

EFFECT OF PEOPLE FACTORS ON PLANNING PERFORMANCE OF SOFTWARE DEVELOPMENT PROJECTS IN SRI LANKA

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ABSTRACT

Software Development Industry is a key contributor to the Sri Lankan economy. Hence, effective and efficient functioning of software development companies is a very essential factor for the National Development. Primary management approach used by the industry to produce software is project management methodology. However, it is observed that the software project failure rate in the industry has come to an unacceptable level. Large number of previous studies has examined direct relationship between critical success factors and project outcome. One of the major causes of failure is lack of application of good project management practices. Projects are implemented applying five phased project management lifecycle namely; initiating, planning, executing, monitoring and controlling and closing. This article aims to examine the effect of people factors on planning performance of the projects. Main people factors considered are, project manager experience, team capability, user involvement, and customer involvement. Data was collected from 244 project managers and project leaders from 109 software development companies using a web based tool. The reliability of the data was analyzed using Cronbach's alpha coefficient. The relationship between variables was measured using Pearson correlation test and regression analysis was used to ascertain the effect of variables. The results indicate that project manager experience and Team capability are significant predictors of planning performance of software development project in Sri Lanka.

Keywords: Project Management, Planning Performance, Project Manager Experience, Team member capability, Customer Involvement, User involvement.

INTRODUCTION

Despite extensive development in the technology and management techniques, most of the software developments projects fail hindering the enormous opportunity available for the industry to grow rapidly and contribute to the economic growth of countries. Causes of software project failure are numerous.

Software development activities conform to the definitions of projects. Therefore, project management is the key management tool used to manage software development activities of any nature and type. According to Nagasinghe (2011), effective Project management is a critical success factor for software development industry, as industry's all development activities are carried out using project management methodology. Software development projects use knowledge, skills, tools and techniques of project management and software development (Schwalbe, 2006; Meredith & Mantel, 2006).

Benefits of software can be reaped by producing efficient and effective software which can be used by the end user without much difficulty. Therefore ability to produce cheaper, effective, efficient and user friendly software is an important determinant to the growth of the software industry. When projects are carried out effectively and efficiently, projects are completed successfully achieving both business and project objectives.

Software development industry is one of the fastest growing industries in Sri Lanka (Jayasena & Jayathilake, 2008). The industry is important to the country in many ways. It contributes to the economy in terms of employment generation, foreign exchange earnings, human capital development and technology transfer in a great way. The industry is amongst the first ten export earners for the country (Export Development Board, 2010).

Higher rate of software project failure in the Sri Lankan software industry is a major issue that demands immediate attention. A previous study indicates that 35% of software development projects fail in Sri Lanka (Fonseka 2011). At the Information Systems Audit and Control Association's (ISACA) annual conference 2008 Dr Madhu Fernando presenting a paper stated that 70% of IT projects in Sri Lanka failed to deliver requirements. Narasinghe (2011) interviewed three leading personalities of the software development industry and established the low success rate of software development projects in Sri Lanka. The author interviewed 42 software project managers and leaders from small, medium and large companies and established that 80% software projects do not meet modern success criterion. Limited studies have been done on project management practices of Sri Lankan software development industry. Moreover, existing global literature examines influence of critical success factors on project outcomes in general. Numerous studies have found that application of good project management practices leads to increased success rate of projects. (Ross, 1999; Holland and Light, 1999; Rosario, 2000; Murray, and Coffin, 2001; Sumner, 1999; PMI, 2004; Dezdar and Ainin, 2012; Nah et al., 2007). However there is limited research that explores relationship between critical success factors and performance of major phases of project management lifecycles namely; project initiation, planning, execution, monitoring and controlling and closing. (PMBOK Guide 5th Edition). In terms of level of activity, planning consumes 30% of project time and resources. (PMBOK Guide 5th Edition).

This paper examines factors that influence effective planning performance of software development projects in Sri Lankan Software Development Industry. The study reviewed the existing literature on critical success factors for software projects and investigates effect of people related factors on planning performance. Data collected using a web based survey from 244 project managers and project leaders from 109 software development companies in Sri Lanka from Jan 2016 to July 2016. The collected data were analyzed using descriptive statistics, reliability test, correlation and multiple regression methods.

LITERATURE REVIEW

Critical Success Factors for Software Development Project

Christine V. Bullen (1981) defines critical success factors as few factors of significant, proper management of which guarantee high performance of an organization, department or individual. Critical success factors are few important areas which should be managed well for projects to be successful (Reel, 1999; Nah et al. 2001; Young & Jordan 2008; Zwildkael, 2008; Hartman & Ashrafi, 2002; The Standish Group, 1995).

