Empirical Study on Causes of Project Delays
Khan Farhan Rafat, Riaz Ahmed

I. INTRODUCTION

Dubai has undergone a massive facelift since the year 1990 [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 output in 166
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 output 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 successful 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, empathy, 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 procedurals 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>
<thead>
<tr>
<th>Cause</th>
<th>Year</th>
<th>Researchers</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope / Design Errors</td>
<td>2013</td>
<td>Akogbe RKTM Akogbe, X Feng, J Zhou, JB Yang, KY Chu, KM Huang, Q Shi, J Zuo, R Huang, J Huang, S Pullen, Mundia Muya, Chabota Kaliba, Balimu Sichombo &amp; Winston Shaktanu</td>
<td>[60]-[63]</td>
</tr>
<tr>
<td>Poor Planning</td>
<td>2014</td>
<td>Mundia Muya, Chabota Kaliba, Balimu Sichombo &amp; Winston Shaktanu, Salunkhe, A. A., &amp; Patil, R. S.</td>
<td>[63], [87]</td>
</tr>
<tr>
<td>Financial Constraints</td>
<td>2015</td>
<td>BG Hwang, LP Leong, Wong and Vimsonatsit, Enslassi and Mosa, Muiang, AM Jacomit, AD Granja</td>
<td>[76], [77], [83]-[85]</td>
</tr>
<tr>
<td>Contractual Disputes</td>
<td>2015</td>
<td>J. McCord, M. McCord, P.T. Davis, M. Haran, W.J. Rodgers, Mubarak, Hoberg and Maksimovic</td>
<td>[75], [88]</td>
</tr>
<tr>
<td>Construction Material (inferior quality, late delivery, and similar issues)</td>
<td>2015</td>
<td>B.A.K.S. Perera, Raufdeen Rameezdeen, Nicholas Chileshe &amp; M. Reza Hosseini, Khanh and Kim</td>
<td>[109], [110], [114]</td>
</tr>
<tr>
<td>Site Management &amp; Environment</td>
<td>2015</td>
<td>Keith Molenaar, and Francisco Orozco, El-Sayegh and Mansour</td>
<td>[93], [113]</td>
</tr>
<tr>
<td>Labor Issues</td>
<td>2014</td>
<td>Marzouk and El-Rasas, Ravissanukar and Anandakumar</td>
<td>[68], [117]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>RBH Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills,</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Akogbe, X Feng, J Zhou, BG Hwang, LP Leong, Wong and Vimsonatsit, C Kaliba, M Muya, K Mumba, RJ Yang, PXW Zou, Y Wang, K. Zhou</td>
<td>[60]-[63], [76]-[78], [102]</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>H Doloj, A Sawhney, KY Chu, S Rentala, Muiang, AM Jacomit, AD Granja</td>
<td>[65], [79]</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Marzouk and El-Rasas, DHT Walker, J Harley, A Mills</td>
<td>[68], [98]</td>
</tr>
</tbody>
</table>
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 positivist 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.

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.

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 ≥ 0.7 of Cronbach’s alpha coefficient was chosen on the analogy of [82] to select contributing survey items. Kaiser–Meyer–Olkin (KMO) ≥ 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>
<thead>
<tr>
<th>Gender</th>
<th>Characteristics</th>
<th>N</th>
<th>Country</th>
<th>Characteristics</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>America</td>
<td>42</td>
<td>Female</td>
<td>Portugal</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>China</td>
<td>18</td>
<td>30-39</td>
<td>Dubai</td>
<td>28</td>
</tr>
<tr>
<td>40-49</td>
<td>France</td>
<td>25</td>
<td>50-59</td>
<td>Germany</td>
<td>21</td>
</tr>
<tr>
<td>Above 60</td>
<td>India</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Management</td>
<td>7</td>
<td>Italy</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle Management</td>
<td>138</td>
<td>Japan</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team Member</td>
<td>264</td>
<td>Malaysia</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td>Greece</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BBA</td>
<td>54</td>
<td>Pakistan</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree in Project Management</td>
<td>121</td>
<td>Russia</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMP Certified</td>
<td>234</td>
<td>South Africa</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience in Construction Industry (Between)</td>
<td></td>
<td>United Kingdom</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-5</td>
<td>208</td>
<td>Project completion (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td>51</td>
<td>Less Than 2</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-15</td>
<td>98</td>
<td>Between 2-5</td>
<td>259</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal or above 16</td>
<td>52</td>
<td>6-10</td>
<td>98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE IV

RESEARCH PHASES
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 subsequentially 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

<table>
<thead>
<tr>
<th></th>
<th>PS</th>
<th>PMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1.0.884**</td>
<td>0.000</td>
</tr>
<tr>
<td>PS Sig. (2-tailed)</td>
<td>4.08</td>
<td>4.08</td>
</tr>
<tr>
<td>N</td>
<td>4.08</td>
<td>4.08</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.884**</td>
<td>1.000</td>
</tr>
<tr>
<td>PMP Sig. (2-tailed)</td>
<td>4.08</td>
<td>4.08</td>
</tr>
</tbody>
</table>

**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 equality 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**

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

### TABLE VII

**ONE-WAY ANOVA**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>11.702</td>
<td>2</td>
<td>5.851</td>
<td>1.513</td>
<td>0.221</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1566.051</td>
<td>406</td>
<td>3.867</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1577.753</td>
<td>408</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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, $P = 0.000$ 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.

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

(1)
Y = Constant + 0.4439 * (PMP)  
(2)

Above implied significance a) under lower influence, β = 0.8421, t (404) = 13.8492, P=0.0000, b) at average level of influence, β = 0.5832, t (404) = 10.0415, P=0.0000, and c) under high level of influence, β = 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.

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:

a) The research focus was on Dubai’s completed projects only.

b) Data gathering was exclusively from the construction industry.

c) Data collected for the study were analyzed only for those respondents who have worked on skyscraper construction projects (High rise buildings: 40+ stories).

d) The research is cross-sectional and does not take into consideration the periodic assessment of a project’s progress.

e) 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.

ACKNOWLEDGMENT

The authors would like to extend their gratitude to the Project Management Institute (PMI) Islamabad (Pakistan) Chapter for the publication of the survey questionnaire (instrument) on its website. The authors are also indebted to the anonymous respondents without whose contribution the study would not have achieved its objectives.

REFERENCES


