An Integrated approach to investigate the critical success factors of the information system projects (An empirical study in developing country)

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Abstract: IT projects are essential information technology investment opportunities for enterprises and the successful implementation of these projects have been taken into account by practitioner and researchers for their potential to improve business performance. The aim of this paper is to provide further insights into the critical success factors of IT business solutions. We hypothesize that there are certain factors in pre-implementation, implementation and post-implementation phases of these projects that positively impact their success. An integrated approach is used to consider projects lifecycle phases, the role of key stakeholders and the external factors for small and medium size enterprises. To illuminate the relationships among the elements of the model, structural equation model is conducted to survey the model fit and the hypotheses. The results clearly demonstrate that the degree of team member's commitment and participation in IT project is the leading element affecting the success of these projects. The data from Iranian car part makers was collected through interviewing of experts and questionnaire surveys. The results provide empirical evidence of the constructive influences of behavioral facilitators on the success of these projects over their life cycle.

Keywords: Critical success factor, SEM (structural equation model), IT projects, behavioral facilitator

1. Introduction

According to Shenhar et al., (2001), the main causes of using IT business applications can be divided into four groups: high growth anticipation, price competition, low operating expenses and expanding services. The implementation of the IT projects is challenging and needs organization preparation and considering more success factors than time, budget and performance. The literature on success factors of IT business solution projects is growing rapidly. Milis & Mercken, (2002) provided a list of possible success factors regarding the implementation of IT in Belgian banks and insurance companies. Motwani et al.,(2005) with case studies in different industries(pharmaceutical, footwear, energy and automobile), studied the critical success factor of enterprise resource planning projects and suggested that a cautious implementation process with support of network relationship and change management as well as the cultural readiness can lead to success implementation of these projects. Ngai et al. (2008) presents a literature review of the critical success factors in the implementation of enterprise resource planning through 10 different countries/regions and concluded that top management support' and 'training and education' were the essential factors to the successful implementation of these projects. Ram et al., (2013) with a survey in 217 organizations, found that some factors are not critical in the success of IT projects but have role in organizational improvement as he results of the projects implementation. Shaul & Tauber, (2013) reviewed 341 papers that addressed critical success factor of enterprise resource planning projects and emphasized the importance of focusing on SMEs considering their constrains in resources and the inherent uncertainty of the ERP projects implementation. They highlighted the gap of studying success factors across the project life cycle, the role of stakeholders and exogenous and endogenous features. In order to fill the gaps in existing literature review, this study conducted the following stages. First, an examination of previous research on success

factors in IT projects is presented to illustrate the classification of the critical elements. Second, a conceptual research model is proposed. Third, data collected from Iranian SMEs in automobile is presented and finally the confirmation of the overall proposed model is done to provide the empirical results of IT projects in SMEs organizations. It should be noted that we focused on the suppliers of Iran Khodro, one of the largest auto manufacturing companies in the Middle East for several reasons. First, the global automotive industry is discovering Information Technology as a strategic business asset. The focus of IT management is moving from cost reduction to improvement in IT's value and support for business growth and customer experience. The current agenda emphasizes on making IT organization more efficient, innovative, and more focused on delivery of value. The globalization is another reason for implementing IT projects in the organization. To achieve these objectives, Iran khodro such as other industrial groups, uses these infrastructure to deal with the changes in the market business. Align with Iran khodro's strategy for improving and moving towards global market, the car part makers try to cope with these strategies in order to be able to compete. These companies utilize the appropriate mechanisms to relay good and high quality services and act as reliable suppliers. In order to achieve this goal, the car part makers apply IT business solutions to facilitate and accelerate their progress. Second, most of the ERP software was developed in technically advanced countries and there are few studies that address the implementation of IT projects in developing or undeveloped countries (Shaul &Tauber, 2013). Third, considering the existing economic sanctions in Iran, these SMEs are facing more uncertainties and challenges in terms of resources and overall business conditions. Moreover, some of these companies have already initiated the IT projects and are in post implementation phase. Hence, empirical evidences related to the internal and external factors contributed in the success of the projects from the life cycle perspective, could provide an integrated approach for studying the critical success factors of SMEs projects considering the environment risks and uncertainties. The rest of this paper is organized as follows: in part 2, a literature review of IT projects success factors is provided. In part 3, the conceptual model and hypotheses are proposed. In part 4, the research method, data analysis and results are presented and finally, part 5 provides the discussions and the main conclusions of the study.