Goparaju Purna Sudhakar (2012), identifies 7 categories of critical success factors that leads to project success. They are; team, organization, technical, environmental, product and project

management factors. 80 critical success factors that contribute to these 7 areas are identified by the author.

According to Prentis(1989), creation of a sound project plan that covers scope, time plan and resource plan is mandatory for achievement of project goals. Venkatharaman and Venkatharaman(1995) proposed that projects should commence after detailed planning. If the project fails, it will impact the business performance. Therefore planning is an important activity of the project life cycle.

Roy Schmidt et,al, (2001) identified lack of planning as a major cause of software project failure. Frederick Zarndt, (2011) investigated reasons why library software or digitization project go wrong. The most common three reasons are; lack of planning, lack of communication among stakeholders, and inadequately defined acceptance criteria.

Project planning is taking necessary actions to combine and coordinate all the sub plans of the project. The project management plan describes how the project is implemented, monitored, controlled and closed (Project Management Institute, 2014).

Major resource used to build software is people. All the phases of the software development lifecycle is completed by people with the support of the Information technology hardware and software. Mohd and Shamsul (2011), ranked 25 critical success factors for software development industry and categorized them under people, process and technical related factors. Ranking given to first 12 critical success are; Clear requirements and specifications 1, Clear objective/goal/scope 2, Realistic schedule 3, Effective project management skills/methodologies (project manager) 4, Support from top management 5, User/client involvement 6, Realistic budget 8, Skilled and sufficient staffs 9, Proper planning 12. Factors with rank 1,2,3,8 and 12 comes under process category and they are planning related and factors ranked 4,5,6, and 9 are grouped under people factor.

The evidence presented in this section justifies the demand to examine effect of people factors on planning performance. Hence, critical success factors identified for the study are; Project planning (process factor), Level of Experience of project manager, Team capability/Competence, User involvement, and Customer Involvement (people factors).

People Factors for Planning

According to Goparaju PurnaSudhakar (2012). The key stakeholders involved in software development projects are; senior management, project manager, team members, system architects, users, vendors, suppliers, and customers. A large no of studies have examined influence of people factors on project performance in general. Several people related factors reviewed in current literature are; knowledge, skills, experience, contribution and commitment.

a. Project Manger Experience

Project manager (PM) plays the most crucial role on a project. Project manager is responsible for planning, executing, monitoring and controlling and closing processes of the project. These activities should be performed in an efficient and effective manner to guarantees project success. Project manager's integration management skills are very important for project success. Large no of studies have been done on the projects managers role on a project. According to (Keider, 1984), project manager can control most of the factors that cause project failure.

Number of studies have identified, possession of good project management skills by the project managers and use of project management methodologies by projects managers as critical success factors for projects. Project manager can improve in these areas by having access to education and training programs and by earning good working experience in projects (Sauer and Cuthbertson, 2003; Kappelman et al., 2006; Perkins, 2006; Humphrey, 2005; Charette, 2005; Standing *et al.*, 2006;).

James E. Tomayko, and Harvey K. Hallman (1989) indicated that the role of the project manager is to prepare a plan incorporating stakeholder requirements, identifying activities, creating a structure, allocating resources, assigning team members to the project, providing leadership and controlling the project progress. On the role of the project manager Fonseca (2011) found that Project success can depend on project managers skills, experience and personality. Standish groups CHAOS TEN for 2000 lists 10 factors for project success. They are ranked according to their influence on project success. The factor ranked third in this study is project manager experience.

Collectively, these studies outline the critical role played by project manager's experience for completing projects successfully.

b. Team Capability and Experience

A large and growing body of literature has investigated effect of team member capability and experience on software project success. Several studies have revealed that team knowledge and skills is a critical success factor for software project success (Shanks et al., 2000; Ross, 1999; Holland and Light, 1999; Sumner, 1999; Jiang et al., 1996; Alghathbar, 2008; Dezdari and Ainin, 2012).

Chow, T., Cao, D-B (2008) found that Strong executive support, Collocation of the whole team, Team members with high competence and expertise, Team members with great motivation, Strong customer commitment and presence as Critical success factors for projects.

Fortune and white (2006) found that team with good qualifications and similar previous experience is important factor that leads to project success. Projects that were run without capable and experienced team members and project managers are more likely to fail. A number of studies have indicated the importance of team Skills and availability of sufficient Staff for software development project success (Sauer and Cuthbertson, 2003; Kappelman et al., 2006; Baccarini et al., 2004; Milis and Mercken, 2002).

