

## Project Planning, Project Success and Project Risk

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### Abstract

*We are investigating the relation of project planning with project success and introduce project risk as a moderator. We examines how different dimensions (organizational, people, technical and technology, project management, economic and stakeholder) of project risk determine this relationship. A survey is carried out from information technology professionals from 20 registered firms in Khyber Pakhtunkhwa Information Technology Board (KPITB). We find that overall project risk has significant moderation impact on the relation of project planning with project success. Information technology (IT) professionals of KPITB plan risk related project management. Technical, technological and economic aspects are detailed and insights on how other risk factors affect project success in IT sector include in the study. Our research highlights the significance of planning in the presence of risk.*

### Key Words

Project Planning, Project Risk, Project Success, Information Technology Projects, Risk Factors, Moderation, MODMED (PROCESS Procedure)

### Introduction

Project planning is an important component of project management and a key characteristic for the success of any project (Andersen, 1996; Carbone & Tippett, 2004). Many studies identify project planning as an important variable contributing towards the success of projects (Pinto & Slevin, 1987; Dov Dvir, Tishler, Lipovetsky, Shenhar, & Tishler, 2003; Thomas & Fernández, 2008; Serrador & Turner, 2015). On the contrary, some authors undermine the role of planning and claim that project planning is not correlated with project success (see e.g., Andersen 1996; Mintzberg, 1994; Dor Dvir & Lechler, 2004).

The initiation stage of a project is of utmost importance (King, 1988; Meyer, Tertzakian, & Utterback, 1995). Project planning is equally important for information technology sector (Aladwani, 2002). The Standish Group (1994, 1996, 1998, 2000, 2004, 2006 and 2008) reveals that IT projects are in chaos and synonym to failure. Other international groups like Coverdale Organization and Oxford University (UK) report that these projects fail due many reasons. For instance, “lack of planning, undefined goals and objectives, changing objectives during the project, unrealistic time and estimates, lack of executive support and user involvement, failure to communicate as a team and inappropriate skills” (Taimour, 2005 p.4). Talet, Mat-zin, and Houari (2014) argue that it is important to improve the management of projects because many of these are facing issues like poor performance, delays and are over budget.

The failure of projects in IT sector is also observed in Pakistan. The Ministry of Science and Information Technology reported that out of every 10 projects 4 fail, which is a huge loss to the economy. During last two decades, IT industry in Pakistan is growing hastily and statistics shows that many of IT projects fail before completion (e.g., Butt, Rafiq, Aslam, Ahmed, & Ayyub, 2014; Ali & Naseem, 2016; Abbas, Faiz, Anam, & Ander, 2017; Butt, 2017). IT projects are in chaos and they fail mainly due to lack of planning (Whittaker, 1999; Zwikael, Pathak, Singh, & Ahmed, 2014; Ahimbisibwe, Tusiime, & Tumuhairwe, 2015). Datta and Mukherjee (2001) argue that the completion of successful projects is dependent upon earlier detection of risks, i.e., external and immediate project risks. Risk adversely affect project success of IT projects (Jiang, J. Klein, & Ellis, 2002).

Literature shows that planning of a project is affected by the dimensions of risk, whether it is predicted vulnerability or unanticipated vulnerability (Zwikael & Sadeh, 2007; Zwikael et al., 2014).

Therefore, risk is introduced as a moderator since it is considered a critical moderator in the success of projects (Zwikael & Ahn, 2011). Six risk factors are adopted based on prior studies (McFarlan, 1981; Bohem, 1991; Sumner, 1999;2000; Nasir & Sahibuddin, 2011; Talet et al., 2014; Neves, Borgman, & Heier, 2016; Ali & Naseem, 2016). These factors are related to organizational, people, technical and technology, project management, economical and stakeholder.