2. Literature review

The success of implementation of any complex system requires identification of factors that promote the effective operation via the life cycle of the system (Chou & Chang, 2008; Klein & Martz, 2003; Tsai et al., 2011). Moreover, the stakeholders play the critical role in order to implement any project successfully (Soh et al., 2000). The different facilitators have an influence on IT projects deployment. Investigation of these factors is needed to better understand the involved parameters in the process of these projects implementation. In the next part, a review of the essential factors and the context of deployment have been provided. The literature on success factors of IT projects is quite vast. In recent years, this topic has received much attention from researchers and practitioners. In this section, we have an overview of the studies that address success factors of these projects from the perspectives that are aligned with the objective of this study. Milis & Mercken (2002) outlined a list of success factors regarding the implementation of IT in Belgian banks and insurance companies. They introduced four main categories of factors. The first group covers features that increase goal and motivation for these projects. The second category is linked to the project team. The third category comprises factors that affect the acceptance of the project and the outcomes and the last group are the implementation strategies factors. Karlsen et al., (2006) draw up a list of success factors including top management supports, good communication and feedbacks from involved parties and clear responsibilities. Gingnell et al., (2014) proposed a model based on the data gathered from 51 experts in order to demonstrate the effect of management decisions on the projects and their performance. Hidding, & Nicholas (2014) studied the impact of culture and environmental pressures on IT project performance. They examined the model in US and China considering two different contexts. They believed that the link between organizational culture and IT project performance is moderated by environmental burdens. We classified the success factors in 6 categories that shown in Table 1.

Table 1: The contributed factors in success of IT projects

No	Factors	Source	Expected Related Project Phases	Related Stakeholders
	Organization factors	Motwani et al.2005 Agarwal &Rathod 2005 Milis & Mercken 2002 Sun & Wing 2005 Al-Fawaz et al. 2010 Ifinedo and Nahar 2007 Dezdar and Sulaiman 2009 Ehie and Madsen 2005	Pre-implementation	User Vendor
1	Culture			
2	Structure decision making process Alignment between business and IT strategies Functional requirements			
3	Change readiness Business change			
4	Communication			
	Behavioral factors	Motwani et al.2005 Agarwal &Rathod 2005 Milis & Mercken 2002 Sun & Wing 2005 Al-Fawaz et al. 2010 Chua and Lim 2009 Dezdar and Sulaiman 2009	Project life cycle	User Vendor
5	Managers support			
6	Business vision			
7	Use of steering committee			
8	Learning capacity			
9	Risk aversion			
10	leadership			
11	Team member motivation			
12	Team member commitment			
13	Conflict management			
	Project factors	Olson & Louis 2004 Milis & Mercken 2002 Al-Fawaz et al. 2010 Chua and Lim 2009	Pre-implementation & Implementation	User Vendor
14	Detailed project plan			
15	Goal definition			
16	Feasibility study			
17	Project resources			
	Technical factors	Al-Mudimigh 2007 Chung et al. 2008 Al-Fawaz et al. 2010 Doom et al. 2010 Dawson and Owens 2008	Project life cycle	User Vendor
18	Quality			
19	Suitability			
20	Information and Data quality			
21	Maintenance			
22	After sale services			
23	Testing and troubleshooting			
24	Collaboration with system providers			
	External factors	Bradford and Florin 2003 Buonanno et al. 2005 Wu and Wang 2007 Zhang et al. 2005 Santamar´ıa et al. 2010	Project life cycle	User Vendor Industrial actors Government
25	Legal			
26	Social			
27	Industry			
28	Economic			
	Stakeholders role	Wang & Huang 2006 Johansen et al. 2014	Project life cycle	User Vendor Industrial actors Government
29	Stakeholders involvement			
30	Stakeholders expectation			

3. Proposed framework and hypothesis development

3.1. Conceptual framework

From the literature review in section 2, we are able to recognize critical factors and facilitators in IT project success and formulate a potential research framework. The simplified research framework is shown in Fig. 1. The proposed conceptual model incorporates different facilitators via the life cycle of the projects. There are six groups of factors which affect the different project phases. Each of these facilitators influences the different dimension of the project success. Moreover, the criticality of the project life cycle could be studied with respect to the project success measures. These three groups of hypothesis will benefit to have an integrated approach to assessing critical success factor of IT projects. This model is a valuable tool to identify the critical success factors in each phase of the projects as well as the importance of each phase in project success. The details elements of the model are described in Figure 2.