Findings of Fan, D. (2010), Sudhakar (2012), and Poon, P. and C. Wagner (2001) also support the argument that team capability is a critical success factor for software projects success.

The Royal Academy of Engineering (2004) found that capability of people involved in the project is an essential factor that influences project success. According to Jang et al (1996) competent team members are important factor for project success. McLeod & Smith (1996) proposed that team members should possess the required skills and team work competencies.

Fonseca (2011) presents similar findings on knowledge and experience of the team. According to him qualifications and the expertise of the project team is a critical factor for project success. A study conducted by IBM (1985) indicates that Often software engineers fail to understand requirements due to lack of domain knowledge. Therefore planning and estimating the size of the software become a difficult exercise.

Aladwani (2002), Pinto and Slevin (1989) and Zwikael and Golberson (2006) identified project personnel competency and project mission as micro project success factors. According to Carmel and Sawyer(1998), Curtis *et al.*, (1988) some of the team related critical success factors of projects are; team skills and competencies, self motivation, team member experience, coordination and communication among the team.

Together, these studies outline that project team member capability and experience is a critical success factor for software projects.

c. Customer and User Contribution

Customer and user involvement, their cooperation, and support during the software development lifecycle are very important people related factors that influence project performance.

Fortune, J. and D. White, Framing (2006) found that projects that focus on user needs are successfully completed. In the mean time they observed that projects that ignore user needs are likely to fail in achieving project objectives.

Lack of customer/user involvement in designing software leads to project failure. Their regularly involvement throughout help better understand the system and get their acceptance for the product as they are well aware of the system capabilities. Salmeron, J.L. and I. Herrero(2005), Fan, D.(2010), Poon, P. and C. Wagner(2001), Sudhakar, G.P.(2012) in their studies have established that customer involvement as a critical success factor for successful IT projects.

Kappelman *et al.* (2006),OGC(2005), Baccariniet al.(2004),Humphrey (2005), Mahaney and Lederer (2003), Leveson (2004),Charette, (2005), Standish Group (2009) and Sauer and Cuthbertson (2003) have shown that customer and user involvement in software development projects effectively leads to project success.

Fonseka (2011) supports the same argument in his study. According to his findings team too may lose their commitment to the project due to lack of customer involvement. User involvement is necessary throughout the life cycle of the project. Andrew Boyd (2001) found that user involvement is the most important factor that determines project success. Most projects fail because the end product does not satisfy the needs of the customer.

Sui Lun Lam *et al.* (2013) found that a good project management process, a clear project definition process, a strong customer involvement, a strong management commitment are as critical success factors for project success..

As per the study of Gould (1988), though most designers consider user requirement, very few get them involved in the designing process or planning for designing. McConnell (1998) identified that User involvement is a critical factor for project success. Success of a software depends on creating a software that user like and uses. Without user involvement developer tends to create some technically sound solution which may not satisfy user.

The studies presented thus far provide evidence that user and customer involvement are important critical success factors for software development projects.

Planning Performance

Literature reviewed for this study highlights the importance of planning for project success. Planning process is one of the key stages of project management lifecycle. Mia *etal*(2011) found that it is very common that projects starts without proper planning and suffer throughout.

A number of studies have found that proper planning is a critical success factor for software development projects (Jones, 2006; Kappelman et al., 2006; Humphrey, 2005; Standing et al., 2006; Sauer and Cuthbertson, 2003).

Cleland & King (1983), Baker et al. (1983), Milis & Mercken (2002) and Dvir et al. (2003) found that well prepared project plan is an important factor for project success. According to Aladwani (2002); Pinto and Slevin (1989); Zwikael and Golberson (2006) Quality of Project Planning is an important success factor for projects.

Jurison (1999) found that many projects fail due to poor planning. According to him main activities of planning is, description of deliverables, resource estimate, time and cost plan, risk management and response plan, organizational responsibilities.

