

# Empirical Study on Causes of Project Delays

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## I. INTRODUCTION

**Abstract**—Renowned offshore organizations are drifting towards collaborative exertion to win and implement international projects for business gains. However, devoid of financial constraints, with the availability of skilled professionals, and despite improved project management practices through state-of-the-art tools and techniques, project delays have become a norm these days. This situation calls for exploring the factor(s) affecting the bonding between project management performance and project success. In the context of the well-known 3M's of project management (that is, manpower, machinery, and materials), machinery and materials are dependent upon manpower. Because the body of knowledge inveterate on the influence of national culture on men, hence, the realization of the impact on the link between project management performance and project success need to be investigated in detail to arrive at the possible cause(s) of project delays. This research initiative was, therefore, undertaken to fill the research gap. The unit of analysis for the proposed research exertion was the individuals who had worked on skyscraper construction projects. In reverent studies, project management is best described using construction examples. It is due to this reason that the project oriented city of Dubai was chosen to reconnoiter on causes of project delays. A structured questionnaire survey was disseminated online with the courtesy of the Project Management Institute local chapter to carry out the cross-sectional study. The Construction Industry Institute, Austin, of the United States of America along with 23 high-rise builders in Dubai were also contacted by email requesting for their contribution to the study and providing them with the online link to the survey questionnaire. The reliability of the instrument was warranted using Cronbach's alpha coefficient of 0.70. The appropriateness of sampling adequacy and homogeneity in variance was ensured by keeping Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity in the range  $\geq 0.60$  and  $< 0.05$ , respectively. Factor analysis was used to verify construct validity. During exploratory factor analysis, all items were loaded using a threshold of 0.4. Four hundred and seventeen respondents, including members from top management, project managers, and project staff, contributed to the study. The link between project management performance and project success was significant at 0.01 level (2-tailed), and 0.05 level (2-tailed) for Pearson's correlation. Before initiating the moderator analysis test for linearity, multicollinearity, outliers, leverage points and influential cases, test for homoscedasticity and normality were carried out which are prerequisites for conducting moderator review. The moderator analysis, using a macro named PROCESS, was performed to verify the hypothesis that national culture has an influence on the said link. The empirical findings, when compared with Hofstede's results, showed high power distance as the cause of construction project delays in Dubai. The research outcome calls for the project sponsors and top management to reshape their project management strategy and allow for low power distance between management and project personnel for timely completion of projects.

**Keywords**—Causes of construction project delays, construction industry, construction management, power distance.

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DUBAI has undergone a massive facelift since the year 1900 [1]. At that time agriculture, seafaring, fishing, mining, nomadic animal farming and trade of gems [2] were the main contributors to the local economy. The discovery of oil in 1966 turned the tides in Dubai's favor. Its massive export in 1969 earned the city [3] huge revenues which were cordially utilized by the Royal regime of Dubai to put their society on the road to success and prosperity [4]. As of today, with a population of 2.1 million people [5], Dubai facilitates between 8 million to 10 million tourists each year, with a record of 12 million visitors in 2014 [6].

The contribution made by United Arab Emirates (UAE) Construction sector to Dubai's GDP in 2008, 2011 and that estimated for 2015 were 10.6%, 10.3%, and 11.1%, respectively [7]. Adding to the list of ongoing impressive construction projects, Dubai also has planned for mega projects like the building of a smart city under the name the "Desert Rose" [8]. Tourist and holiday attraction site constructions are also in full swing. The newest on the list is the Al Mamzar Beachfront – a project estimated at 10 billion dirhams. Also, projects such as the Bluewater Island, Dubai Creek Harbor, Dubai theme parks, and Dubai Water Canal are worth billions of dirhams. Aladdin City and Al Mamzar projects are expected to get started shortly. Following the construction heroics of Burj Khalifa, Dubai is yet again all set to stretch to the sky through a skyscraper project worth about \$1bn (£700m).

This research exertion, however, was carried out in the context of completed skyscraper construction projects, and the effort remained to accentuate on the contributing factors that might have led to project delays.

The subsequent discussion has the following arrangement: Section II discusses the background of the study. Section III covers the literature review. Section IV focuses on the problem, while the research objectives, questions, hypothesis, and methodology are elaborated in Section V. Test results and discussion are covered in Section VI. Section VII concludes the study.