3.2. Hypothesis development

With this model, we find the relationships among the six groups of success factors and their impacts in different phases of the projects. Furthermore, we explore the relationship among these factors and degree of satisfaction from IT project, the level of performance improvement and project management success. In addition, the importance of the different project phases on project success indicators could be revealed.
In the following data analysis, we utilize structural equation model to test these hypotheses. The questionnaire and the collected data allow the testing of variance analysis using that approach. The three groups of hypothesis with a more inclusive explanation are expressed in the subsequent subsections.

3.2.1. The critical success factors and the project life cycle(Group 1)

According to Chang, 2004, the factors related to management information system life cycle make it a multi-layered concept and then requires a systematic analysis. Critical success factors of these projects should be studied in each stage of implementation process (Esteves and Pastor 2006; Shaul and Tauber, 2013). Moreover, some factors are only substantial in certain phases of the project implementation (Somers and Nelson 2001). Shaul & Tauber, (2013) with providing a state of the art of the literature which address the critical success factor of ERP projects, emphasized that there are few studies that address the factors through life cycle of the projects. Hence, a deep analysis of the impacts of the critical factors on different phases of the project is needed. We considered three phases for the project life cycle. It is essential to determine and analyze what factors have effects on these three phases; pre-implementation phase, implementation and post implementation phase. Therefore, we propose the following hypotheses.

H1a*: The organizational facilitators positively affect pre-implementation phase of the project.*
H1b*: The behavioral facilitators positively affect whole life cycle of the project.*
H1c*: The project factors positively affect pre-implementation and implementation phases of the project.*
H1d*: The technical factors positively affect whole life cycle of the project.*
H1e*: The external factors positively affect life cycle of the project.*
H1f*: The stakeholder's role positively affect life cycle of the project.*

3.2.2. The impact of factors on project success (Group 2)

Measuring the success of IT projects is extensively known by practitioners and academics as a difficult concept to explain (Tsai et al., 2011). There are many studies that aimed address the success of information system projects (DeLone & McLean, 1992; DeLone & McLean, 2003; Gable et al., 2003; Sehgal & Stewart, 2004; Shenhar et al., 2001). User satisfaction is a common indicator of system success. The questionnaires for stakeholders to express their view regarding project could be a measure for project success (e.g., Guinan et al. 1998). Hence, we can classify the measures in three categories; project management success factor such as meeting the time, budget and project specification (Shenhar et al., 2001) performance improvement which includes the organizational improvement , the economic and other benefits for firms and finally the satisfaction (including user satisfactions and all other stakeholders involved in life cycle of the project). It is necessary to determine the effect of

facilitators on these measures. Therefore, we propose the following hypotheses.

H2a: *There is a positive relationship between the organizational facilitators and project management success.*
H2b: *There is a positive relationship between behavioral facilitators and all the project success measures (Project management success, Performance Improvement and satisfaction)*
H2c: *There is a positive relationship between the project factors and project management success.*
H2d: *There is a positive relationship between the technical factors and all the project success measures (Project management success, Performance Improvement and satisfaction)*
H2e: *There is a positive relationship between external factors and all the project success measures (Project management success, Performance Improvement and satisfaction)*
H2f: *There is a positive relationship between the role of stakeholders and all the project success measures (Project management success, Performance Improvement and satisfaction)*

3.2.3. The critical phases and the impact on success (Group 3)

The better understanding of the critical phase of the project and its impact on the different project measures could make the better investment decision on that phase as well as resource management in order to lead to the greater chance of successful implementation of the project. The set of hypotheses in Group 3 tries to clarify the relationship among the project phases and the project success indicators. Hence, we propose the following hypotheses.