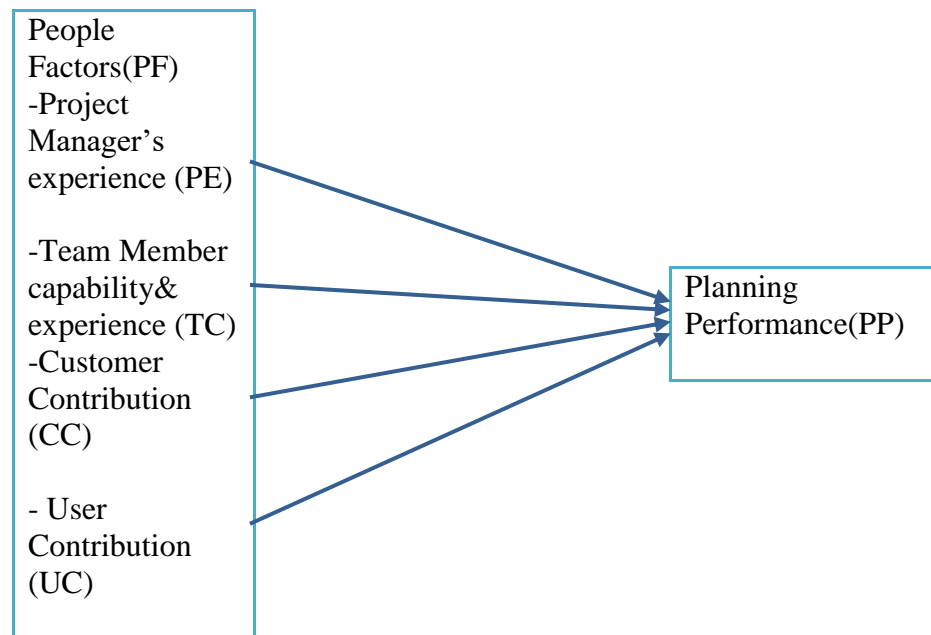
Planning is the process of developing a range of subsidiary plans that cover important areas of project management and combining them into a cohesive whole. The project management plan should describe how project is implemented, monitored and controlled and closed. A project plan consists of following subsidiary plans; Scope, cost and time baselines, management plans for scope, time, cost, quality, Human resources, communication, risk, procurement and stakeholder management knowledge areas, process improvement plan, change management plan, configuration management plan, requirement management plan (Project Management Institute, 2013).

Overall, these literatures highlight the elements of a plan in the software development project and its importance for project success.

Theoretical Framework

The objective of this study is to examine effect of people factor on project planning performance in Sri Lankan Software development industry. Existing literature supports positive relationship between people factors, and project outcome. However very limited studies have been done to investigate effect of people factors on planning performance. Thus, a research framework is designed considering the relationship between main variables (Figure 1). Accordingly five variables are identified in the research framework are: Project manager experience, Team capability and experience, customer involvement and user involvement as independent variables and planning performance as the dependent variable.

The studies presented thus far provide evidence that planning consist of Requirement definition, - Estimating time & effort, Estimating resource & cost, Scheduling & budgeting, Risk planning and Quality planning. Use of project manager experience for above mentioned planning activities is investigated. As far as team capabilities are concerned, team knowledge, skill, experience and commitment towards planning is examined. In respect of customer and user involvement, their level of contribution and commitment towards planning process is examined.



The Statement of Hypotheses

The primary objective of this research study is to identify the impact of people factors on planning performance in the software development industry in Sri Lanka. With the view of achieving this objective, following hypothesizes are developed.

- 1: There is a positive relationship between the experience of the project manager and planning performance
- 2: There is a positive relationship between the team member capability and planning performance
- 3: There is a positive relationship between the customer involvement and planning performance
- 4: There is a positive relationship between the user involvement and planning performance

RESEARCH METHODOLOGY

This section presents research design, population, sample, designing instruments, data gathering procedures and statistical analysis.

Sample and Data Collection

The population of the study consists of all the software development companies actively operating in Sri Lanka. There is no source that provides most current list of software development companies in Sri Lanka. Information and Communication Technology Agency (Sri Lanka) ICTA has carried out a salary survey on Sri Lankan Software Industry in 2009. It has surveyed 291 companies. Export Development Board (EDB) has carried out a IT export value survey in 2010, and it has surveyed 598 IT companies.

The both the list obtained from ICTA and EDB were developed in 2009 and 2010. Since there is a high entry and exit rate in the industry both the lists were combined and it was decided to verify their existence using web addresses and telephone numbers. Since there were large no of non responses, it was decided to send the questionnaire to all the companies in the list.

Data Collection

Data for the study were obtained from both primary and secondary sources. Main data required for the study were on software development companies, project managers and software development projects. Data was collected between February 2016 to July 2016.

Primary data were gathered using the survey method from project managers and project leaders of software development companies. A self-administered questionnaire was posted on a web based data collection tool and the access link was sent to companies through e-mails. Questionnaire consists of five parts; questions on Project manager experience, team capability and experience, customer involvement, user involvement and planning performance. It was constructed using a Likert five scale models with rating from very high to very low. The scale was structured in the following manner. 5 Very high; 4= High 3= Average 2= Low and 1= Very Low. The questionnaire was sent to 431 companies and 275 responses were received from 109 companies and 31 Questionnaires contained missing data and they were omitted from the data analysis process. Remaining 244 responses were considered for the study.