## II. BACKGROUND

National output is a function of net capital stock. Any change in the net capital stock has a direct impact on national output. Hence, for an economic boom, investment in capital share is essential [9], [10]. Likewise, investments in economic infrastructure also add to the national capital. For example, investments in electricity, communication, and roads are a source of boosting up the national capital stock, which in consequence has a growing influence on national output.

The construction industry contributes to the national

economy [11]. It does so by generating income or adding value to a state's infrastructure, as is evident from the empirical findings of [12]. The construction industry also plays a significant role in a country's strategic development. Governments invest heavily in this sector to ensure its economic stability. For instance, during the recession period, some states relied mostly on construction investments to raise employment opportunities and their national economy [13]. However, current concerns over the construction industry's slow outturn have raised doubt about its role in economic development which needs an in-depth investigation.

The body of knowledge explains a project as a temporary work initiated to deliver a unique product or service within stipulated time frame. The project reduces business complexity [14] and is the vehicle to bring organizational change [15]. Reference [16] has defined project management as both an art and a science. The art part constitutes the soft skills achieved through understanding, discipline, and business drive. Being organized and having a firm and practical business handling approach in achieving objectives are what that makes it a science. Project managers are expected to master this skill-set for efficient and effective project administration.

An important aspect to be kept in mind while evaluating any project is that project performance and project management performance (PMP) merit separately [17]; a project can be successfully delivered despite the failure of project management [18]. For example, the Sydney Opera House project was a failure regarding its project management, but yet the project is a massive success. Likewise, project management may help team members to achieve personal landmarks, but the project can fail [19].

In 1980, not only did that the concept of success dimensions gained popularity, but it also facilitated in conceptualizing that the meaning of success which varies according to people's perception [20]-[24]. Earlier research and research models on the subject were confined around the project's triple constraints [25], but [26], [27] opined that this does not call for discontinuing research on modeling PMP on factors other than scope, time, and cost.

It is hard to disavow the contribution of quality management (QM) for improved PMP [28]. Nowadays, the knowledge drawn from QM is oppositely used to develop theoretical frameworks that link project and PMP [29] to increase the possibility of successful (on time) project delivery [30].

National culture plays a significant role in managing projects [31] and the style of the management [32]. Because of its imperceptibility, people are unaware of the impact that culture has on their persona, empathies, opinions, and responses. Age and gender differences can intensely affect individual perspicacity that in turn is swayed by cultural divergence [33]. Hence, it is domineering to contemplate the influence National culture has on the PMP, processes, and practices applied in the construction industry [34]. The processing speed is subjective to the political, social, and institutional culture [35] that correlates with the partnerships

and organizing processes [36]. It is, therefore, evident that project success (PS) (inclusive of on time delivery) can be influenced by the national culture of the host country [37], as avowed by [36]. It is, therefore, opined that national culture-based studies in a project oriented construction industry such as Dubai, are of immense significance.

### III. LITERATURE REVIEW

Construction delays not only impede the productivity of the construction industry, but also perpetrate heavy blows to the national economy [38]. Over a period, diversified factors have been brought forward that have led to construction delays [39]. For example, payment disputes, contractor's maladministration, lack of technical expertise [40], and material cost escalation [41] have been acknowledged as the key factors behind construction delays [42].

Incompetent contractors [43], inferior quality construction designs [44] and poor valuation [45], maladministration at the construction site [46] and procedural defilements [47] have also been acknowledged as principal causes behind construction delay [48]. Changes in supply orders [49], [50], unawareness on the client's part [51] and contractors [52], poor planning [53], inappropriate scheduling [49] and averseness in financing on the contractor's part are some other factors leading to construction delays [53]. Mismanagement in handling project stakeholders [54], ineffectual deaccessioning by project managers [55], poor communication [56], mishandling of HR [42], and a dearth of quality control [51] are an equal contributor to schedule delay in the construction industry. Table I summarizes some of the recently conducted research to identify causes of construction projects delays.

### IV. RESEARCH PROBLEM

Despite increasing interest in project management education and certification [52], project management practices are belligerent with little performance [53]. The percentage of project completion rate is not in proportion to the number of projects undertaken, regardless of the use of state-of-the-art project management techniques, equipment, and process enhancing tools. The fact of the matter is that this trend is consistent for the last five years [54]. Project managers are finding the timely delivery of the product or services difficult [55], [56]. According to the [57], 2.5% of the projects attained success, but by compromising on scope, cost, schedule and business. Around 10% of cost and schedule overheads accounted for 30% of the completed projects, whereas 25% to 50% was squandered in managing project labor. Management inadequacies cost project owners between \$15.6 billion and \$36 billion, while rework accounted for 2% to 20% of the overall expenses. The report further extended that each year \$4 billion to \$12 billion are spent on dispute resolutions and construction claims. This situation requires a thorough investigation to find the Allied cause(s) of project failures and suggest appropriate remedial measure(s) accordingly.