H3a*: There is a positive relationship between the successful pre-implementation of the project and project management success.*
H3b*: There is a positive relationship between the successful implementation of the project and project management success.*
H3c*: There is a positive relationship between the successful implementation of the project and satisfaction.*
H3d*: There is a positive relationship between the successful post-implementation of the project and the satisfaction.*
H3e*: There is a positive relationship between the successful post-implementation of the project and the performance improvement.*

4. Research method

4.1. Research context

Iran Khodro is one of the largest auto manufacturing companies in the Middle East. This company, founded in 14 may 1962. Iran Khodro ranks as the 19th auto manufacturer in the world, with a production capacity of 520000 units a year. Under the comprehensive 10-year strategy plan, Iran Khodro has placed its strategies around four fundamental issues based on profit, leading of the market, focusing on development and training of the manpower and organization. Main strategies of the company are including strategic relations with the world leaders of the car market; ability to compete with any new manufacturer in the region and becoming the most suitable base of vehicle industry in the region for developing the investments. In this regard, long term plans of product with a view to various sectors of the market have been prepared which include the plan for the development of new products and replacement of the present products. In the field of product technology, the company orientation is toward making products with more variety and common platform. In order to provide financial resources needed for investment, a long term fiscal and investment plan by taking into consideration the existing limitations has been codified. In addition, Cost reduction program has been included as a basic and vital strategy. Iran Khodro's big family has exceeded mass production and became an automaker by designing and producing national car, furthermore plans to become a world-class automaker. With its personnel's effort and diligence, Iran Khodro continues its leadership in Iranian industry and achieves high vision of the group. Concerning the above mentioned goals and objectives, IT infrastructures are very important. The global automotive industry is discovering Information Technology as a strategic business asset. The focus of IT management is moving from cost reduction to improvement in IT's value and support for business growth and customer experience. The current agenda emphasizes on making IT organization more efficient, innovative, and more focused on delivery of value. The globalization is another reason for implementing IT projects in the organization. To achieve these objectives, Iran khodro such as other industrial groups, uses these infrastructure to deal with the changes in the market business. Align with Iran khodro's strategy for improving and moving towards global market, the car part makers try to

cope with these strategies in order to be able to compete. These companies utilize the appropriate mechanisms to relay good and high quality services and act as reliable suppliers. In order to achieve this goal, the car part makers apply IT business solutions to facilitate and accelerate their progress.

4.2. Sample and variable measurement

The method used for testing the proposed model is survey in Iranian car part makers companies and we employed a questionnaire as a research instrument. A total of 100 copies of the questionnaire were sent to 100 Iranian car part makers companies in Tehran. A total of 74 questionnaires were returned within five weeks period. A draft of the questionnaire was prepared based on critical success factors identified by previous researchers. All possible critical success factors were allocated to pre-implementation and implementation phases. An internal survey was conducted in one of the major Iranian companies to test whether the critical success factors were relevant to the work at each phase and whether they were easily understood and answered. We asked from several experts to survey the questionnaire and we analyzed the questionnaire reliability with this method. The returned questionnaires showed that the respondents found some factors were not clearly described and some terms could not be easily or fully comprehended

The respondents' organization level and size and the range of variables are illustrated in table 2, 3 and 4 respectively.

