

The Effect of Project Governance and Sustainability on Project Success of the Public Sector Organizations in Pakistan

Muhammad Irfan and Mazlan Hassan*

Department of Management & Marketing, Faculty of Economics and Management, Universiti Putra Malaysia, Serdang 43400, Malaysia.

ABSTRACT

The purpose of this paper is to investigate the effect of project governance and sustainability on project success of the public sector organizations in Pakistan. Across Pakistan, 425 valid responses were collected using a cross-sectional survey. The sample was restricted to firms registered with Pakistan Engineering Council. PLS-SEM was used to assess the proposed reflective-formative model through path modeling and bootstrapping technique. The results indicate that project governance and sustainability are positively associated with project success. This paper provides empirical evidence about the substantial positive effect of project governance and sustainability on project success, in the context of public sector organizations in Pakistan.

Keywords: PLS-SEM, project governance, project success, sustainability

INTRODUCTION

Public sector organizations are continuously striving to achieve success in projects. Success is a barometer by which an organization can assess its performance. The reason

why project success is significant for public sector projects is because it involves a large amount of money of taxpayers, who need to be satisfied with the outcomes. Similarly, project success is vital to public sector organizations as it enables them to gain profits and maximize value in both short and long term (Badewi, 2016).

Globally, project success rates are falling alarmingly, making achieving success on

ARTICLE INFO

Article history:

Received: 3 August 2017

Accepted: 7 March 2018

Published: 29 April 2019

E-mail addresses:

irfaankakar@gmail.com (Muhammad Irfan)

mazlanhs@upm.edu.my (Mazlan Hassan)

* Corresponding author

projects a major concern for public sector organizations. Despite the attention, these organizations have failed to achieve their objectives on projects. In the USA alone, trillions of dollars have been invested in public sector projects, but unfortunately, the failure rates on these projects are more significant than the success rates (Serrador & Pinto, 2015). Similarly, in the United Kingdom, two thirds of public projects went over budget and could not be completed on time (Cabinet Office, 2013; NAO, 2011).

Concurrently, a much worsening trend of failing projects is observed in the developing countries. In India, Ghosh (2015) reported that public sector projects worth billions of US dollars had failed to achieve their objectives and eventually terminated. Likewise, Asian Development Bank (2016), reported that in Pakistan, only 21.6% of the public sector projects, which were partially funded by the bank, had been successful in the last eight years. Also, Ullah et al. (2017) posited that a majority of the projects in Pakistan were performing inefficiently, which had resulted in time and cost overruns. In addition, the funding of “Balochistan Copper and Gold Project” was stopped by the Government of Pakistan, because it had failed despite an expenditure of USD 15 Million (“Balochistan to stop”, 2015).

However, several reasons have been identified by organizations that lead to

these unfavorable circumstances on the projects. Pinto and Mantel (1990) conducted a comprehensive study to understand the reasons why projects failed to achieve success and concluded that the failure was mainly due to poor governance, unrealistic project objectives, and inability to fulfill stakeholder needs. Similarly, Sage et al. (2014) believed that inefficiency and lack of governance were among the few possible reasons why projects were unable to be successful. Likewise, Ullah et al. (2017) and Asian Development Bank (2016) reported that, in Pakistan, most public sector projects were failing due to poor project governance. Among the many reasons identified, project governance has been observed as the most critical in achieving project success. Also, Joslin and Müller (2016) and Young et al. (2013) posited that prospects of achieving project success could be improved by project governance.

Another factor leading to project success is sustainability. Sustainability is development along the protection of the environment, economy, and society. A lack of sustainable practices has resulted in global warming and since 1960 average sea level, globally, has risen at an average rate of 1.8 mm/year and since 1993, 3.1 mm/year (Thomson & El-Haram, 2014). Approximately 530 million tons of demolition and construction waste from different projects has been produced by the European Union, which accounts for 25-30% of the total solid waste generated (Zhong & Wu, 2015).

1 Project success is the achievement of objective and subjective measures, included in the success criteria and measured at the end of a project (Müller & Jugdev, 2012)

Pakistan has a long history of public sector projects that have also facing the sustainability challenges (Khan et al., 2013b). It was further iterated by Rehman et al. (2011) that current efforts to improve the project management systems in public sector organizations of Pakistan were not effective. Simultaneously, Pakistan¹ is far behind in meeting Sustainable Development Goals. The problems reported suggest that sustainable development activities in Pakistan are fragmented in projects and thus need to be empirically tested with project success to quantify its effects.

Moreover, to our best knowledge, in the context of developing countries there is very scarce empirical evidence on the association between project governance, sustainability, and project success. Furthermore, the focus of the existing literature is explicitly on the corporate sector. Previous studies have only discussed the impact of dimensions of project governance on project success and used secondary data to understand the relationship (Joslin & Müller, 2016; Young et al., 2013).

Thus, the purpose of this study is to empirically test the effect of project governance and sustainability on the project success of the public sector organizations in Pakistan. This study will use primary data to investigate the relationship. Simultaneously, the study will also provide useful insights to practitioners, by allowing them to

understand how different governance structures and sustainable practices can be developed to achieve success.

The next section presents review of the literature on project success, project governance, and sustainability. Research methodology, results, and discussion are dealt with in the subsequent sections. Conclusion and limitations of the study are discussed in the last section of the paper.

LITERATURE REVIEW

Project Success

In the current literature, project success is one of the most researched topics in the field of project management. Several authors have debated on the meaning and definition of “project success” (Joslin & Müller, 2016; Müller & Jugdev, 2012; Munns & Bjeirmi, 1996).

Project success has evolved from a simple performance measurement tool to a list of achievements on the projects. Moreover, the concept was traditionally known as project management success, and was defined by Pinto and Slevin (1988) as the fulfillment of technical performance criteria; later on, Atkinson (1999) added the achievement of project objectives to the definition followed by the contribution from Shenhar and Dvir (2007), who instilled the idea of stakeholder satisfaction as a crucial component of the concept. Similarly, Khan et al. (2013a) in their study, compiled and analyzed all the previous definitions of project success and divided the concept into five distinct dimensions namely (i) project efficiency (ii) organizational benefits (iii)

² Pakistan far behind in meeting sustainable development goals. (2016, Feb 13). *Daily Times* Retrieved from <http://search.proquest.com/docview/1764803347?accountid=27932>

project impact (iv) future potential, and (v) stakeholder satisfaction. Hence, it can be understood from the previous literature that project success is no longer the completion of the project in the given time and within a given budget; rather, it also means to make sure that the result of the project ultimately satisfies the end user.