TABLE I  
CAUSES OF CONSTRUCTION PROJECTS DELAYS

Cause	Year	Researchers	Reference
Scope / Design Errors	2016	K.Z. Sha'ar, S.A. Assaf, T. Bambang, M. Babsail & A.M. Abd El Fattah, Pawanhari and Gupta	[44]
	2015	El-Sayegh and Mansour	[58]
	2014	Marzouk and El-Rasas	[68], [101]
	2013	Akogbe RKT M Akogbe, X Feng, J Zhou, JB Yang, MY Chu, KM Huang, Q Shi, J Zuo, R Huang, J Huang, S Pullen, Mundia Muya, Chabota Kaliba, Balimu Sichombo & Winston Shakantu	[60]-[63]
	2012	A Kazaz, S Ulubeyli, NA Tuncbilekli, H Doloi, A Sawhney, KC Iyer, S Rentala	[64], [65]
Poor Planning	2016	Pawanhari and Gupta	[44]
	2015	Tarhini, A Tarhini, M Fakih, M Arzoky, T Tarhini, I Zafar, T Yousaf, S Ahmed, Marzouk and El-Rasas,	[66]-[70]
	2014	Mundia Muya, Chabota Kaliba, Balimu Sichombo & Winston Shakantu, Salunkhe, A. A., & Patil, R. S.	[63], [87]
Lack of / Poor Decision Making	2013	RKT M Akogbe, X Feng, J Zhou,	[60], [101]
	2012	H Doloi, A Sawhney, KC Iyer, S Rentala	[65], [79]
	2016	Mohd Nasrun Mohd Nawi, Mohamed Nor Azhari Azman, Wan Nadzri Osman, Kamaruddin Radzuan, Mazri Yaakob, Bagaya and Song, Kumar, Shirowzhan, M. Shirowzhan, M. Shanaki, M. H. Sebt, H. Naghash Toosi	[40], [42], [71], [72], [74]
	2015	El-Sayegh and Mansour, J. McCord, M. McCord, P.T. Davis, M. Haran, W.J. Rodgers	[58], [75]
	2014	M. H. Sebt, H. Naghash Toosi, El-Sayegh and Mansour, P.T. Davis, M. Haran, W.J. Rodgers	[58]
Lack of Communication / Coordination between Project Stakeholders	2013	Marzouk and El-Rasas, RKT M Akogbe, X Feng, J Zhou, BG Hwang, LP Leong	[60], [68], [76], [101]
	2012	Wong and Vimonsatit	[77]
	2016	Ayodeji Ogunde, Dele Owolabi, K.O. Olusola, Patience Tunji-Olayeni, Lekan Amusan, Opeyemi Joshua, A. O Akhigbe, Patanakul, Seung Heon Han; Sungmin Yun; Hyoungkwan Kim; Young Hoon Kwak; Hyung Keun Park; Sang Hyun Lee Hiyassat, Mohammed A. Hiyassat, Montaser A. Hiyari & Ghaleb J. Sweis	[80]-[82]
	2015	BG Hwang, LP Leong, Wong and Vimonsatit, Enshassi and Mosa, Muiang, AM Jacomit, AD Granja	[76], [77], [83]-[85]
	2014	Wong and Vimonsatit, Marzouk and El-Rasas	[68], [77]
Financial Constraints (owner/ client)	2013	Alinaitwe, Alinaitwe, Henry; Apolot, Ruth; Tindiwensi, Dan, Megha and Rajiv	[86], [99]
	2012	Meng, Doloi, H Doloi, A Sawhney, KC Iyer, S Rentala	[65], [79]
	2016	Pawanhari and Gupta, An, JT O'Connor, N Torres, J Woo, Parvaneh and El-Sayegh	[44], [58]
	2015	J. McCord, M. McCord, P.T. Davis, M. Haran, W.J. Rodgers, Mubarak, Hoberg and Maksimovic	[75], [88]
	2014	Marzouk and El-Rasas, Taylan, O Taylan, AO Bafail, RMS Abdulaal, MR Kabli	[68], [89]
Contractual Disputes	2013	Abbasnejad and Izadi Moud, RKT M Akogbe, X Feng, J Zhou, BG Hwang, LP Leong	[60], [76], [90], [101]
	2012	Wong and Vimonsatit, A Kazaz, S Ulubeyli, NA Tuncbilekli	[64], [77]
	2016	Y Fang, YK Cho, S Zhang, E Perez, CK Lee, TW Yiu, SO Cheung, David Treacy, John P. Spillane, Paul Tansey, Shafique and Mufti, Wang, C. M., Xu, B. B., Zhang, S. J., & Chen, Y. Q., CM Harper, KR Molenaar	[73], [91]-[94], [114]