## Research Questions

We primarily examine the relation of project planning with project success. The importance of plans and planning in the success of projects has been studied in different sectors (e.g., Armstrong, 1982; Meyer & Utterback, 1995; Dor Dvir & Lechler, 2004; Serrador & Turner, 2015). Mixed results in literature on the significance of planning in project success, justifies further examination of this relationship. Therefore, we ask research question 1

**RQ1:** Does project planning effect project success?

Survey has been conducted through questionnaire from randomly selected IT firms. The results show that planning does impact the success of projects in IT sector. Ineffective planning also leads to failure of projects. Therefore, other factors must be considered that may contribute towards the success of a project (Aladwani, 2002). The interaction between planning and risk factors and their moderation effect on success has not been examined in detail in prior studies, hence, we ask research question 2:

**RQ2:** Does project risk moderate the relation of project planning with project success?

Results show all risk factors to be statistically significant and risk as a moderator effects the relation of project planning with project success. Organizations involved in IT projects do not need to avoid risk rather its identification and early management is necessary (Aloini, Dulmin, & Mininno, 2007). The findings are expected to help IT firms minimize project risks and have an efficient and effective work plan for the completion of their projects. No such study has been conducted in Peshawar (at least not in authors' knowledge) and findings are generalizable to other parts of the country as well. This paper can help in creating a road map for policy makers of Directorate of Science and Technology for multiple mega projects e.g., Pakistan Digital city, Haripur and KP-CERC.

The remaining scheme of the paper includes literature review and hypotheses in section 3. Section 4 presents methodology. Section 5 includes data analysis whereas, section 6 is conclusion.

## Literature Review and Hypotheses

IT projects have been the equivalent of failure in the course of the most recent four decades (Al-Ahmad et al., 2009). Therefore managing IT projects is the main concern of IT professionals (Whittaker, 1999). The challenging task for a project manager is to forecast precisely at the early stage, i.e., planning for the future risks and the tasks necessary for achieving project success (Raz, Shenhar, & Dvir, 2002). Few authors have underplayed the role of project planning (see e.g., Bart, 1993; Andersen, 1996). Ample and apt planning is essential before starting any IT project (Aladwani, 2002). There are mix results on the significance of planning. The hypothesis H1 assumes:

**Hypothesis 1 (H1):** Project planning is positively related to project success

Planning may not be the only reason of project success but there are other factors responsible for project to be successful. Managing risk proficiently is a key element for project success (Carbone & Tippett, 2004). Information technology projects are risky in nature but it is difficult to identify those risks (Boehm & DeMarco, 1997). Risk management is believed to be the best practice for the success of IT projects (Baccarini, Salm, & Love, 2004). Though it is difficult to completely mitigate risk, yet IT project managers should allocate resources for risk management as risk is thought to be important arbitrator for the success of projects (Chapman & Ward, 2004). The next hypothesis claims:

**Hypothesis 2 (H2):** Project risk will moderate the relation of planning with project success

Numerous studies have been done to examine failure in IT projects (Al-Ahmad et al., 2009). For managing risk, it is important to identify specific risk factors responsible for failure of IT projects (Aloini et al., 2007). Various risk factors have been investigated, e.g., poor project planning, organizational i.e., structure, unclear goals, scope and objectives, miscommunication, inappropriate resource planning, management and leadership, monitoring and evaluation, poor methodology, stakeholder involvement and training, technical and technology planning, inability to adapt, inexperience project managers, superficial environment for employees; and risks not managed. These

different factors have been homogenized and grouped into six categories, i.e., Organizational, People, Project management, Technical and Technology, Economic and Stakeholder. Each risk factor is further classified into different proxies to measure risk occurrence and impact.

Following hypotheses suggest that each risk proxy moderates the relation of project planning with project success.

**Hypothesis 2a (H2a):** Organizational will moderate the relationship of planning with project success

**Hypothesis 2b (H2b):** People will moderate the relationship of planning with project success.

**Hypothesis 2c (H2c):** Project management will moderate the relationship of planning with project success.

**Hypothesis 2d (H2d):** Technical and technology will moderate the relationship of planning with project success.

**Hypothesis 2e (H2e):** Economic will moderate the relationship of planning with project success.

**Hypothesis 2f (H2f):** Stakeholder will moderate the relationship of planning with project success.

## Methodology

The paper is quantitative in nature and utilizes deduction approach with a positivism paradigm. A positivist study generally depends upon quantifiable examination that leads to numerical and statistical analysis (Collins, 2010). Crotty (1998) and other authors (e.g., Yin, 2003) have preferred survey methodology for such studies.

