational culture positively relates to OCB.

**Citizenship Behavior and Its Impact on Project Performance.** There are many studies on OCB and its impact on the performance of an organization. Podsakoff et al. [10] conducted the meta-analysis on the previous literature and found that OCB has a significant impact on several measures of organizational performance such as increasing management productivity, improved coordination and the adaptation ability to environmental changes. However, the relevant studies on citizenship behavior and its impact on project performance are still very limited. According to the collected data on IT implementation and engineering projects, Aronson and Lechler [19] discovered that citizenship behavior has a significant positive impact on project success. Based on the survey on project managers and workers who worked in a variety of projects from construction projects to IT implementation, Braun et al. [6] found that each of citizenship behavior dimensions predicts parts of "iron triangle" (time, budget, quality) outcomes respectively and overall project success. Therefore, we suggest the following hypotheses:

**H3.** OCB positively relates to project performance.

**Mediating Role of Citizenship Behavior.** Existing literature demonstrates the mediating effects of employee attitude or behavior in the relationship between organizational culture and performance. Siehl and Martin [20] proposed that culture potentially impact the factors such as commitment, job satisfaction, and these "intermediate" factor directly influence financial performance. Gregory et al. [21] validated that group and balanced cultures impact the organizational outcomes by the mediating effects of employee attitudes such as satisfaction. Based on the valuable empirical research findings in project management, Aronson and Lechler [19] demonstrated that the culture in the project has an indirect impact on project success through citizenship behavior. Therefore, we develop the following hypothesis:

**H4.** OCB partially mediates the effect of organizational culture on project performance.

## Methods

**Sample and Procedure.** The survey data are collected from construction and engineering industry in China. The targeted respondents are identified as the project professionals within the organizations. The respondents are instructed to choose a completed project. A total of 600 questionnaires are distributed via paper and e-mail surveys. After discarding unusable ones without sufficient data for further analysis, the usable sample consists of 451 responses with a response rate of 75.2%. The respondents consist of project managers (33.3%), project superintendents (39.9%) and project engineers (26.8%). Seventy-seven percent of the respondents are male and 23% are female. Approximately 72% of the respondents have more than 6 years of experience in project management and the average age is 35. The sample covers the diversity of project size in terms of budget and numbers of employees. The average project duration is 2.5 years.

**Measures.** A 5-point Likert scale (5=“I totally agree”, 1=“I do not agree at all”) is used for all organizational culture, OCB and project performance items. The *dependent variable* is originated from project management literature. The “iron-triangle” indicators are measured based on the measuring scale from Pinto et al. [22]. And the items related to participant satisfaction are captured from Cheung et al. [23]. The *independent variable* is adapted and measured from Organizational Culture Assessment Instrument (OCAI). OCAI is used for measuring the dominant organizational culture across six key facets: dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphasis and criteria for success. The *mediating variable* (OCB) is measured in five dimensions: *helping behavior*, *project loyalty*, *project compliance*, *interpersonal harmony* and *individual initiative*. The well-established scales from Braun et al. [6] and Farh et al. [11] are adapted in the project context. The constructs are refined by a pilot study based on semi-structured interviews with twelve project professionals. Several *control variables* including project budget, duration, complexity and the numbers of workers are selected to check for other potential impact of culture domains on project performance.

## Analysis and Results

**Measure Validation.** Cronbach’s alphas are used to assess the reliability for all constructs and dimensions in the model. The values of Cronbach’s alpha above 0.70 are considered adequate [24]. Cronbach’s alpha values for organizational culture, OCB and project performance are 0.95, 0.94 and 0.90 respectively, indicating high reliability of scale items.

The content validity is established carefully through literature review and semi-structured interviews with twelve project professionals. Some items have been modified based on their insights for final survey. The construct validity is tested by factor analysis. Factors are extracted by using varimax rotation with the eigenvalues greater than one for determining the number of factors. As suggested by Hair et al. [25], an item is considered to load on a given factor when the factor loading from rotated factor pattern is 0.50 or more. Cronbach’s alpha values and factor loadings for survey are shown in Table 1.

Table 1. Cronbach’s alpha values and factor loadings for survey items.