	2015	P Lu, S Guo, L Qian, P He, X Xu, H Ke, Z Cui, K Govindan, EK Zavadskas, R Eadie, T McLernon, A Patton	[47], [95]-[97]
	2014	Marzouk and El-Rasas, DHT Walker, J Harley, A Mills	[68], [98]
Construction Material (inferior quality, late delivery, and similar issues)	2013	Alinaitwe, Henry; Apolot, Ruth; Tindiwensi, Dan, Kikwasi, Berger, O Ogunsanmi	[99], [100], [102]
	2012	Lahdenperä, Li, H Li, D Arditi, Z Wang, H Doloi, A Sawhney, KC Iyer, S Rentala	[65], [79], [102]
	2016	Keng and Kamil, Marle and Vidal, Haidar	[104], [162], [103]
	2015	Jarkas and Haupt, Sibiya, Mukuka, Mitra and Wee Kwan Tan	[105]-[108]
	2014	B.A.K.S. Perera, Raufdeen Rameezdeen, Nicholas Chileshe & M. Reza Hosseini, Khanh and Kim	[109], [110], [114]
Site Management & Environment	2013	RKT M Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimonsatit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang	[60], [63], [76]-[78], [102]
	2012	H Doloi, A Sawhney, KC Iyer, S Rentala, Mitra and Wee Kwan Tan	[65], [108]
	2016	K.Z. Sha'ar, S.A. Assaf, T. Bambang, M. Babsail & A.M. Abd El Fattah, Pablo González; Vicente González	[79], [113], [114]
	2015	Keith Molenaar, and Francisco Orozco, El-Sayegh and Mansour	[93], [113]
	2014	Bonsang Koo and Martin Fischer, Ghoddousi, Parviz Ghoddousi, Omid Poorafshar, Nicholas Chileshe, M. Reza Hosseini, Marzouk and El-Rasas, O Taylan, AO Bafail, RMS Abdulaal, MR Kabli	[68], [89], [109], [112], [114]
Labor Issues	2013	BG Hwang, LP Leong, Wong and Vimonsatit, Abbasnejad and Izadi Moud, Akogbe RKT M Akogbe, JB Yang, CK Kao	[60], [76], [77], [90], [102]
	2012	H Doloi, A Sawhney, KC Iyer, S Rentala	[65], [79]
	2016	Naoum, Kumar, Santoso and Soeng	[116]
	2015	BG Hwang, X Zhao, LP Leong, Arashpour and Arashpour, El-Sayegh and Mansour	[76], [58], [102], [111]
	2014	Marzouk and El-Rasas, Ravisankar and AnandaKumar	[68], [117]
2013	Mundia Muya, Chabota Kaliba, Balimu Sichombo & Winston Shakantu, Kikwasi, Fallahnejad	[63]	
2012	A Kazaz, S Ulubeyli, NA Tuncbilekli, H Doloi, A Sawhney, KC Iyer, S Rentala, A Kazaz, S Ulubeyli, NA Tuncbilekli	[65], [79]	

	2016	Xu, Santoso and Soeng, Q Lu, J Won, JCP Cheng, Ahmad	[87], [116], [145]
	2015	El-Sayegh and Mansour, Sundar, Naoum	[46], [58]
Mismanagement	2014	Chen and Leu, Zouher Al-Sibaie, Eyad Zouher Al-Sibaie, Ali Mohammed Alashwal, Hamzah Abdul-Rahman, Umi Kalsum Zolkafli	[118]
	2013	Anyanwu, C. I., Ruparathna and Hewage	[115], [119]
	2012	Doloi, Basheka and Tumutegereize, Challal and Tkiouat	[79], [120], [121]

It can be understood from column one of Table I that the explicit reasons for project delays implicitly points at “men” as the real “cause”. While analyzing the 3M’s (manpower, machinery, and materials) of project management, it is evident that machine and material are dependent on men. This insinuation is in line with the contention that top management’s (men) support is critical for a project’s success [58].