However, project success is in the limelight due to several reasons, such as it enables organizations to strategically align the project objectives with the organizational objectives (Cooke-Davies, 2002; Joslin & Müller, 2016). Similarly, project success allows the organizations to evaluate their efficiency and stakeholder satisfaction (Atkinson, 1999). Müller and Turner (2007) suggested that organizations could improve their financial performance, increased market shares, and a higher rate of return on investments for their shareholders, by successfully executing their projects.

Santos and Varajão (2015) postulated that though project success was a vital project management issue, the path necessary to achieve it was inadequately investigated. Therefore, several studies have examined a number of antecedents that may possibly lead to project success. Koskinen (2001) recommended that communication on the projects only supplied knowledge but it might not guarantee the project's success. Gray (2001) studied the impact of organizational climate on the project success, and concluded that the primary objective of management on projects should be the reduction of threat, in order to achieve success on projects. Similarly,

Dvir et al. (2003) suggested that the amount of effort invested in project planning had a significant effect on becoming successful in projects. Raymond and Bergeron (2008) claimed, in their empirical study, that the project management information system had a substantial contribution in achieving success in projects.

Although the antecedents observed have a significant role in achieving success, but recent literature (Badewi, 2016; Joslin & Müller, 2016; Toivonen & Toivonen, 2014; Young et al., 2013) points to more pragmatic issues such as the governance on projects. In the next section, governance and its role in project success was discussed.

Project Governance

Müller et al., (2016) defined governance as the aggregate of approaches and processes that defined the objectives of organizations and provided the mechanism to control progress in attaining those objectives. However, Cadbury (2002) described governance as a holistic process, where the goal was to meet the interests of the stakeholders. Brownill and Carpenter (2009) posited that the overall function of governance should be to achieve success. In the context of projects, governance is a structure by which the objectives of a project are defined and the means of achieving those objectives and monitoring performance are determined (Turner, 2009). Furthermore, project governance stresses on the relationship among a project's management, sponsor, owner, and stakeholders.

On the contrary, Renz (2007) argued that the issue at hand was how governance concerns were implemented within the organizational units such as projects. Similarly, Crawford and Cooke-Davies (2005) claimed that corporate strategies were executed and driven by projects, and thus, effective governance of projects using governance framework became a serious concern for organizations. Likewise, the main objective of every project, as Ojiako et al. (2014) stated, is to create and maximize value for organizations. They further asserted that, this maximized value was strongly related to project success, which was the overall measure of the performance of the organization. Therefore, it is important to manage these projects using governance structures appropriately.

Hence, project governance establishes a mandatory link for management and control of projects that are executed across organizations (Bernardo, 2014; Joslin & Müller, 2016; Too & Weaver, 2014). Thus, this governance gap between project governance and project success leads to the assumption that governance structures on projects are vital in achieving success.

Concurrently, Joslin and Müller (2016) revealed that there was a small but significant correlation between project governance and project success. Likewise, Joslin and Müller (2015) investigated the role of project governance in the influence of project management methodologies on project success. The basis of their framework was a study conducted by Sharma et al. (1981). The findings of their study indicated that

project governance did not exhibit traits of a moderating or a mediating role in the methodology-success relationship. They concluded by suggesting that project governance might be an antecedent to project success. Their results are in coherence with other studies (Young et al., 2013). Bekker and Steyn (2009) conducted a qualitative case study in South Africa in which they used Delphi and nominal group techniques to test the relationship between project governance and project success on large scale investment projects. They found strong association among project governance and project success after conducting interviews with their respondents.

Sustainability

One of the major concerns for practitioners as well as academicians in the present era is restoring the sustainability of our planet. Schwaninger (2015) reported that over the last 200 years, the separation of economics and ecology had led to a profound conflict. As a solution to the existing scenario, we have to find the unity of economic activity and its natural basis to achieve sustainability. Projects are an economic activity as argued by Rolstadås et al., (2014) and the amalgamation of sustainability has been considered crucial for projects in the recent literature (Albrecht et al., 2007; Bohne et al., 2015; Hannan & Sutherland, 2014; Sánchez, 2015).

Sustainable development, as defined by the Brundtland Commission's Report, is the development that meets the needs of the present generations without compromising

the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). Similarly, Johnston et al. (2007) stated that sustainability demanded ways of living that enabled all people of the world to lead healthy, fulfilling, and economically secure lives without destroying the environment and without endangering the future welfare of people and the planet.

Additionally, it is observed from the literature that sustainability is expanding beyond purely environmental concerns, and with it, different perspectives have emerged on what represents sustainability. In the context of projects, Khan (2000) defined sustainability as “the ability of a project to maintain an acceptable level of benefit flows through its economic life”.

Although practitioners have called for project sustainability, how this is practiced by professionals is unclear (Willard et al., 2010). However, project sustainability should also be viewed in terms of environmental, social, and economic perspectives. Opoku et al. (2015) asserted that sustainable development balanced environmental resource protection, social progress, and economic growth and stability now and for the future. Sánchez (2015) suggested that to assess projects with respect to goals defined within an organization, it was necessary to consider economic, social, and environmental criteria. She further argued that projects or deliverables of a project could have social, economic, and environmental impacts that far outlasted the projects themselves. Thus, this study will

consider the three dimensions to measure sustainability.

Similarly, Lapiņa and Aramina (2011) believed that the twenty-first century not only required greater productivity and effectiveness on the side of management, but it also needed that project management paid more attention to the issue of sustainability. Although sustainability and project management have been widely researched, Brent and Labuschagne (2007) believed the alignment between the two issues was still very rare.

Moreover, limited research has been conducted to study the integration of sustainability in project management; organizations incorporating sustainability in their project management methodologies would support their project management, making it a part of the success of the project (Silvius & Schipper, 2015).

Therefore, in conjunction with the previous studies, this study will contribute by empirically testing the theoretically hypothesized relationship between project governance, sustainability, and project success.