Construct	Number of items	Cronbach’s alpha	Range of factor loadings
Clan culture (CC)	6	0.83	0.51 to 0.72
Adhocracy culture (AC)	6	0.86	0.56 to 0.73
Market culture (MC)	6	0.81	0.50 to 0.63
Hierarchy culture (HC)	6	0.82	0.60 to 0.71
Project loyalty (PL)	3 (one item was dropped)	0.79	0.59 to 0.81
Helping behavior (HB)	4	0.85	0.60 to 0.67
Project compliance (PC)	5 (one item was dropped)	0.81	0.51 to 0.73
Interpersonal harmony (IH)	4	0.81	0.61 to 0.73
Individual initiative (II)	4	0.83	0.68 to 0.75
Project performance (PP)	9	0.90	0.60 to 0.83

**Measurement Models Testing Results.** In the conceptual model, organizational culture and OCB are a second order construct. Data are analyzed by using AMOS/SPSS statistical package. Multiple fit indices are used to assess the overall fitness of measurement models including chi-square statistic, goodness of fit index (GFI), normed fit index (NFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The fit indices of measurement models are shown in Table 2. And Table 3 shows the descriptive statistics of the constructs.

Table 2. Fit statistics of measurement models for the constructs.

Variable	chi-square	df	p	GFI	NFI	CFI	RMSEA
Organizational culture	617.69	237	<0.001	0.90	0.90	0.93	0.06
OCB	397.46	156	<0.001	0.92	0.92	0.95	0.06
Project performance	75.56	24	<0.001	0.97	0.96	0.97	0.07

Table 3. Descriptive statistics for the constructs.

Variable	Mean	SD	1	2	3
1. Organizational culture	3.78	0.60	(0.95)		
2. OCB	3.90	0.56	0.79**	(0.94)	
3. Project performance	3.88	0.64	0.66**	0.64**	(0.90)

Note: Cronbach's alpha values for variables are shown in parentheses along the diagonal, \*  $p < 0.05$ , \*\*  $p < 0.01$ ,  $n = 451$ .

Generally, the scales in this study meet the recommended levels. Additionally, the composite reliability for the constructs is above 0.7 level [25], indicating adequate reliability of each construct.

**Structural Models and Hypothesis Testing.** The model that satisfies both theoretical expectations and goodness-of-fit is selected for structural equation modeling (SEM) analysis [26]. Based on the several adjustments, the overall fit statistics indicates a good fit for the overall model as shown in Fig. 1. The values of GFI, NFI and CFI are 0.89, 0.91 and 0.92 respectively, which are all above 0.90 in acceptable level. And RMSEA value is 0.04, which is below 0.08 cut-off level.

The hypotheses of H1, H2 and H3 are tested based on the direct effects among the constructs as shown in Fig. 1. H1 is supported by significant structural coefficient indicating a positive relationship between organizational culture and project performance ( $\beta = 0.41$ ;  $p < 0.001$ ). H2 is supported by significant structural coefficients a positive relationship between organizational culture and OCB ( $\beta = 0.86$ ;  $p < 0.001$ ). H3 is supported by significant structural coefficient indicating a positive relationship between OCB and project performance ( $\beta = 0.38$ ;  $p < 0.001$ ).

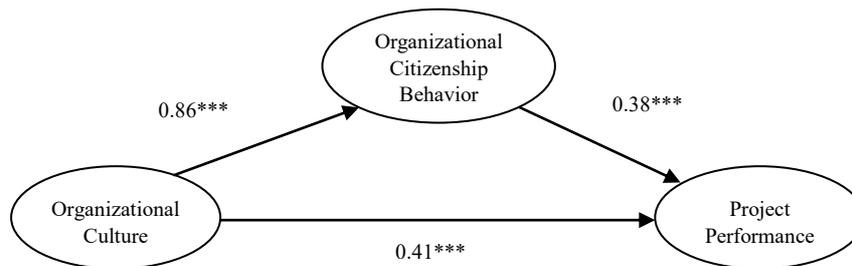


Fig. 1 Conceptual model with structural coefficients.

**Mediating Effect of OCB.** As suggested by Frazier et al. [27], four additional analysis procedures are conducted to test the mediator. The results of mediator testing are presented in Table 4. First, a direct positive relationship between the *independent variable* and the *dependent variable* is established in Model 1 and tested with a coefficient value of 0.73 ( $p < 0.001$ ). Second, the direct relationship between the *independent variable* and the *mediating variable* is established in Model 2 and tested with a coefficient value of 0.85 ( $p < 0.001$ ). Third, the direct link between the *mediating variable* and the *dependent variable* is established in Model 3 and tested with a coefficient value of 0.72 ( $p < 0.001$ ). Finally, the links between organizational culture and project performance, between organizational culture and OCB, and between OCB and project performance are simultaneously considered in Model 4. The coefficient between the *independent variable* (organizational culture) and *dependent variable* (project performance) is dropped from 0.73 to 0.41 significantly ( $p < 0.001$ ), indicating partial mediating effect of OCB in the relationship between organizational culture and project performance. Therefore, H4 is supported.