Studies have confirmed that communication and ways of decision-making are governed by culture [59]. It is observed that a team member’s cultural values enact strong, indirect and moderating stimulus on the project teams [60]. Moreover, PS is linked with the perception of people judging it [61]. This inference is also in propinquity to the psychiatrists’ viewpoint, which asserts that the environment intervenes in shaping the human mind and its functioning. The social environment on the other hand, however, is inclined towards the culture people are groomed in [62], [63]. Hence, it is, in fact, the human side under the influence of national culture [64] that also needs consideration while probing for causes of project schedule delays.

The proposed study is an endeavor to fill in the research gap by examining the moderating influence of national culture on the bonding between PMP and PS. It also explores if top management, project managers, or project staff contribute differently to PMP and PS. A notable trait of this research is in its uniqueness, since to date no known research has been conducted to explore the said issue [65].

## V. RESEARCH METHODOLOGY

Research is the process of discovering and understanding some phenomena by examining and construing the gathered data [66]. It is performed systematically from the start until the end [67], and initiated through some query or concern over a phenomenon. The research context, its related queries, and stratagems help the researcher to comprehend ways to carry out the exploration of the type of effects that are likely to occur in the purview of the data gathered.

### A. Research Approach

Of the three popular research approaches namely: qualitative, quantitative, and hybrid (mix of the two approaches), the lateral mode of research suited this study. National cultural issues are frequently handled quantitatively that is driven epistemologically through positivistic bonds and biases [68]-[70]. Quantitative research operates on numeric, or discrete data gathered through polls, survey, or via some questionnaire using statistical or computational techniques [71], [72].

### B. Research Design

The research design emulates the line of action that the researcher shall adopt to acclimatize the components of studies in a comprehensible and coherent manner [73], [74]. It also warrants effective handling of the research problem. However, it is pertinent to mention here that the research problem only points at the type of strategy that is employed [75]. The research design for this research study is derived from [76] and given in Table II.

TABLE II  
RESEARCH PHASES

Phase	Elements
1	Literature review, theoretical substance, research questions, research objectives, and research hypothesis
2	Quantitative methods used, preference of cross-sectional study, sampling procedure, and data collection methods
3	Test Results and discussion
4	Limitations of the study, future work, and conclusion

### C. Research Model

This research endeavor was modeled around the five national culture dimensions proposed by [77], as explained in Table III and illustrated diagrammatically in Fig. 1.

TABLE III  
HOFSTEDE’S FIVE CULTURAL DIMENSIONS [77]

Sr. No.	Dimension	Assertion
1	Power Distance	People expect unequal power distribution. Depicts dictatorial and authoritarian mode of conduct in which peers have designated places.
2	Individualism	Everyone in the society thinks about her/himself and of their families only.
3	Uncertainty Avoidance	It is the peer’s intent to have contextual clarity about of things happening around them.
4	Masculinity	It is the degree up to which society is inclined towards success, gentility, insistence and material rewards for accomplishment.
5	Long Term Orientation	It is the extent to which society reacts towards its present and futuristic requirements.

### National Culture Explained through It’s Dimensions

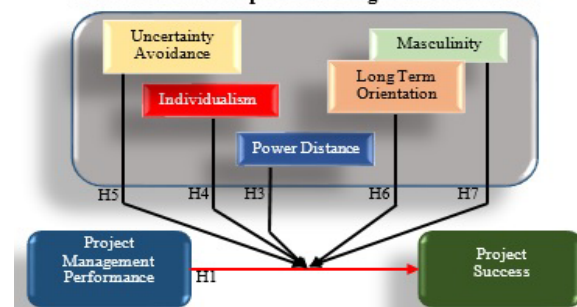


Fig. 1 Research Model used Study Type

### D. Research Hypothesis

Following were the research hypothesis:

- 1) There exists a positive relationship between PMP and PS.
- 2) Top Management, project managers, and project staff collectively contribute towards project management performance and project success.
- 3) Power Distance has a moderating effect on the bonding between PMP and PS.
- 4) Individualism has a moderating impact on the bonding between PMP and PS.
- 5) Uncertainty Avoidance has a moderating effect on the bonding between PMP and PS.
- 6) Long Term Orientation has a moderating effect on the bonding between PMP and PS.
- 7) Masculinity has a moderating effect on the bonding between PMP and PS.