Hence, we can hypothesize:

Hypothesis 1: *There is a positive relationship between project governance and project success.*

Hypothesis 2: *There is a positive relationship between sustainability and project success.*

Figure1 displays the research model;

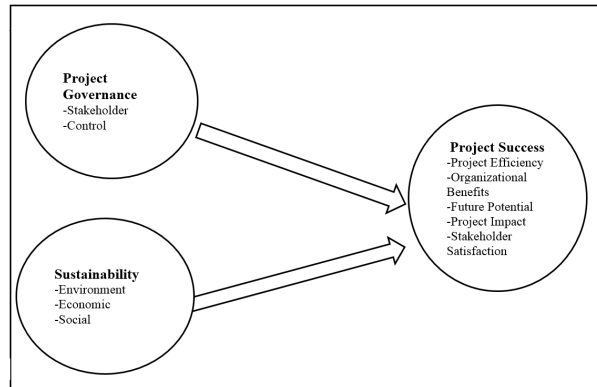


Figure 1. Proposed research model

RESEARCH METHODOLOGY

Sample and Data Collection

The “Key Informant Approach” was employed in this study to determine the respondents. This approach is common in product and services related studies (Marshall, 1996). Key informants such as project managers are selected because of their knowledge, experience, and ability to communicate (Joslin & Müller, 2016; Khan et al., 2013a; Turner et al., 2013). In other words, the mid-level managers such as project managers or program managers are responsible for the oversight of governance in projects and for adopting sustainable policies.

Therefore, project related staff members, working on different public sector projects across Pakistan, were selected as the unit of analysis for this study. The list of organizations working on these projects was obtained from Pakistan Engineering Council (PEC). A total of 75,713 firms are registered with PEC, which is considered as the sampling frame for this study. The

database of these firms is available on the website of Pakistan Engineering Council (www.pec.org.pk).

The formula given by Krejcie and Morgan (1970) was used to calculate the sample size. In this case, the sample size for a population or a sample frame of 75,713 appears to be 384. Next, Hair et al. (2010) suggested a minimum sample size required for Structural Equation Modeling (SEM) technique was 100 samples, given that there were five or less latent constructs where each latent construct had more than three items in the proposed theoretical framework.

Quantitative data was collected using the stratified sampling method because the sample was divided into sub-groups. To gain widest coverage, data was collected from four different provinces and the federal territory of Pakistan using the cross-sectional approach.

Therefore, a total of 1000 questionnaires were distributed, using self-administered survey, across Pakistan from December, 2016 until March, 2017. An e-mail with the online survey link was forwarded to 1000

firms from the list obtained from PEC of the sampling frame. However, only 425 returned questionnaires, from both methods, were usable.

The non-response bias was addressed by comparing the means of the online respondents and the mail survey respondents. The t-Test performed on the study indicated no significant difference (at $\alpha = 0.05$) between the two groups of responses. Viswanathan and Kayande (2012) suggested using different scales for measuring the constructs to avoid the common method bias, thus project governance was measured at a continuum of seven whereas project success was measured using a range of five scores.

A majority of the respondents possessed a bachelor's degree, i.e., 56.9%, followed by Master's and Diploma, being 32% and 9.2%,

respectively. Only 1.9% of the respondents held doctoral degrees. Moreover, 30.1% of the responses came from Balochistan, followed by 21.4% from Punjab, 20% from Khyber Pakhtunkhwa, 14.4% from Sindh, and 14.1% from Islamabad. A large majority of project managers participated in the survey, i.e., 59.5%. Program managers accounted for 12.7% of the distribution. Whereas, 6.1% of the respondents were project directors, 5.4% of the participants in the survey were portfolio directors. The average experience on projects for the respondents was fifteen years. 63.1% of the respondents were working on engineering/construction projects, followed by research and development being 14.4%, education 5.9%, IT/telecom 4.9%, and health 3.1%. Table 1 presents the demographic profile of the respondents.

Table 1
Demographic profile of the respondents

Variable	Frequency	Percent
Education		
Diploma	39	9.2
Bachelors	242	56.9
Masters	136	32.0
Ph.D.	8	1.9
Total	425	100.0
Geography/Working		
Balochistan	128	30.1
Sindh	61	14.4
Khyber Pakhtunkhwa	85	20.0
Punjab	91	21.4
Islamabad Capital Territory	60	14.1
Total	425	100.0

Table 1 (Continued)

Variable	Frequency	Percent
Position Held		
Project Manager	253	59.5
Program Manager	54	12.7
Portfolio Manager	23	5.4
Architect	13	3.1
Project Director	27	6.4
Team Member	51	12.0
other	4	0.9
Total	425	100.0
Project Experience		
1-5 years	197	46.4
6-10 years	91	21.4
11-15 years	29	6.8
16-20 years	25	5.9
20 years plus	83	19.5
Total	425	100.0
Sector		
Research and Development	61	14.4
Engineering/ Construction	268	63.1
IT/Telecom	21	4.9
Health	13	3.1
Education	25	5.9
other	37	8.7
Total	425	100.0

Questionnaire Development

The questionnaire consists of four sections. In the first section, demographic information of the respondents is recorded. The demographics allow us to check if the respondent's knowledge and experience about the pertaining issues is sufficient.

The second section of the questionnaire examines the respondent's opinion of

project governance. Questions for project governance were adapted from Müller and Lecoivre, (2014). The governance paradigms of stakeholder and control are preferred as they have been effectively used in previous studies related to project governance in the past to measure the construct (Joslin & Müller, 2016). These items reflect the position of the organization in the context of (1) stakeholder & (2)

control dimension. The responses were elicited on a seven point “Likert” scale with 1 = strongly disagree and 7 = strongly agree.

The third section of the questionnaire investigates the respondent’s opinion on the success of projects. Questionnaire items were adapted from Khan et al., (2013a) as their instrument is public sector sensitive. They have suggested five different dimensions for measuring project success which are project efficiency, organizational benefits, project impact, stakeholder satisfaction, and future potential. These dimensions cover both, short-term and long-term, implications of the construct. The responses were elicited on a five point “Likert” scale with 1 = strongly disagree and 5 = strongly agree.