Table 4. Mediating effect of OCB.

Structural path	Model 1	Model 2	Model 3	Model 4
Organizational culture → Project performance	0.73***	—	—	0.41***
Organizational culture → OCB	—	0.85***	—	0.86***
OCB → Project performance	—	—	0.72***	0.38***

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Hypothesis Testing on Culture Domains and Project Performance.** Hierarchical regression analysis is used to examine the relationship between four culture domains and project performance. The results of hierarchical regression analysis are summarized in Table 5. From step 1 to step 2, we enter the control variables and four culture domains. We have tested regression assumption with the

use of collinear statistics in advance. All of VIF scores are below 5.0, indicating that the variables did not contain redundant information. For the regression models tested, the hierarchic regression analysis demonstrates 45% of explained variance.

H1a predicts that clan culture positively relates to project performance, which is supported by significant regression coefficient ( $\beta=0.211$ ;  $p<0.01$ ). H1b predicts that adhocracy culture positively relates to project performance, which is supported by significant regression coefficient ( $\beta=0.190$ ;  $p<0.01$ ). H1c predicts that market culture positively relates to project performance, which is partially supported by the regression coefficient ( $\beta=0.128$ ;  $p>0.05$ ). H1d predicts that hierarchy culture positively relates to project performance, which is supported by significant regression coefficient ( $\beta=0.197$ ;  $p<0.01$ ).

Table 5. Regression results predicting project performance.

Variable	Project Performance	
	Step 1	Step 2
Control variable		
Project duration	-0.011	0.030
Project budget	-0.072	-0.004
Project complexity	0.020	-0.045
Number of project members	-0.070	-0.061
Independent variable		
Clan culture (CC)		0.211**
Adhocracy culture (AC)		0.190**
Market culture (MC)		0.128
Hierarchy culture (HC)		0.197**
F test	1.360	45.115***
R-squared	0.012	0.450
R-squared increased	—	0.438

Note: \*  $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$ ,  $n=451$ .

## Discussion

**Overview.** This study has explored the possible impact mechanism of organizational culture on the performance in the construction projects. The results demonstrate the different effects of four culture domains on project performance. This study also provides solid evidence on the relationship between citizenship behavior and project outcomes, and indicates the non-prescribed citizenship behavior is a possible mediator in the relationship between organizational culture and project performance.

**Managerial Implications.** This study has presented several managerial implications for project management. First, the research findings suggest that citizenship behavior has a significant impact on project performance. Compared with permanent organizations, project participants have to confront more dynamic conditions. It is important to implement extra tasks not formally required in their contracts, share information with other partakers proactively, and make constructive suggestions for improving project performance.

Second, the results demonstrate that OCB partially mediates the impact of organizational culture on project performance, which represents the major contribution of this study. The research findings suggest that organizational culture is a vital factor to differentiate project partakers exhibiting high levels of citizenship behavior from those with plain adequate. It is common for project leaders to reward behaviors that are beneficial to project outcomes, but these behaviors may be decreased if the rewards are not available. Since citizenship behavior is not enforceable and in control of project managers, culture can be used as a lever to promote such behavior.

Third, the results provide the empirical evidence on differentiating the impacts of four culture domains on project performance. The findings demonstrate that clan culture has the most significant positive effect on project performance. The related result also supports the assertion from Denison [7] that the culture with group values has a significant impact on the effectiveness of the organization.

## Conclusions and Limitations

**Conclusions.** The research findings empirically support impact mechanism of culture on project performance through the mediating effect of OCB in the construction projects. Furthermore, because OCB plays significant positive impact on project performance, project managers can foster suitable culture to inspire project partakers in high level of citizenship behaviors. Finally, the research findings support that clan culture has greater positive effect on project performance than the other three domains.

**Limitations and Future Research.** The current study has several limitations. The composition of survey respondents is a limitation of this study. The most effective method in assessing organizational culture would be conducted by surveying all project members. Multiple responses in an organization should be considered for survey in future. Another limitation of this study is the cross-sectional design. Longitudinal data should be collected to test more potential mediators in the relationship of organizational culture and project performance in various industries in future.

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