A cross-sectional study compares the snapshot of the proceeding at a particular point in time. It does not, however, measure the changes induced by some intervention during the process [78], [79].

#### E. Unit of Analysis

For this research, the unit of analysis were the individuals who had worked in skyscraper construction projects, in any of the three roles namely a) Top Management (TM), Project Manager (PM), and project staff (PSt.). It is ostensive from the literature review that construction projects are preferred means of describing project management practices. Hence, the project-oriented city of Dubai was chosen as the target location to carry out this study.

#### F. Sample Size

A sample size of 377 was computed using the online tool [80] because of its recurrent reference in the literature reviewed for the survey.

#### G. Data Collection

As suggested by [81] that structured survey questionnaire as an instrument, is the best technique to conduct the cross-sectional study. Hence, a questionnaire adapted from the previous peer-reviewed research work was published online through the courtesy of the Project Management Institute (PMI) local chapter on the commendation of PMI, USA. In addition to the Construction Industry Institute (CII), Austin, Texas, the 23 UAE-based skyscraper construction firms were sent emails requesting their contribution and its further dissemination – an approach known as snowball sampling. During a period of two months, a total of 417 responses were obtained, of which nine were filtered out for not being related to skyscraper projects. The response rate, therefore, was 97.84%.

#### H. Design of Survey Questionnaire

The questionnaire consisted of four parts. Part I intended to collect demographic information. It comprised of a total of eleven questions. Part II unfolds the national culture influence within the purview of its Hofstede's defined cultural dimensions with five questions describing each aspect. Part III and Part IV contained questions to gauge on the relationship between PMP and PS based on their corresponding six and

five dimensions, respectively. A total of five questions (each) were used to assess each of the dimensions for PMP and PS, as well. A five-point Likert scale was used for measuring the response, with "1" representing strong disagreement, "2" denoting disagreement; "3" conveying a neutral response, and "4" and "5" corresponding to agreement and strong disagreement, respectively.

#### I. Reliability and Validity

Reliability measures the internal consistency of the construct for which a cutoff threshold  $\geq 0.7$  of Cronbach's alpha coefficient was chosen on the analogy of [82] to select contributing survey items. Kaiser–Meyer–Olkin (KMO)  $\geq 0.60$  [83], and Bartlett's test of sphericity for a value  $< 0.05$  [84] were monitored to maintain the appropriateness of sampling adequacy and homogeneity in their variances.

Factor analysis is a data reduction technique [85] through identification of underlying structure [86], [87]. Exploratory factor analysis (EFA) was performed using Varimax rotation. A cutoff threshold of 0.4 was used to load items [88] during the exploratory factor analysis.

#### J. Participants

Single-informant biasing was removed by asking for input from top management, project managers, and project team members. Participants surveyed had the demography as shown in Table IV.

TABLE IV  
RESEARCH PHASES

Item	Characteristics	N	Item	Characteristics	N
	<b>Gender</b>			<b>Country</b>	
	Male	315		America	42
	Female	94		Portugal	12
	<b>Age (Between)</b>			Spain	43
	20-29	170		China	18
	30-39	134		Dubai	28
	40-49	86		France	25
	50-59	18		Germany	21
	Above 60	1		India	17
	<b>Position</b>			Iran	12
	Top Management	7		Italy	20
	Middle Management	138		Japan	19
	Team Member	264		Malaysia	19
	<b>Education</b>			Greece	18
	BBA	54		Pakistan	18
	Degree in Project Management	121		Philippines	18
				Russia	12
	<b>PMP Certified</b>	234		South Africa	12
				United Kingdom	55
	<b>Experience in Construction Industry (Between)</b>			<b>Project completion (years)</b>	
	2-5	208		Less Than 2	52
	6-10	51		Between 2-5	259
	11-15	98		6-10	98
	Equal or above 16	52			

## VI. TEST RESULTS

Lately, Dubai has become a hub for construction projects. It has skilled resources, state-of-the-art machinery and equipment, and the latest project management techniques added with software tools. However, despite being free from fiscal constraints, construction projects in Dubai are lagging behind schedule. Hence, finding what possibly could cause this continuing schedule delay for construction projects may bridge the research gap. The research findings and appropriate remedy proposed after that can then be extended to future projects. With this approach, the researcher pursued the issue by focusing on the cultural context as more and more expats are entering into Dubai, a state that is full of opportunities.