Section four of the questionnaire examines the expert judgment of respondents on the sustainability in projects in terms of social, environmental, and economic aspects. The questionnaire developed by Martínez et al. (2013) was adapted in this study to measure sustainability. The construct is measured using three dimensions, namely, (i) Economic, (ii) Social, and (iii) Environment. A pilot study was conducted with the initial sample of fifteen respondents. In addition, wordings for a few items on the instruments were changed for better understandability. The answers from the pilot test are not included in the study.

Data Analysis

In the current study, the data was analyzed using Partial Least Square – Structural Equation Modeling (PLS-SEM), using

Smart PLS version 3.0. The reason for using PLS-SEM instead of CB-SEM is because Hair et al. (2017) suggested that PLS-SEM was more efficient in the prediction of exogenous variables. Likewise, we intend to analyze the relationship between reflective-formative constructs also known as hierarchical latent variables, which cannot be assessed by CB-SEM, therefore, PLS-SEM is considered as a rational option. Additionally, PLS-SEM uses the data to estimate the path relationships with the objective of reducing error terms. Finally, PLS-SEM is preferred over CB-SEM, as it does not require any assumption about the data distribution which allows us to retain most of the measurement items (Hair et al., 2017).

Therefore, the research model in this study was analyzed using the two-stage approach proposed by Becker et al. (2012). In the first stage, the final endogenous variables (i.e., project governance, sustainability, and project success) are linked to the path model with the first-order constructs (stakeholder, control, environment, economic, social and project efficiency, organizational benefits, future potential, project impact, and stakeholder satisfaction) and estimated, then, the scores for latent variables for the first-order constructs are saved. However, in the second stage, the latent variable scores are used for the analysis of the second order constructs.

Furthermore, the reliability and validity of the manifest constructs was assessed through the outer layer (i.e., measurement model) in the first stage, whereas,

in the second stage (structural model) bootstrapping was performed which allowed us to analyze the inner layer to answer our hypothesis and retrieve t-statistic.

RESULTS

Measurement Model

In a reflective-formative model, initially the suitability of the lower order reflective constructs is analyzed. Thus, it becomes necessary to observe the measurement model, which provides a comprehensive view of the constructs. Hence, we begin by understanding the integrity of the measures for lower order reflective constructs followed by the evaluation of the higher order formative constructs.

Integrity of Measures

Goodness of a measure or the integrity of an instrument is tested by observing the reliability and validity. Cooper and Schindler (2014) suggested that if an instrument had consistent results, it was believed to be reliable, whereas validity indicated how well an instrument measured a specific concept which it intended to measure.

Reliability of the Instrument

The reliability of a measurement instrument is indicated by the internal consistency of the items. Cooper and Schindler (2014) posited that internal consistency was the extent to which the items on an instrument were homogenous and reflected the same underlying construct. In this study, Cronbach's Alpha (α) coefficient indicates the consistency of the measurement

items. The alpha values and loadings are summarized in Table 2.

Moreover, it is observed, from Table 2, that the alpha values of all the lower order reflective variables are well above the cutoff point of 0.6 as suggested by Nunnally and Bernstein (1994). Thus, it is concluded that the measurement items are reliable.

However, Cronbach's Alpha (α) assumes that all indicators are equally reliable, i.e., the loading of indicators on a construct is equal. However, Hair et al. (2017) argued that in PLS-SEM, the reliability of the individual indicators was more crucial. This indicates that Cronbach's Alpha might not be a proper measure of reliability.

Hence, Hair et al. (2017) recommended using another measure of internal consistency, that was, the composite reliability which dealt with the reliability of the individual indicators. Thus, composite reliability is the extent to which the reflective items indicate the latent variable. The values of composite reliability are given in Table 2 (Hair et al., 2017) recommend a threshold value of 0.7 and in this study the composite reliability values range from 0.816-0.900, exhibiting sufficient reliability.

Convergent Validity

The next major criterion for the assessment of goodness of instrument is to determine the convergent validity. Cooper and Schindler (2014) stated that it was the extent to which responses on one item correlated with responses on other items for the same construct. It is, therefore, understood that the items of a reflective construct should

Table 2

Results of the assessment of measurement model for lower order constructs

Formative Constructs	Scale Type	Indicators	Weights	P Value	VIF
Project Success	Formative	Project Efficiency	0.313	0.000	2.067
		Organizational Benefits	0.143	0.036	2.903
		Project Impact	0.205	0.006	2.917
		Future Potential	0.352	0.000	2.808
		Stakeholder Satisfaction	0.147	0.022	2.416
Project Governance	Formative	Control	0.549	0.000	1.478
		Stakeholder	0.580	0.000	1.478
		Environment	0.344	0.000	1.514
Sustainability	Formative	Social	0.320	0.000	1.895
		Economic	0.535	0.000	1.595

share a high proportion of variance among each other. Furthermore, Hair et al. (2017) suggested that to assess convergent validity of reflective constructs, the factor loadings of the items and the average variance extracted (AVE) must be considered.

The factor loadings of the reflective constructs are presented in Table 2. It has been suggested by Hair et al. (2017) that ideally these outer loadings should be 0.708 or higher.

But, it is observed that the factor loadings for all the items except for PSPE3, PSPE7, PSSS2, PSOB1, SUSAA2, PGSTK4, and PGCTRL5 are slightly below the cutoff point. Hair et al. (2017) suggested that items that had factor loadings below the threshold could be retained if they did not significantly affect the composite reliability and average variance extracted. Thus, PSSS2, PGCTRL5, and SUSAA2 were removed from the measurement model because deleting them would increase the

AVE beyond the minimum threshold of 0.5. The other items were retained because their removal might lead to issues of content validity.

Additionally, convergent validity is also exhibited by the average variance extracted (AVE). Hair et al. (2017) define AVE as the total amount of variance in the indicators accounted for the latent variables. The cutoff point for AVE is 0.5. The values of AVE for the lower order reflective constructs are presented in Table 2. However, the values lie between the range of 0.521 and 0.670, surpassing the suggested value of 0.5 (Hair et al., 2017).

Hence, it is noted from the values of factor loadings and average variance extracted, provided in Table 2 that the instrument fulfills the assumption of convergent validity.