Analysis and Results

Software Package for Social Science (SPSS) version 21 was used to analyze the data. Statistical techniques used were descriptive statistics, reliability test, correlation and multiple regression analysis. The questionnaire was pilot tested with a sample of 35 candidates. Further, The validity of the questionnaire was confirmed by experts in the field of project management. The reliability of the data was analyzed using Cronbach's alpha coefficient (Table 1). The relationship between variables were measured using Pearson correlation test (Table 2). Regression analysis was used to ascertain effect of variable (Table 3).

Reliability Analysis

In the process of reliability analysis, firstly the internal consistency of the scale that were used were determined. Cronbach's alpha analysis technique was used using SPSS 21 version to measure reliability of the questionnaire. According to Sekeran & Bouie (2012) Cronbach's Alpha value less than 0.6 is considered as poor and more than 0.7 is acceptable for the study. Table 1 presents the Cronbach's alpha values for three variables; Project Manager experience for planning (.873), Team knowledge and experience for planning (.642), Planning performance (.879). Customer and user involvement is measured by only one item and hence reliability analysis is not applied.

Table 01 Cronbach alpha of questionnaire's Dimensions

Dimensions	Cronbach's alpha
PE	.873
TC	.642
PP	.879

Descriptive Statistics and Correlation

Mean score and standard deviation was determined for 244 cases examined for four independent variables and the dependent variable examined for the study. The output of the descriptive statistics is as shown in Table 2. The mean score for all the variables were recorded above 3.2 except for user involvement which recorded 2.92. PM experience recorded the highest (3.9). The planning performance recorded 3.2 and team knowledge and experience 3.6. This indicates that planning performance of the software companies are at average level and contribution of independent variables; PM experience and team knowledge and experience is at above average level. User involvement recorded 2.92 which is also very close to the average. However, user involvement in planning is seen to be low comparative to other three variables. The standard deviation for four independent variables recorded; PM experience .68, team knowledge and experience .65, showing significantly small variability. However, customer involvement and user involvement recorded 1 and 1.08 respectively showing a comparatively large variation in the data set for these two

variables. The planning performance recorded .79 standard deviation demonstrating small variability in the data set.

The correlation analysis indicates the existence of a correlation between dependent and independent variables. The correlation results are; CC.201,UC.197, PE.170,TC.285, .These variables are positively associated with PP and are significant at 0.01.

Table 02 Descriptive Statistics and Correlation

Variable	Mean	SD	PE	TC	PP	CC	UC
PE	3.9968	.68180	1				
TC	3.68	.655	.274**	1			
PP	3.22	.79	.170**	.285**	1		
CC	3.44	1.000	.185**	.196**	.201**	1	
UC	2.92	1.085	-.007	.262**	.197**	.355**	1

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

Hypotheses Testing

Multiple regression technique was used to test H1, H2,H3, and H4. The test examines if PP depends on PE , TC ,CC, and UC. Using the regression techniques it was tested PP as the dependent variable and the PF as the independent variable. The results are presented in the table 3.

Table 3 Results of Regression Analysis

Independent Variable	B	S.E β	t-value	Sig.	Toleranc e	VIF
(Constant)	1.342	.368	3.643	.000		
Role of Experience of PM for Planning	.203	.075	3.368	.003	.893	1.119
Team knowledge and Experience for planning	.247	.081	3.060	.002	.857	1.167
Customer Involvement in Planning	.085	.053	1.607	.109	.839	1.192
User Involvement	.096	.052	1.858	.064	.831	1.204
R ² =0, .160 Adjusted R ² =0. .106 F=8.769 Sig. F=0.000 ^b						

As per the results presented in table 3 (PP) depends on PF(PE,TC,CC,UC). According to(Chinna&Yuen,2015) the R square value ranges from 0 to 1 in social sciences and the desired minimum R squared value is 0.15. The R –squared value being 0.160, 16% of the variation in planning performance is explained by the people factors. A large F- Value, followed by a small P-value , implies good fit in a regression model.(china & Yuen,2015). The P-value of the analysis is less than 0.001, which suggests that at least one of the four variables :PE,TC,UC,CC can be sued to model PP. The equation: $PP=1.342+.203(PE)+.247(TC)+.085(CC)+.096(UC)$.

Thus, for every unit increase in PE, PP is expected to increase by.203 units provided other two variables remain unchanged. As far as other variables are concerned; for every unit increase in TC,PP is expected to increase by .247,provided other variables remain unchanged. For every unit

increase in CC; PP is expected to increase by .085 provided other variables remain unchanged and for every unit increase by UC, PP is expected to increase by .096. Provided other variables remain unchanged.