We investigate the relation of project planning with project success and include risk as moderating factor. The success of projects in IT sector is considered by the project team members including project managers and project coordinators (Nguyen, Nguyen, & Cao, 2016). The sample is randomly selected from KPITB i.e., IT park Peshawar. The target population is IT project teams, therefore, the scope is limited to the project team comprising of project managers, project coordinators, project team lead, and software engineers.

## Data Collection Instrument

The questionnaire was devised with questions on a 5 point likert scale related to independent variables project planning; moderating variable project risk and dependent variable project success. Data was collected through simple random sampling from 44 projects of 20 IT firms and 220 questionnaires were distributed, out of which 200 were received and analysed.

The Cronbach alpha (0.92) is estimated to test the reliability the questionnaire. To test the moderating variable, the “simple linear moderation” model 1 has been adopted from Hayes (2013).

**Project success  $Y_i = i_i + b_1 \text{Planning} + b_2 \text{Project risk} + b_3 \text{Interaction}$**

## Data Analysis

Table 1 present the descriptive statistics and the means, standard deviation and data spread show that the data is normal. The data is analyzed through regression analysis for testing hypothesis 1. The results are shown in Table 2, the independent variable, i.e., project planning has a positive coefficient and indicates a highly significant positive relationship with project success.

To test hypothesis 2, 2a, 2b, 2c, 2d, 2e and 2f moderation analysis (MODMED) is used. Table 3 and 4 represent these analyses. The overall project risk (moderator) significantly moderates the relationship of project planning with project success. The p-value is highly significant, which shows the prevalence of risk in IT sector and the success of projects is affected due to the existence of risk proxies. Later, the individual moderation analysis is conducted for each risk proxy. Results indicate that these risk factors do moderate the relationship of project planning with project success and the interaction term of planning with individual risk proxies is statistically significant. Hence, it is evident from the results of moderation analysis that each risk proxy has an influence on the association of project planning with project success i.e., it can increase or decrease the strength of relationship as explained by Hayes (2013).

**Table 1.** Descriptive Statistics

Descriptive statistics for the sample of twenty IT firms with data of forty-four projects (where n=200).

	N	MIN	MAX	MEAN	STD. DEV
PPL	200	1.04	4.70	3.1	.94
PR (LIKELIHOOD)	200	1.46	4.31	2.8	.61

PR (IMPACT)	200	1.58	4.50	3.1	.65
OVERALL RISK	200	2.13	4.40	3.0	.50
PS	200	1.00	6.00	2.7	.81
OR	200	1.00	4.70	2.8	.82
PL	200	1.50	4.50	2.9	.75
PM	200	2.00	4.50	3.1	.76
TTR	200	1.20	4.70	3.1	.75
ER	200	1.00	4.50	3.0	.77
SR	200	1.00	5.00	2.9	.89

PPL denotes project planning; PR denotes project risk; while likelihood represents the prevalence of those risk factors and impact represents the influence of those risk factors; Overall risk is the total amount of project risk i.e., likelihood and impact; PS denotes the project success; OR denotes the organizational risk factor; PL denotes the risk related to people; PM denotes the risk related to project management; TTR denotes the technical and technology risk factor; ER denotes the economic risk factor and SR denotes the stakeholder (user) risk factor.

**Table 2.** Regression Analysis

The association of project planning with project success

Independent variable	Beta value	Dependent variable	F-statistics (sig)	R <sup>2</sup>	Adjusted r <sup>2</sup>	Df	F value
PPL	.404	PS	.000	.163	.159	1,198	38.53

\*, \*\*, \*\*\* denote p <0.10, p <0.05 and p <0.01 respectively.

Where PPL denotes project planning for IT projects and PS denotes project success of IT projects.