Discriminant Validity

After ensuring the reliability and convergent validity of the instrument, we test the measures for discriminant validity. Hair et al. (2017) stated that discriminant validity was the degree to which the construct was distinct from other constructs. Moreover, Fornell and Larcker (1981) suggested a technique for assessing the discriminant validity. They believed that the discriminant validity of an instrument could be examined by comparing the square root of the average variance extracted values with the correlations of the latent constructs.

This comparison is presented in Table 3. However, it is noted that the lower order reflective constructs have a higher square root of average variance extracted (AVE) values than the correlations among the latent reflective constructs, indicating sufficient discriminant validity.

But, Hair et al. (2017) argued that the criteria for assessing discriminant validity given by Fornell and Larcker (1981) was very poor when item loadings differed minutely (i.e., between 0.6-0.8). Therefore, Henseler et al. (2015) suggested the criteria of heterotrait-monotrait (HTMT) ratio of the correlations. Hair et al. (2017) described this method as the true estimate of the correlation between the variables, if these variables were perfectly reliable. This correlation is also known as the disattenuated correlation.

Ideally, the HTMT ratio of the correlations should be less than 1 (Henseler et al., 2015). In Table 4, the HTMT ratios of the correlations for the reflective variables are presented, which are below the threshold indicating sufficient discriminant validity. The measurement model for the lower order constructs is diagrammatically given below in Figure 2.

Table 3
Fornell and Larcker (1981) criteria of discriminant validity

Reflective Constructs	1	2	3	4	5	6	7	8	9	10
Control (1)	0.725									
Economic (2)	0.46	0.788								
Environment (3)	0.36	0.442	0.74							
Future Potential (4)	0.468	0.645	0.497	0.798						
Organizational Benefits (5)	0.389	0.622	0.46	0.727	0.734					
Project Efficiency (6)	0.414	0.52	0.635	0.625	0.634	0.728				
Project Impact (7)	0.434	0.639	0.457	0.721	0.718	0.641	0.777			
Social (8)	0.387	0.598	0.568	0.582	0.573	0.564	0.559	0.731		
Stakeholder (9)	0.569	0.506	0.309	0.459	0.427	0.37	0.465	0.401	0.722	
Stakeholder Satisfaction (10)	0.37	0.565	0.462	0.644	0.672	0.63	0.707	0.551	0.457	0.818

Note: Diagonals (**bold**) represent the square root of the average variance extracted while other entries represent the correlations

Table 4

HTMT criteria of discriminant validity

	1	2	3	4	5	6	7	8	9	10
Control (1)										
Economic (2)	0.616									
Environment (3)	0.461	0.531								
Future Potential (4)	0.619	0.805	0.595							
Organizational Benefits (5)	0.522	0.788	0.559	0.84						
Project Efficiency (6)	0.525	0.622	0.732	0.74	0.762					
Project Impact (7)	0.581	0.812	0.553	0.905	0.917	0.767				
Social (8)	0.523	0.765	0.688	0.738	0.737	0.681	0.72			
Stakeholder (9)	0.776	0.645	0.38	0.583	0.549	0.451	0.597	0.522		
Stakeholder Satisfaction (10)	0.506	0.73	0.574	0.825	0.874	0.771	0.92	0.721	0.599	

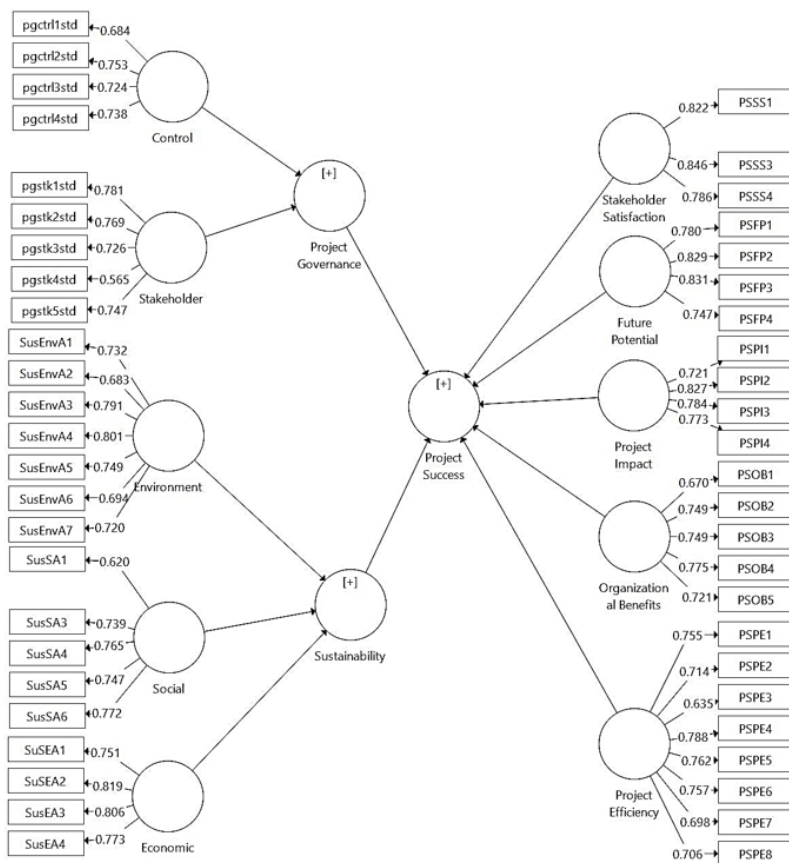


Figure 2. Measurement model for lower order constructs

Outer Weights and Multicollinearity of Formative Constructs

As discussed earlier in data analysis, this study analyzed the reflective-formative model using two stage approach suggested by Becker et al. (2012). Moreover, Becker et al. (2012) argued that this method was parsimonious on the higher level analysis. Hair et al. (2017) suggested that the indicator weights, significance of the weights and multicollinearity of the variables should be reported for formative constructs, to validate them. The corresponding values are presented in Table 5.

Hence, it is observed that the outer weights are significant for the formative constructs. Additionally, the VIF of the indicators for the formative constructs are

below the threshold i.e., $VIF < 5$, indicating that there are no multicollinearity issues. Likewise, The VIF between the latent formative constructs (project governance, sustainability, and project success) is 1.529 which is below the cutoff value given by Hair et al. (2017).