Table 4 - Results of Hypotheses

Hypotheses	Results
H1a: There is a positive relationship between the experience of the project manager and planning performance	Supported
H1b: There is a positive relationship between the team member capability and planning performance	Supported
H1c: There is a positive relationship between the customer involvement and planning performance	Not supported
H1d: There is a positive relationship between the user involvement and planning performance	Not supported

P-values of PE and TC are less than 0.05. Thus, PE and TC are the significant predictors of PP. Based on the standardized Beta coefficients; the effect of PE (0.201), TC (0.202), UC (0.125), and CC (.107). Hence, the effects of PE and TC on PP are almost similar and UC and CC is having low effect on PP comparatively.

VIF values in respect of all four independent variables were recorded below 5 denying multi-collinearity problems.

DISCUSSION AND IMPLICATIONS

Very little was found in the literature on the inquiry of effect of people factors on planning performance in software development project in Sri Lanka. The present study was designed to determine the effect of people factors on planning performance of Sri Lankan Software development industry. As mentioned in the literature review People factors considered are ; PM experience, team knowledge and experience, customer involvement and user involvement which are positively related with planning performance. What is surprising is that only PM experience and team knowledge and experience is found to be positively related with planning performance. It is found that other variables considered; user involvement and customer involvement are not related to planning performance. The results of this study will now be compared to the findings of previous work. These supportive findings related to team knowledge and experience is in agreement with many previous studies. Shanks et al. (2000), Ross (1999), Holland and Light (1999); Sumner (1999), Jiang et al. (1996); Alghathbar (2008), Dezdard and Ainin (2012), Fonseka (2011) and IBM (1985) found that team knowledge and skills is a critical success factor for project success.

Large no of studies have identified effective project management skills and use of project management methodologies by projects managers as critical success factors for projects. Project manager can improve in these areas by having access to education and training programs and by earning good working experience in projects (Sauer and Cuthbertson, 2003; Kappelman et al., 2006; Perkins, 2006; Humphrey, 2005; Charette, 2005; Standing et al., 2006)

In contrast to earlier findings, however, no evidence of user involvement and customer involvement being positively related to planning performance was found in this study. Many previous studies that supported this relationship are; (Kappelman et al., 2006; OGC, 2005; Baccarini et al., 2004; Humphrey, 2005; Mahaney and Lederer, 2003; Leveson, 2004; Charette, 2005; Standish Group, 2009; Sauer and Cuthbertson, 2003)

A possible explanation for these results may be the lack of adequate commitment of the client and customer representatives towards the planning activities of the project. Software development companies are ultimately responsible for building the product as per the customer requirements, and customer and user accountability for such results are not formally negotiated. Due to this reason customer and user may not extend the required support for the planning activities of the project.

The present results are significant at least in three respects. Firstly, the companies should focus on PM experience and team capability when recruiting them to organizations which is generally a factor given priority in recruitment and selection. Further, organizations should create an conducive environment, that facilitates PMs and team members to contribute to planning activities whenever required. Secondly, software development companies should take necessary steps to include customer and user involvement related activities as contractual obligation of the initial contract signed with the customer so that expected support and contribution can be guaranteed. Thirdly, the researchers in Sri Lanka can use the conceptual model in Fig 1, to examine the behavior of these variables in other project driven industries like construction, engineering etc.

CONCLUSIONS

The main goal of the current study was to determine effect of people factor on planning performance of software development projects in Sri Lanka. In view of this, relationship between PM experience, team knowledge and experience, user involvement and customer involvement with planning performance were investigated. This study has shown that PM experience and team knowledge and experience is positively related to planning performance conforming to findings of previous studies. Therefore they continue to be focus areas in planning in Sri Lanka. One of the more significant findings to emerge from this study is that other variables considered; customer and user involvement is not supporting planning performance. This finding is conflicting with previous studies and need to be further investigated as to why this kind of behavior happens in Sri Lankan Software Industry.

ACKNOWLEDGEMENTS

The author of this research article wishes to thank his supervisors Prof. Dr. Ali Khatibi, Prof. Dato' Dr. Md Gapar Md Johar, Dr. S. M. Ferdous Azam, and Dr Ganga Sajeewani Karunathilaka, for their expert advice, guidance and consistent support.