Table 2 reports coefficients of the following regression model.

$$PS_j = i_i + b \text{ PPL } j + e_j$$

**Table 3.** Moderation Analysis

The moderation effects of overall project risk on the association of project planning with project success utilizing bootstrap

Model	Planning coefficient (b)	Moderator coefficient	Interaction coefficient	F
Overall				
project risk	.42*	.59**		21.43**
R <sup>2</sup> = .282**	4.5	3.9	.41***	8.85**

Table 3 reports coefficients of the following regression/moderation models.

$$PS_j = i_i + b_1 \text{ PPL } + b_2 \text{ PR } + b_3 \text{ PPL } * \text{ PR}$$

**Table 4.** Moderation Analysis

The moderation effects of risk proxies on the relationship of project planning with project success using bootstrap.

Model	Planning coefficient (b)	Moderator coefficient	Interaction coefficient	F
Organizational				
R <sup>2</sup> = .223**	.45*	.33**		17.11**
R <sup>2</sup> change = .031	4.1	2.7	.23***	7.40**
People				
R <sup>2</sup> = .234**	.50**	.44**		19.23**
R <sup>2</sup> change = .013	5.0	3.0	.29	3.42**

Project management	.41**	.52**	.41**	20.29**
R <sup>2</sup> = .293**	4.2	3.8		6.61**
R <sup>2</sup> change =				
Technical and technology	.52**	.24**	.43***	18.28**
R <sup>2</sup> = .261**	5.8	1.9		7.61**
R <sup>2</sup> change = .031				
Economic	.49**	-.10	.63***	18.17**
R <sup>2</sup> = .260**	6.3	-.86		18.58**
R <sup>2</sup> change = .097				
Stakeholder	.55**	.11	.19**	13.50**
R <sup>2</sup> = .217**	5.9	1.2		5.54**
R <sup>2</sup> change = .026				

Table 4 reports coefficients of the following regression/moderation models.

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 OR + b_3 PPL * OR$$

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 PL + b_3 PPL * PL$$

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 PM + b_3 PPL * PM$$

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 TTR + b_3 PPL * TTR$$

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 ER + b_3 PPL * ER$$

$$PS_i = \hat{\alpha}_i + b_1 PPL + b_2 SSR + b_3 PPL * SSR$$

## Conclusion

The association of project planning with project success differs for every project. It can be argued that there are many factors that affect this association. Many studies have added new risk factors that affect the project success or failure. Relevant risk factors were identified in the literature and then analyzed. Risk is considered to influence the relationship of project planning with project success but research documents conflicting views about it. The IT projects of Pakistan have not been examined much, so it is essential to study this relationship for better understanding. The paper shows that there is a positive impact of project planning on project success. Focus of the paper is to help the IT firms of Peshawar by identifying the significance of risk (organizational, technical, people, project management, stakeholder, economic) and its impact on the relationship of project planning with project success. Principally, project planning is primarily related to the success of a project and overall project risk significantly moderates this relationship. The successful completion of a project depends on planning and risk calculation play a vital role in the achievement. This empirical study gathers information on risk factors from 44 IT projects and the outcomes indicate that the significance of planning is dependent upon project risk the success is measured accordingly.

The framework of this paper will help IT professionals to measure success of IT projects considering planning as an important phase through analyzing different risk proxies. In order to improve their project planning, firms at IT Park Peshawar are highly encouraged to develop strategies on the basis of this study. The paper has important implications for IT professionals of KPITB by focusing and improving the project planning; properly identify strategy for the upcoming risk on time. In light of this paper if they improve these elements, ultimately project success can be ensured to a great extent and the skills of project manager for managing the project effectively at every stage of the project as well. Proper project planning aids in dealing with the challenges of project success. Therefore, this particular examination adds towards knowing the effectiveness associated with planning of project about project achievement with different risk configurations for progress IT projects. The final results of this exploration add to an even more intense knowledge of the achievable way to deal with IT project risk management. Findings of this paper will help policy makers, e.g., Ministry of Science and Technology.

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