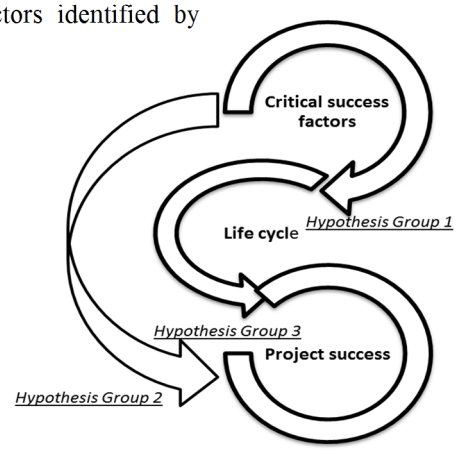

Figure 1: The simplified conceptual model

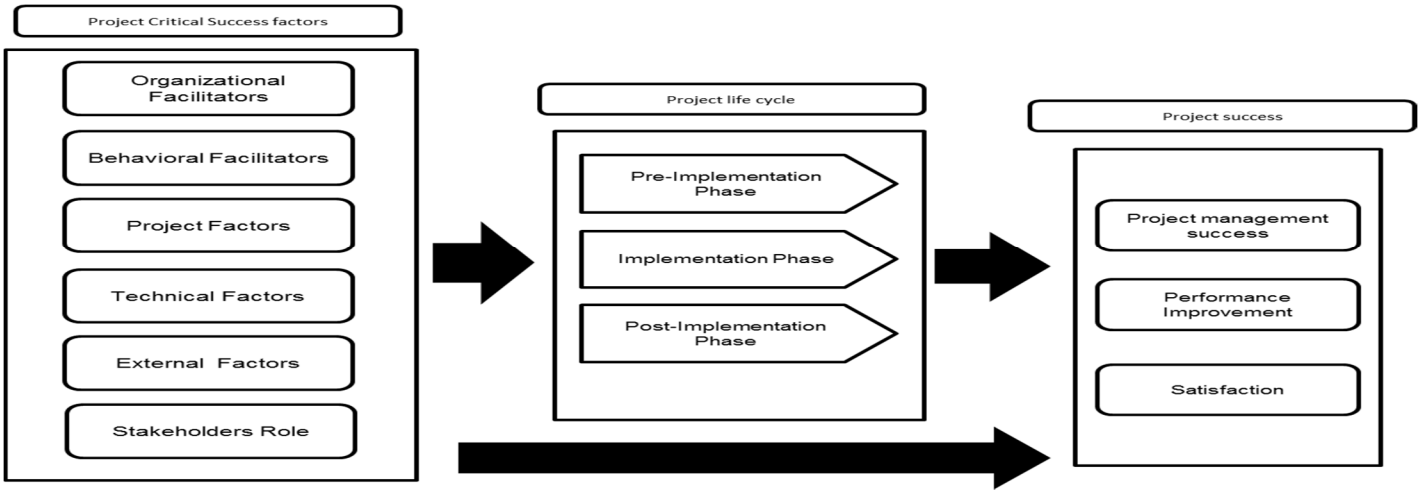

Figure 2: The conceptual framework with more details

Job title	frequency	Percentage of respondent
Executive manager	3	0.08
Factory manager	2	0.05
Quality manager	7	0.19
System & computer manager	1	0.02
Production manager	2	0.05
Counselor of manager	5	0.13
Employee of quality department	12	0.33
Employee of production department	1	0.02
others	3	0.08

Table 3: Organizational size

No .of staff	frequency	Percentage of respondent
< 50	6	0.16
50 – 149	3	0.08
150 - 299	5	0.13
300- 500	11	0.30
No answer	6	0.16

Table 4: Summary of the measurement model

Latent	Indicator	Mean	Std. Dev.	Cronbach's α
Organization factors				0,88
Culture	**OF1**	4,33	0,62	
Structure	**OF2**	4,23	0,65	
decision making process	**OF3**	4,02	0,66	
Alignment between business and IT strategies	**OF4**	3,99	0,60	
Functional requirements	**OF5**	4,15	0,53	
Change readiness	**OF6**	4,12	0,63	
Business change	**OF7**	3,65	0,62	
Communication	**OF8**	4,52	0,58	
Behavioral factors				0,95
Managers support	**BF1**	4,22	0,67	
Business vision	**BF2**	3,99	0,71	
Use of steering committee	**BF3**	4,65	0,69	
Learning capacity	**BF4**	4,82	0,70	
Risk aversion	**BF5**	4,99	0,57	
leadership	**BF6**	4,11	0,58	
Team member motivation	**BF7**	4,32	0,62	
Team member commitment	**BF8**	4,74	0,60	
Conflict management	**BF9**	4,91	0,61	
Project factors				0,83
Detailed project plan	**PF1**	3,29	0,69	
Goal definition	**PF2**	4,56	0,73	
Feasibility study	**PF3**	3,93	0,72	

Project resources	**PF4**	4,24	0,64	
Technical factors				0,9
Quality	**TF1**	4,23	0,69	
Suitability	**TF2**	4,11	0,70	
Information and Data quality	**TF3**	4,22	0,66	
Maintenance	**TF4**	3,99	0,62	
After sale services	**TF5**	4,65	0,59	
Testing and troubleshooting	**TF6**	4,82	0,60	
Collaboration with system providers	**TF7**	4,99	0,61	
External factors				0,83
Legal	**EF1**	3,99	0,73	
Social	**EF2**	3,26	0,75	
Industry	**EF3**	4,23	0,72	
Economic	**EF4**	4,53	0,69	
Stakeholders role				0,95
Stakeholders involvement	**SR1**	4,95	0,56	
Stakeholders expectation	**SR2**	4,23	0,72	
Project Life cycle				0,93
Pre-Implementation	**PRE**	3,99	0,78	
Implementation	**IM**	3,76	0,75	
Post-Implementation	**POST**	3,24	0,73	
Project success				0,92
Project management success	**PMS**	3,24	0,73	
Performance Improvement	**PI**	4,25	0,53	
Satisfaction	**SAT**	4,85	0,63	