After preliminary verification of the data collected through survey questionnaire, the confirmation of the first two hypothesis was carried out. It was followed by the moderator analysis, as subsequently explained.

## A. Testing Hypothesis # 1 (H1)

In conformance to [89], [90], the bivariate correlation was performed to find the strength of the association between PMP and PS. The correlation was significant at 0.01 level, as is shown in Table V.

TABLE V  
BIVARIATE CORRELATION BETWEEN PMP AND PS

	PS	PMP
Pearson Correlation	1	0.884**
PS Sig. (2-tailed)		0.000
N	408	408
Pearson Correlation	0.884**	1
PMP Sig. (2-tailed)	0.000	
N	408	408

\*\* Correlation is significant at the 0.01 level (2-tailed).

As it is apparent, a high correlation of 0.884 exists between PMP and PS which validate the first hypothesis (H1).

## B. Testing Hypothesis # 2 (H2)

One-way Analysis of Variance (ANOVA) alias "omnibus" test statistics [91] was performed to find the difference of the mean between the three independent groups of the variable labeled as "Position" namely: a) top management, b) project manager and c) project staff. However, before commencing the analysis, its prerequisite six assumptions should be met [92]-[94]. The dependent variable, in this case, was the bonding between PMP and PS (PMP\_PS). The assumptions are summarized in Table VI.

After verifying the six assumptions, the One-way ANOVA test was performed, and the results are shown in Table VII. The insignificance of One-way ANOVA for  $p > 0.05$  followed by the irrelevance of POST HOC test (that is  $p = 0.294, 0.214, 0.294, 0.816, 0.214, 0.816$  between PM and PSt., TM and PSt., and TP and PM, respectively) explicate that there is no substantial evidence which could establish the inequality of the three means. This validates the second hypothesis (H2) that top management, project manager, and project staff collectively contribute towards PMP and PS.

TABLE VI  
ASSUMPTIONS TO BE CONFIRMED BEFORE CONDUCTING ANOVA

#	Assumption
1	There must be at least one dependent variable which is measured on a continuous scale.
2	At least one independent variable must have two or more categorical, independent groups.
3	Independence of observations (that is, contiguous observations should be correlated) for the data set must be met.
4	No significant outliers are allowed in the groups of the independent variable about the dependent variable.
5	The dependent variable is approximately, normally distributed for each group of the independent variables.
6	Homogeneity of variances should exist in each group.

TABLE VII  
ONE-WAY ANOVA

	PMP_PS				
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.702	2	5.851	1.513	0.221
Within Groups	1566.051	406	3.867		
Total	1577.753	408			

## C. Appropriateness of the Model

Moderator analysis was performed to find the model fit and the effect of national culture within the purview of five of its dimensions namely: a) power distance, b) individualism, c) masculinity, d) uncertainty avoidance, and e) long-term orientation [77], on the relationship between PMP and PS. However, there are some assumptions to satisfy before initiating the process, which includes finding the variance caused by the independent variables both with and without the interaction term, test for linearity, multicollinearity, outliers, leverage points and important cases, test for homoscedasticity, and normality. Centering of independent variables is yet another condition before carrying out the moderator analysis.

## 1) Testing Hypothesis # 3 (H3)

After successfully testing the prerequisite assumptions, the moderator analysis was performed using the macro called PROCESS, an SPSS add-in programmed by [95] that automatically also does the centering of independent variables. The moderating effect is also plotted using the Excel sheet (formula) also provided by [95].