In aggregation, the measurement model confirmed both sufficient convergent validity and discriminant validity for the reflective (lower order) variables. And, it is also noted for the formative (Higher Order) constructs that the outer weights are significant and there are no multicollinearity issues, allowing us to proceed to our stage two i.e., the structural model analysis. The visual representation of the second stage of the measurement model is given in Figure 3.

Table 5
Results of assessment of measurement model for higher order constructs

Formative Constructs	Scale Type	Indicators	Weights	P Value	VIF
Project Success	Formative	Project Efficiency	0.313	0.000	2.067
		Organizational Benefits	0.143	0.036	2.903
		Project Impact	0.205	0.006	2.917
		Future Potential	0.352	0.000	2.808
Project Governance	Formative	Stakeholder Satisfaction	0.147	0.022	2.416
		Control	0.549	0.000	1.478
Sustainability	Formative	Stakeholder	0.580	0.000	1.478
		Environment	0.344	0.000	1.514
		Social	0.320	0.000	1.895
		Economic	0.535	0.000	1.595

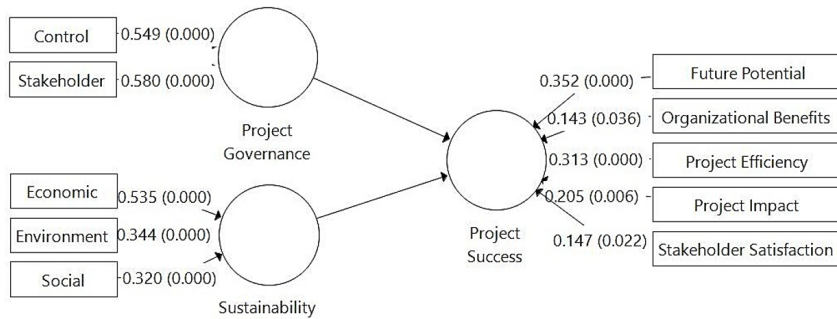


Figure 3. Measurement model for higher order constructs

Structural Model

It is hypothesized in this study that project governance and sustainability have a positive effect on the project success of the public sector organizations. By using the partial least square analysis, it is empirically verified that project governance ($\beta = 0.171$, $p < 0.000$) and sustainability ($\beta = 0.692$, $p < 0.000$) have a positive impact on the project success of the public sector organizations explaining roughly 64% of variance in project success ($R^2 = 0.64$). In addition,

the effect size of R^2 is important because it determines the strength of the variance explained. Cohen (1988) considered an affect size of 0.02 as small, 0.15 as medium, and 0.35 as large.

Thus, according to Cohen’s criteria, the effect of project governance on project success is small ($F^2 = 0.056$) and it is also determined that the effect of sustainability on project success is large ($F^2 = 0.912$). The summary of the structural model is presented in Table 6.

Table 6

Summary of the structural model

Hypothesis	Std. Beta	P-Value	T-statistic	Decision
Project Governance → Project Success	0.171	0.000	16.745	Supported
Sustainability → Project Success	0.692	0.000	20.837	Supported

DISCUSSION

This paper investigates the relationship between project governance, sustainability, and project success of public sector organizations of Pakistan. The results of this study have provided empirical evidence in support of the formulated hypotheses. Furthermore, our findings have confirmed

that there is a significant positive effect of project governance ($\beta = 0.171$) and sustainability ($\beta = 0.692$) on project success.

Moreover, the results are consistent with the findings of Joslin and Müller (2016), who stated that the dimensions of project governance had a significant impact on the project success. Also, the outcomes

of this present study are in coherence with the findings of Young et al. (2013) who analyzed secondary data to establish similar conclusions. Additionally, this study provides empirical support to the theoretically hypothesized relationship of project governance and project success by Bekker and Steyn, (2009) and Brownill and Carpenter, (2009). Similarly, the results of this study reinforce the findings of Ojiako et al. (2014) who stated that if governance structures on projects were managed properly, the probability of achieving success increased.

Also, empirical evidence is established in favor of the argument presented by Lapiņa & Aramina (2011) that sustainability may impact the success of the projects. Based on the results, it has been found out that sustainability has a stronger effect on project success. These results are also in coherence with the findings of Sánchez (2015), and Silvius and Schipper (2015), who theoretically bridged these two concepts.

Previously, Ahmad et al. (2015) revealed in their study, how soundness of business, planning, quality performance, and past performance affected the project success in the public sector organizations of Pakistan. Likewise, Khan et al. (2013a) suggested that factors such as project management competence, organizational environment, financial control and top management support. contributed to the achievement of project success, whereas, to our best knowledge, this study was the first attempt of determining the role of project governance and sustainability in attaining

successful results on public sector projects in Pakistan.

CONCLUSION

This undertaken quantitative research aimed at determining the effect of project governance and sustainability in project success in the public sector organizations of Pakistan. After empirically testing the hypothesized research model, it has been proved that there is a significant positive impact of project governance and sustainability on project success. Also, the research question that was posed earlier can now be answered. Our hypothesis (H.1) is supported by a relatively small effect size ($F^2 = 0.056$), whereas our hypothesis (H.2) is supported by a large effect size (0.912). Furthermore, it has been found out that almost 64% of the variance is explained in project success by project governance and sustainability.

However, we measured project governance using two different dimensions (stakeholder and control), as suggested by Müller and Lecoivre (2014). It is observed from the results that stakeholder dimension explains a greater portion of the variance in project governance than control. This indicates that the stewards who are the project managers should attend to the needs of the various stakeholders rather than exercising control on the project.

Also, it is recommended that sustainability should be measured as an aggregate of environmental, social, and economic perspective on the public sector projects in Pakistan. It is further suggested

that the practitioners in Pakistan and other developing countries should focus on adopting environmental friendly, socially responsible, and economically viable policies in public sector projects. Similarly, project efficiency contributes the most to project success as a dimension of the construct. It proves that in Pakistan there is a greater need for project managers to focus on the triple constraint criteria (time, cost, and quality) to measure the success of their projects.

Moreover, a number of project-related staff members were contacted - 425 valid responses were collected across Pakistan from five different sectors. The large number of respondents implies the willingness of the public sector project managers' participation in the study. Managers with a vast experience were more responsive, being mainly from engineering/construction industry.