4.3. The proposed model

We propose a structural equation model to analyze the critical success factors of IT projects. One of the unique characteristics of an SEM is its ability to provide parameter estimates for relationships among unobserved variables. Fig. 3(a, b) illustrates the hypothesized model used in this study, that selects the model constructs and components and the structural relationships among them. The measurement model was estimated using AMOS6.

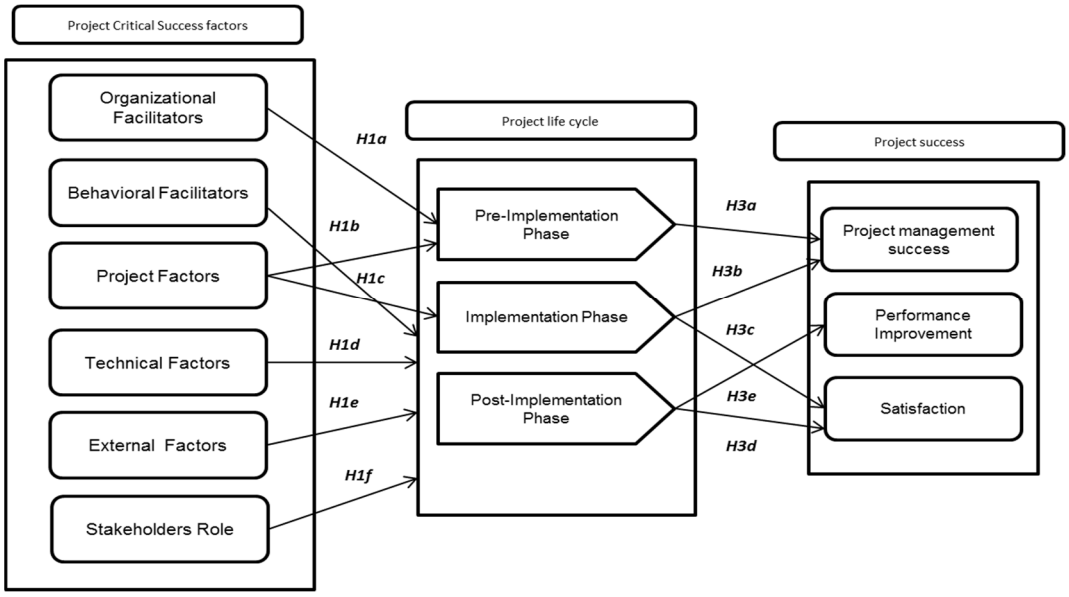

Figure 3-a: Structural model

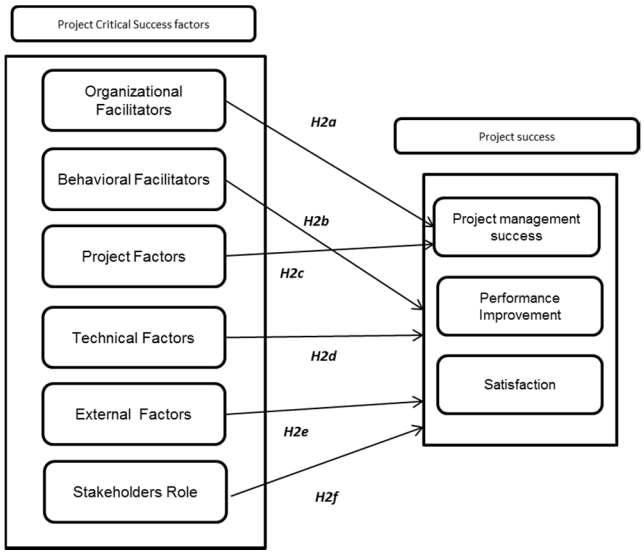

Figure 3-b: Structural model

4.4. Data analysis and results

To measure the validity of the proposed model, content validity and construct validity and discriminant validity were evaluated. Content validity was assessed by checking the consistency between the models components and the existing literature. We interviewed with senior managers to assure that the models measures reflect the objectives of the study properly. The Cronbach alpha ranges from 0.83 to 0.95 for the constructs demonstrate the internal consistency of the model. Furthermore, Table 5 shows the loadings of the measures in our research model. All measures are significant on their path loadings at the level 0.01 significance. Table 6 approves the discriminant validity because the square of the average