The overall model was  $F(3, 404) = 67.04, P < 0.001$ , and  $R^2$  Change = 28.94%. The predictors a) PMP:  $\beta = 0.5832, t(404) = 10.0415, P = 0.0000$  was significant – every unit effort put into the project, raises the prospects for PS by 0.5832 units; b) Power Distance:  $\beta = -0.1392, t(404) = -5.7068, P = 0.0000$  was significant; and c) for interaction Int\_1:  $\beta = -0.0508, t(404) = -5.4839, P = 0.0000$ . Johnson-Neyman significance at  $P = 0.05$  was also an indicator of the positive relationship [95] between PMP and PS. The interaction item contributed significantly because the conditional effect on the bonding between PMP and PS at different levels of power distance could be calculated through (1) and (2), respectively.

$$Y = \text{Constant} + 0.5832 * (\text{PMP}) - 0.1392 * (\text{Power Distance}) - 0.0508 * (\text{Power Distance} * \text{PMP}) \quad (1)$$

$$Y = \text{Constant} + 0.4439 * (\text{PMP}) \quad (2)$$

Above implied significance a) under lower influence,  $\beta = 0.8421$ ,  $t(404) = 13.8492$ ,  $P=0.0000$ , b) at average level of influence,  $\beta = 0.5832$ ,  $t(404) = 10.0415$ ,  $P=0.0000$ , and c) under high level of influence,  $\beta = 0.3243$ ,  $t(404) = 3.7437$ ,  $P=0.0000$ . Hence, it follows from the outcome that power distance has a negative influence on the link between PMP and PS. The moderating effect is depicted graphically in Fig. 2.

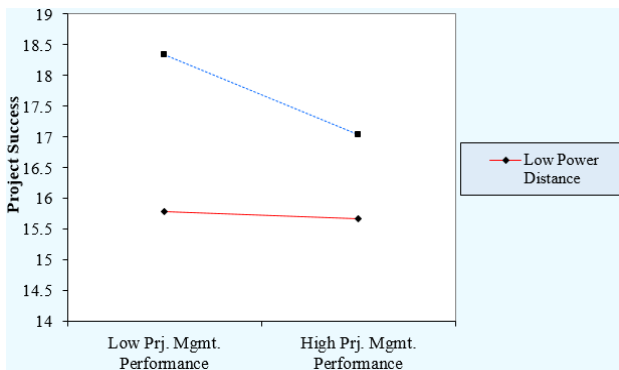


Fig. 2 Moderating Effect of Power Distance on the Link between PMP and PS

## 2) Testing Hypothesis # 4 - 7 (H4 – H7)

The remaining four dimensions of Hofstede's national culture [77] were also examined; however, the study revealed that the dimensions' individualism, masculinity, uncertainty avoidance, and long-term orientation did not have enough evidence to claim their moderating influence on the link between PMP and PS (for  $p = 0.1, 0.12, 0.16, 0.4$  for the corresponding dimensions).

## VII. DISCUSSION

Culture does matter [96] since it extends complexity to projects [97]. Complexity is instigated by human, system behavior and ambiguity, which acts as a variable in project management success [98]. It also has an impact on the leadership style and communication [99]-[101]. The emerging global, multicultural milieu is becoming a new norm for the projects [102]. Hence, it is necessary for project managers to consider and master the cultural facets of efficient management for their projects [103]. The dearth of cultural niche that can prevent the spread of skirmishes across the project is becoming an unfavorable cause for projects on schedule delivery [104], as evident from the results of this research.

Based on empirical findings it is desirous that businesses must exhibit and respond to different cultural understandings to make projects a success [105]. According to [106], a relationship exists between national culture and project management. Familiarity and cognizance of national culture are vital for PS [107]. PS must be seen in the purview of an active project management role within projects. This role must also be valued in perspective of the project, along with

benchmarks and long-term prospects [108]. National culture has an influence on project management [109], specifically in areas of planning and control, which affect project performance [106], [107]. The effectiveness of cross-cultural project teams has been emphasized by [110], where people from different national cultures bring the experience of diversified fields, various management concepts, and a blend of distinct skills which can be exploited to achieve success.

## VIII. RESEARCH LIMITATIONS

Following are some of the limitations of this study:

- The research focus was on Dubai's completed projects only.
- Data gathering was exclusively from the construction industry.
- Data collected for the study were analyzed only for those respondents who have worked on skyscraper construction projects (High rise buildings: 40+ stories).
- The research is cross-sectional and does not take into consideration the periodic assessment of a project's progress.
- Only democratic style of project leadership was addressed in the survey questionnaire.

## IX. WAY FORWARD

Future studies should take a global outlook on the issue. Longitudinal research can have a full grip on the project's proceedings that is, from initiation to the final project delivery to the client. Independent research studies can be done for other categories of high rise buildings. It is opined that exploration is further extended by taking into consideration the different environments to gain valuable insight into the impact of culture on organizational performance and operations management, especially while formulating project teams.

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