REFERENCES

- Adel M. Aladwani, (2002), "IT project uncertainty, planning and success: An empirical investigation from Kuwait", *Information Technology & People*, Vol. 15 Iss: 3 pp. 210 – 226
- Alghathbar, K. (2008). "Practical ERP Implementation in Government Organization," *International Conference on E-Learning, E-Business, Enterprise Information Systems, and E-Government*, 343-349.
- Andrew Boyd, (2001), "The five maxims of project satisfaction", *Aslib Proceedings*, Vol. 53 Iss: 10 pp. 423- 430
- Baccarini D, Salm G, Love PED (2004). *Management of Risks in Information Technology Projects*. *Ind. Manag. Data Syst.*, 104(4): 286-295.
- Baker, B N., Murphy, D C., & Fisher, D. 1983. Factors affecting project success. in *Project Management Handbook*, ed. Cleland, D. I. & King, W. R. Second Edition. New York: Van Nostrand Reinhold, 479-512.

- Carmel E. and Sawyer, S. (1998), "Packaged software development teams: what makes them different?", *Information Technology & People*, Vol. 11 No. 1, pp. 7-19.
- Charette RN (2005). Why Software Fails. *IEEE Spectrum.*, 42(9): 42-49.
- Chow, T., Cao, D-B., A Survey Study of Critical Success Factors in Agile Software Projects, *The Journal of Systems and Software*, 81, 961-971, 2008.
- Curtis, B., Krasner, H. and Iscoe, N. (1988), "A field study of the software design process for large systems", *Communications of the ACM*, Vol. 31 No. 11, pp. 1268-287.
- Cleland, D I., & King, W R. 1983, *Systems Analysis and Project Management*. New York: McGraw Hill
- Dezdar, S.&Ainin, S. (2012). "Examining Successful ERP Projects in Middle-East and South-East Asia," *American Journal of Scientific Research*, 13-25.
- 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* 21:89-95.
- Fan, D. Analysis of critical success factors in IT project management. In *Industrial and Information Systems (IIS)*, 2010 2nd International.
- FonsekaT.(2011) *Sri Lankan Journal of Management, Volume 14, No. 4 & Volume 15, No. 1*
- Fortune, J. and D. White, Framing of project critical success factors by a systems model. *International Journal of Project Management*, 2006.24(1): p. 53-65.
- Frederick Zarndt, (2011),"Project management 101: Plan well, communicate a lot, and don't forget acceptance criteria!", *OCLC Systems & Services*, Vol. 27 Iss: 3 pp. 170 – 174
- GoparajuPurnaSudhakar, (2012),"A model of critical success factors for software projects", *Journal of Enterprise Information Management*, Vol. 25 Iss: 6 pp. 537 – 558.
- Gould, J.D. "How to Design Usable Systems," In *Handbook of Human –Computer Interactions* 1988, pp. 757-789.
- Hartman, F., Ashrafi, R. (2002), *Project Management in the Information Systems and Information Software*, IEEE, 16, 30-36.
- Holland, C. R. & Light, B. (1999). "A Critical Success Factors Model for ERP Implementation," *Software*, IEEE, 16, 30-36.
- Humphrey WS (2005). Why Big Software Project Fail: The 12 Key Questions. *CrossTalk, J. Def. Software Eng.*, 18(3): 25-29.
- Jayasena and Jayathilake 2008, Identifying Key Risks in Software Project Management In Sri Lanka, 5th International Conference on Business Management Sri Lanka.
- Jiang, J. J., Klein, G. &Balloun, J. (1996).Ranking of System Implementation Success Factors,' *Project Management Journal*, 27, 49-53.
- Jones C (2006). Social and Technical Reasons for Software Project Failures.*CrossTalk, The J. Def. Software Eng.*, 19(6): 4-9.
- Jurison J., *Software project management : The manager's view*, *Comm. of the AIS.*, 2(1999)
- Kappelman LA, Mckeeman R, Zhang L (2006). Early Warning Signs of IT Project Failure, *The Dominant Dozen. Inform. Syst. Manage.*, 23(4): 31-36.
- Keider, S.P. "Why Projects Fail," *Datamation* (20:12), 1974, pp. 53-55.
- Leveson NG (2004). The Role of Software in Spacecraft Accidents. *J. Spacecraft Rockets.*, 41(4): 564-575.
- Mahaney RC, Lederer AL (2003). Information System Project Management: An Agency Theory Interpretation. *J. Syst. Software.*, 68(1): 1-9.
- Meredith, J.,R., Mantel, S.,J. (2006), *Project Management: A Managerial Approach*, 6th edition, John Wiley & Sons, Inc, USA
- Murray, M. & Coffin, G. (2001). "A Case Study Analysis of Factors for Success in ERP System Implementations," *Proceedings of the Seventh Americas Conference on Information Systems*, 1012-1018.
- Milis K, Mercken R (2002). Success Factors Regarding the Implementations of ICT Investment Projects. *I. J. Prod. Econ.*, 80(1): 105-117.