variance resulted for each construct is greater than the levels of correlations containing the construct. Each construct has also larger variance with its own components than with other constructs components. This model was estimated using AMOS 6.0. Table 7 shows the goodness of fit measures in the proposed model. The chi-squares estimates (2138, 41) was significant and suggested a good fit. It should be noted that chi-square is strongly influence by sample size. Thus, by increasing the sample size, the probability of chi-squares significant will be increased. The value of NFI (0.83),CFI(0.87),GFI(0.71) and RMR(0.03) meet the threshold level based on Bentler & Bonett(1980),Bagozzi & Yi(1988),Scott(1994) and Hu & Bentler(1999) respectively. These goodness fit indices indicate extremely acceptable levels of meanness and fit of the model. All of the propositions paths are significant and supporting the relevant hypotheses. The results are provided in Table 8. These results essentially support all of our hypotheses.

Table 5: The loading of measures

Latent	Indicator	Standard Loading	T statistic
Organization factors			
Culture	**OF1**	0,81	17,21
Structure	**OF2**	0,82	16,98
decision making process	**OF3**	0,72	11,23
Alignment between business and IT strategies	**OF4**	0,76	11,87
Functional requirements	**OF5**	0,82	12,83
Change readiness	**OF6**	0,84	13,24
Business change	**OF7**	0,73	10,56
Communication	**OF8**	0,77	12,11
Behavioral factors			
Managers support	**BF1**	0,81	16,81
Business vision	**BF2**	0,91	18,23
Use of steering committee	**BF3**	0,80	15,14
Learning capacity	**BF4**	0,75	15,07
Risk aversion	**BF5**	0,80	16,29
leadership	**BF6**	0,84	18,68
Team member motivation	**BF7**	0,75	11,43
Team member commitment	**BF8**	0,62	11,43
Conflict management	**BF9**	0,93	20,13
Project factors			
Detailed project plan	**PF1**	0,79	12,13
Goal definition	**PF2**	0,74	12,34
Feasibility study	**PF3**	0,78	11,83
Project resources	**PF4**	0,93	19,24
Technical factors			

Quality	**TF1**	0,65	9,60
Suitability	**TF2**	0,78	10,01
Information and Data quality	**TF3**	0,90	18,07
Maintenance	**TF4**	0,71	11,53
After sale services	**TF5**	0,81	15,58
Testing and troubleshooting	**TF6**	0,70	10,18
Collaboration with system providers	**TF7**	0,89	16,77
External factors			
Legal	**EF1**	0,73	11,52
Social	**EF2**	0,88	18,90
Industry	**EF3**	0,62	10,93
Economic	**EF4**	0,82	16,84
Stakeholders role			
Stakeholders involvement	**SR1**	0,58	8,51
Stakeholders expectation	**SR2**	0,59	8,63
Project Life cycle			
Pre-Implementation	**PRE**	0,77	12,32
Implementation	**IM**	0,83	16,66
Post-Implementation	**POST**	0,84	16,96
Project success			
Project management success	**PMS**	0,77	13,23
Performance Improvement	**PI**	0,66	11,27
Satisfaction	**SAT**	0,95	16,32

Table 6: The correlation matrix

Var	**OF**	**BF**	**PF**	**TF**	**EF**	**SR**	**PLC**	**PSUC**
OF	**0,653**							
BF	0,321	**0,723**						
PF	0,232	0,534	**0,662**					
TF	0,278	0,326	0,291	**0,583**				
EF	0,249	0,327	0,421	0,412	**0,652**			
SR	0,213	0,272	0,278	0,321	0,326	**0,576**		
PLC	0,304	0,216	0,512	0,317	0,234	0,321	**0,613**	
PSUC	0,312	0,314	0,295	0,416	0,278	0,217	0,379	**0,642**

Table 7: Fit indices of structural model

Fit Indices	Value
χ^2	2138,41
df	761
χ^2/df	2,81
NFI	0,83
CFI	0,87
GFI	0,71
RMR	0,03