Additionally, we contribute to the body of knowledge by concluding that project governance and sustainability behave as an antecedent to project success. Finally, scientific proof has been presented to practitioners to improve governance and sustainability in projects to achieve project success.

STRENGTHS AND LIMITATIONS

In the present study, a rational sample of project-related staff is collected from throughout Pakistan, covering all the provinces and the federal territory. Additionally, professional respondents were approached, which resulted in improved

responses. Similarly, PLS-SEM is used for the empirical analysis of the research model, which provides more robust and stringent results as compared to the traditional methods.

However, in this study we analyzed the relationship between the higher order variables which may be considered as a limitation of this study. In future, researchers can study the effect of project governance and sustainability on the different dimensions of project success. Another limitation of the study is that it was conducted in the context of public sector organizations of Pakistan, whereas in future, researchers can analyze the relationship in different geographical regions, focusing on the private sector.

REFERENCES

- Ahmad, A., Younis, M. S., Ahmad, N., & Anwar, N. (2015). Critical factors influencing the project success in Pakistan. *Mediterranean Journal of Social Sciences*, 6(3), 815–822.
- Albrecht, P., Burandt, S., & Schaltegger, S. (2007). Do sustainability projects stimulate organizational learning in universities? *International Journal of Sustainability in Higher Education*, 8(4), 403-415.
- Asian Development Bank. (2016). ADB helps address Pakistan's development needs for energy, transport, agriculture, natural resources, rural development, water supply, urban infrastructure and services, public sector management, and finance [Fact Sheet]. Retrieved June 06, 2017, from <https://www.adb.org/sites/default/files/publication/27786/pak-2016.pdf>
- Atkinson, R. (1999). Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria.

- International Journal of Project Management*, 17(6), 337-342.
- Badewi, A. (2016). The impact of project management (PM) and benefits management (BM) practices on project success: Towards developing a project benefits governance framework. *International Journal of Project Management*, 34(4), 761-778.
- Balochistan to stop funding copper, gold project. (2015, February 11). *Dawn*. Retrieved July 19, 2017, from <https://www.dawn.com/news/1162836>
- Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: Guidelines for using reflective-formative type models. *Long Range Planning*, 45(5), 359-394.
- Bekker, M. C., & Steyn, H. (2009). Defining 'project governance' for large capital projects. *South African Journal of Industrial Engineering*, 20(2), 81-92.
- Bernardo, M. D. R. (2014). Performance indicators for enhancing governance of projects. *Procedia - Social and Behavioral Sciences*, 119, 55-64.
- Bohne, R. A., Klakegg, O. J., & Lædre, O. (2015). Evaluating sustainability of building projects in urban planning. *Procedia Economics and Finance*, 21(2212), 306-312.
- Brent, A. C., & Labuschagne, C. (2007). An appraisal of social aspects in project and technology life cycle management in the process industry. *Management of Environmental Quality: An International Journal*, 18, 413-426.
- Brownill, S., & Carpenter, J. (2009). Governance and 'Integrated' planning: The case of sustainable communities in the Thames Gateway, England. *Urban Studies*, 46(2), 251-274.
- Cabinet Office. (2013). *The major projects authority annual report 2013: Making projects world class*. London, England: Cabinet Office.
- Cadbury, A. (2002). *Corporate governance and chairmanship: A personal view*. Oxford, England: Oxford University Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Abingdon, England: Routledge,
- Cooke-Davies, T. (2002). The "real" success factors on projects. *International Journal of Project Management*, 20(3), 185-190.
- Cooper, D. R., & Schindler, P. S. (2014). *Qualitative research. Business research methods*. New York, USA: McGraw-hill/Irwin.
- Crawford, L. H., & Cooke-Davies, T. J. (2005). Project governance: The pivotal role of the executive sponsor. *PMI Global Congress*, North America, Toronto, Canada. Retrieved June 21, 2017, from <https://www.pmi.org/learning/library/project-governance-pivotal-role-executive-sponsor-7447>
- Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management*, 21(2), 89-95.
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of marketing research*, 382-388.
- Ghosh, H. (2015, December 9). Failed power projects shackle India's energy growth. *India Spend*. Retrieved May 12, 2017, from <http://www.indiaspend.com/cover-story/failed-power-projects-shackle-indias-energy-growth-90531>
- Gray, R. J. (2001). Organisational climate and project success. *International Journal of Project Management*, 19(2), 103-109.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Englewood Cliffs, USA: Prentice Hall.
- Hair, J. F. J., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)*.

- Long range planning*. Los Angeles, USA: Sage Publications.
- Hannan, S., & Sutherland, C. (2014). Mega-projects and sustainability in Durban, South Africa: Convergent or divergent agendas? *Habitat International*, 45, 205-212.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Johnston, P., Everard, M., Santillo, D., & Robèrt, K.-H. (2007). Reclaiming the definition of sustainability. *Environmental Science and Pollution Research*, 14(1), 60-66.
- Joslin, R., & Müller, R. (2015). Relationships between a project management methodology and project success in different project governance contexts. *International Journal of Project Management*, 33(6), 1377-1392.
- Joslin, R., & Müller, R. (2016). The relationship between project governance and project success. *International Journal of Project Management*, 34(4), 613-626.
- Khan, K., Turner, J. R., & Maqsood, T. (2013a). Factors that influence the success of public sector projects in Pakistan. In *Proceedings of IRNOP 2013 Conference* (pp. 17-19). Oslo, Norway: BI Norwegian Business School.
- Khan, M., Majid, A., Yasir, M., & Arshad, M. (2013b). Corporate social responsibility and corporate reputation: A case of cement industry in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 5(1), 843-858.
- Khan, M. A. (2000). Planning for and monitoring of project sustainability a guideline on concepts, issues and tools. *Monitoring and Evaluation News*. Retrieved June 18, 2017, from <http://www.mande.co.uk/docs/khan.htm>
- Koskinen, K. U. (2001). Tacit knowledge as a promoter of success in technology firms. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences* (pp. 9). Maui, USA: IEEE.
- Krejcie, V. R., & Morgan, W. D. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30, 607-610.
- Lapiņa, I., & Aramina, D. (2011). Competence based sustainable development: Quality of education. *Management Theory and Studies for Rural Business and Infrastructure Development*, 26(2), 138-145.
- Marshall, M. N. (1996). The key informant technique. *Family practice*, 13(1), 92-97.
- Martínez, P., Pérez, A., & del Bosque, I. R. (2013). Measuring corporate social responsibility in tourism: Development and validation of an efficient measurement scale in the hospitality industry. *Journal of Travel & Tourism Marketing*, 30, 365-385.
- Müller, R., & Jugdev, K. (2012). Critical success factors in projects. *International Journal of Managing Projects in Business*, 5(4), 757-775.
- Müller, R., & Lecoeuvre, L. (2014). Operationalizing governance categories of projects. *International Journal of Project Management*, 32(8), 1346-1357.
- Müller, R., Zhai, L., Wang, A., & Shao, J. (2016). A framework for governance of projects: Governmentality, governance structure and projectification. *International Journal of Project Management*, 34(6), 957-969.
- Müller, R., & Turner, R. (2007). The influence of project managers on project success criteria and project success by type of project. *European Management Journal*, 25(4), 298-309.