- McLeod, G., & Smith, D. 1996. Managing Information Technology Projects. Cambridge: Course Technology
- McConnel, S.C. "Software Project Survival Guide (SPSG)," 1998.
- Mia Badruddozza M. and Magnus R, IT project management in developing countries: approaches and factors affecting success in the microfinance sector of Bangladesh, 6th Int. Res. Workshop on IT Proj. Man.(IRWITPM), 4 December 2011, Shanghai, China, (2011)
- Nagasinghe S.D (2011), impact of agile project management practices on enhancing the IT project success in srilanka, 8th International Conference on Business Management , Sri Lanaka
- Nah, F. F. H., Islam, Z. & Tan, M. (2007)."Empirical Assessment of Factors Influencing Success of Enterprise Resource Planning Implementations," Journal of Database Management (JDM), 18, 26-50.
- Nah, F., Lau, J., Kuang J. (2001), Critical factors for successful implementation of enterprise systems,Business Process Management Journal, 2001, 7(3), 285-296
- OGC Best Practice.(2005). Common Causes of Project Failure, Office of Government of Commerce.
- Perkins TK (2006). Knowledge: The Core Problem of Project Failure. CrossTalk, The J. Def. Software Eng., 19(6): 13-15.
- Pinto JK, Slevin DP (1989). Project success: definition and measurement techniques. Project Manage. J., 19 (3): 31-35.
- PMI (2004). A Guide to the Project Management Body of Knowledge: PMBOKR Guide, 4th Ed.: Project Management Institute
- Poon, P. and C. Wagner, Critical success factors revisited: success and failure cases of information systems for senior executives. Decision Support Systems, 2001. 30(4): p. 393-418.
- Prentis, E.L, (1989), "Master project planning : Scope, time and cost", *Project Management Journal*, Vol. 20, pp. 24-30.
- Reel, J., S. (1999), Critical Success Factors in Software Projects, IEEE Software, May-June 1999, 18-23.
- Rosario, J. G. (2000). 'On the Leading Edge: Critical Success Factors in ERP Implementation Projects,' Business World, 17, 15-29.
- Ross, J. W. (1999). "Surprising Facts about Implementing ERP," IT Professional, 1, 65-68.
- Salmeron, J.L. and I. Herrero, An AHP-based methodology to rank critical success factors of executive information systems.Computer Standards & Interfaces, 2005. 28(1): p. 1-12.
- Sauer C, Cuthbertson C (2003). The State of IT Project Management in the UK 2002-2003. Computer Weekly, 15 April, pp. 1-82.
- Schmidt R, Lyytinen K, Keil M, Cule P (2001). Identifying Software Project Risks: An International Delphi Study. J. Manage. Inform. Syst., 17(4): 5-36
- Schwalbe, K. (4th Edn), "Information Technology Project Management", Thomson Course Technology (2006)
- Sekaran, U., & Bougie, R. (2012). *Research Methods for Business*. New Delhi: Sareen Printing Press.
- Shanks, G. G., Parr, A. N., Hu, B., Corbitt, B. J., Thanasankit, T. & Seddon, P. (2000). "Differences in Critical Success Factors in ERP Systems Implementation in Australia and China: A Cultural Analysis," Proceedings of the 8th European Conference on Information Systems, Citeseer, 537-544.
- Standish Group, (1995), The Chaos Report, Standish Group International, Inc.
- Standing C, Guilfoyle G, Lin C, Love PED (2006).The Attribution of Success and Failure in IT Projects.Ind. Manag. Data Syst., 106(8):1148-1165.
- Standish Group International (2009). Chaos Summary 2009: 10 Laws of CHAOS. Technical Report.

- Sudhakar, G.P., A model of critical success factors for software projects. *Journal of Enterprise Information Management*, 2012. 25(6): p. 537-558.
- Sumner, M. (1999). "Critical Success Factors in Enterprise Wide Information Management Systems Projects," *Proceedings of the 1999 ACM SIGCPR Conference on Computer Personnel Research*, ACM, 297-303.
- The Royal Academy of Engineering (2004), *The Challenges of Complex IT Projects*
- Young R., Jordan, E. (2008), Top management support: Mantra or necessity, *International Journal of Project Management*, 2008, 26, 713-725
- Zwikael O, Globerson S (2006). Benchmarking of project planning and in selected industries. *Benchmarking: Int. J.*, 13 (6): 688-700
- Zwikael, O. (2008), Top management involvement in project management: Exclusive support practices for different project scenarios, *International Journal of Managing Projects In Business*, 2008, 1(3), 387-403.