Table 8: Parameters estimates and the results of hypothesis test

Hypothesis	Path coefficient	P Value	Result
H1a	0,32	0.001	Supported
H1b	0,35	0.001	Supported
H1c	0,23	0.001	Supported
H1d	0,28	0.001	Supported
H1e	0,43	0.001	Supported
H1f	0,41	0.001	Supported
H2a	0,46	0.001	Supported
H2b	0,31	0.001	Supported
H2c	0,27	0.01	Supported
H2d	0,19	0.001	Supported
H2e	0,34	0.001	Supported
H2f	0,28	0.001	Supported
H3a	0,27	0.001	Supported
H3b	0,32	0.001	Supported
H3c	0,36	0.001	Supported
H3d	0.21	0.001	Supported
H3e	0.27	0.001	Supported

4.5. Results discussion

The hypotheses H1a, H1b, H1c, H1d, H1e, H1f are strongly supported (0.32, 0.35, 0.23, 0.28, 0.43, 0.41, p-value <0.001), demonstrate the critical success factors that affect the different part of IT project5s life cycle. The behavioral facilitators, external factors and stakeholder's role need to be more taken into account considering the positive impacts on whole life cycle of the project. The results show that the member role in IT project success is so important. The group dynamic and the member commitment are the crucial success factors in this survey. Organization facilitators such as the culture, communication and change readiness are the parameters which play important role in IT project success especially in pre-implementation phase. Management role and project facilitators are other important factors that affect pre-implementation and implementation phases. According to Heeks (2002), there are two high-risk prototypes that affect information systems in developing countries; country context gaps and hard-soft gaps. The proposed model by author also explains the constrains that exist in implementation of IT project in developing countries. The path coefficient of external factor reflect the importance of external factors such as industrial , economic, legal and social constrains on the success of these projects. The economic constraints due political sanctions also impose some limitation for implementation of IT solutions. The hypotheses H2a, H2b, H2c, H2d, H2e, and H2f are also supported (0.46, 0.31, 0.27, 0.19, 0.34, and 0.28), demonstrate the effect of the factors on elements of the success. Organizational facilitators and project factors positively influence on project management success while behavioral facilitators, technical factors, external parameters and the stakeholders affect all of the elements of success. In addition to the conventional factors such as project factors and organizational facilitators that affect the successful implementation of every project, behavioral facilitators and the role of stakeholders play an important role in other success indicators such as performance of IT project and satisfactions. Moreover, technical and external factors are also the parameters that should be considered by managers in order to sustain the success in terms of project success, performance improvement and user satisfactions. Our analysis also supports the hypotheses H3a, H3b, H3c, H3d, and H3e, (0.27, 0.32, 0.36, 0.21, and 0.27). the successful pre-implementation phase positively affect project management success while the successful implementation phase and post implementation are more contributed to the overall performance of the project and user satisfactions. These results also illuminate the role of post-implementation phase in sustaining the success in IT projects. Our discussion with experts revealed that for most Iranian car part makers that implement IT projects, the after sale services and technical supports in addition to the vendors collaboration are critical in user satisfactions and the long lasting performance outcomes.

5. Conclusion

This paper provides empirical explanation for a model that recognizes the critical success factors of IT projects in a developing country. We survey the existing literature of IT project critical success factors in order to formulate the propositions in three groups; the critical success factors and the project life cycle(Group 1);the impact of factors on project success (Group 2) and the critical phases and the impact on success (Group 3). The results provided motivating insights into IT projects implementation for practitioners and researchers. The proposed integrated model with considering the life cycle of project and the role of stakeholders added valuable outcomes into current literature. The results of the study confirms that six main constructs ; organizational and behavioral facilitators, project factors, technical and external factors as well as the role of stakeholders affect different phases of project life cycle. Among these factors behavioral facilitators, external factors and the stakeholder's involvement have more impacts on successful implementation of the IT projects. Moreover, the results of this research reveal the impact of successful implementation of the different phases of the project on success indicators. The post-implementation phase of the project is essential in long lasting success outcomes such as performance improvement and satisfactions. Future research could be done to study the relationships among the critical factors in order to discover causal relationship among constructs. Moreover, we tested the model based on empirical results in Iranian car part makers. Applying and modifying the model in other

developing countries also provide more insights in order to generalize the model.

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