- Munns, A. K., & Bjeirmi, B. F. (1996). The role of project management in achieving project success. *International Journal of Project Management*, 14(2), 81-87.
- NAO. (2011). *Guide: Initiating successful projects*. London, England: National Audit Office.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychological theory*. New York, USA: MacGraw-Hill.
- Ojiako, U., Chipulu, M., Ashleigh, M., & Williams, T. (2014). Project management learning: Key dimensions and saliency from student experiences. *International Journal of Project Management*, 32(8), 1445-1458.
- Opoku, A., Cruickshank, H., & Ahmed, V. (2015). Organizational leadership role in the delivery of sustainable construction projects in UK. *Built Environment Project and Asset Management*, 5(2), 154-169.
- Pinto, J. K., & Mantel, S. J. (1990). The causes of project failure. *IEEE Transactions on Engineering Management*, 37(4), 269-276.
- Pinto, J. K., & Slevin, D. P. (1988). Project success: Definitions and measurement techniques. *Project Management Journal*, 19, 67-71.
- Raymond, L., & Bergeron, F. (2008). Project management information systems: An empirical study of their impact on project managers and project success. *International Journal of Project Management*, 26(2), 213-220.
- Rehman, A. U., Khan, A. M., & Khan, R. A. (2011). Measuring training effectiveness: A case study of public sector project management in Pakistan. *Journal of Diversity Management*, 6(1), 39-48.
- Renz, P. S. (2007). *Project governance: Implementing corporate governance and business ethics in nonprofit organizations*. Heidelberg, Germany: Physica-Verlag.
- Rolstadås, A., Tommelein, I., Schiefloe, P. M., & Ballard, G. (2014). Understanding project success through analysis of project management approach. *International Journal of Managing Projects in Business*, 7(4), 638-660.
- Sage, D., Dainty, A., & Brookes, N. (2014). A critical argument in favor of theoretical pluralism: Project failure and the many and varied limitations of project management. *International Journal of Project Management*, 32(4), 544-555.
- Sánchez, M. A. (2015). Integrating sustainability issues into project management. *Journal of Cleaner Production*, 96, 319-330.
- Santos, V., & Varajão, J. (2015). PMO as a key ingredient of public sector projects' success – Position paper. *Procedia Computer Science*, 64, 1190-1199.
- Schwaninger, M. (2015). Organizing for sustainability: A cybernetic concept for sustainable renewal. *Kybernetes*, 44(6/7), 935-954.
- Serrador, P., & Pinto, J. K. (2015). Does agile work? — A quantitative analysis of agile project success. *International Journal of Project Management*, 33(5), 1040–1051.
- Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and analysis of moderator variables. *Journal of Marketing Research*, 18(3), 291-300.
- Shenhar, A. J., & Dvir, D. (2007). *Reinventing project management: The diamond approach to successful growth and innovation*. Boston, USA: Harvard Business Review Press.
- Silvius, A. J. G., & Schipper, R. P. J. (2015). A conceptual model for exploring the relationship between sustainability and project success. *Procedia Computer Science*, 64, 334-342.
- Thomson, C., & El-Haram, M. (2014). Potential and implications of sustainability action plans: Lessons from the Greater Middlehaven Regeneration Project. *Built Environment Project and Asset Management*, 4(1), 108-122.

- Toivonen, A., & Toivonen, P. U. (2014). The transformative effect of top management governance choices on project team identity and relationship with the organization - An agency and stewardship approach. *International Journal of Project Management*, 32(8), 1358-1370.
- Too, E. G., & Weaver, P. (2014). The management of project management: A conceptual framework for project governance. *International Journal of Project Management*, 32(8), 1382-1394.
- Turner, J. R., (2009). *The handbook of project-based management: Leading strategic change in organizations*. Chicago, USA: McGraw-hill.
- Turner, J. R., Anbari, F., & Bredillet, C. (2013). Perspectives on research in project management: The nine schools. *Global Business Perspectives*, 1(1), 3-28.
- Ullah, F., Thaheem, M. J., Siddiqui, S. Q., & Khurshid, M. B. (2017). Influence of Six Sigma on project success in construction industry of Pakistan. *The TQM Journal*, 29(2), 276-309.
- Viswanathan, M., & Kayande, U. (2012). Commentary on "common method bias in marketing: Causes, mechanisms, and procedural remedies". *Journal of Retailing*, 88(4), 556-562.
- Willard, M., Wiedmeyer, C., Flint, R. W., Weedon, J. S., Woodward, R., Feldman, I., & Edwards, M. (2010). The sustainability professional: 2010 competency survey report. *Environmental Quality Management*, 20(1), 49-83.
- World Commission on Environment and Development. (1987). *Our common future*. New York, USA: Oxford University Press.
- Young, R., Poon, S., & Wong, A. (2013). Does project governance lead to successful projects? In H. Deng, & C. Standing (Eds.), *ACIS 2013: Information systems: Transforming the future: Proceedings of the 24th Australasian Conference on Information Systems*. Melbourne, Australia: RMIT University.
- Zhong, Y., & Wu, P. (2015). Economic sustainability, environmental sustainability and constructability indicators related to concrete- and steel-projects. *Journal of Cleaner Production*, 108, 748-756.