

Critical Success Factors for Information and Communication Technology (ICT) Projects: A meta-Synthesis

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INTRODUCTION AND BACKGROUND

Nowadays, business environments are dynamic, unpredictable and unreliable calling for project managers to be equipped with dependable knowledge and advanced practice as well as experiences on how to achieve project success (Neverauskas, Bakinaike & Meiliene, 2013:1). There is a limitless amount of research on ICT project management. Notably, there is a wide range of research results focusing on critical success factors in ICT projects. Doom, Milis, Poelmans and Bloemen (2010:2) define a critical success factor as a factor which, if addressed, significantly improves the chances of successful project implementation. There is no general consensus on the critical success factors on an ERP implementation. Nasir and Sahibuddin (2011:2) note that project success factors are not universal to all projects. The Critical success factors (CSFs) concept promised a systematic way of identifying the key areas or signposts that require the constant and careful attention of management in order to achieve performance goals (Ram & Corkindale 2014:4).

Many times, project managers and practitioners do not have time to refer to the myriad of research findings in order to apply the critical success factor model resulting in the rate of success of ICT projects remaining low. This research study solves this problem by providing meta-synthesised knowledge for the ICT project practitioners. A literature search was done from which seven (7) articles were selected systematically for study and synthesising in order to highlight critical factors in the management of ICT projects.

The biggest challenge in the literature of ICT project management critical success

factors is that ICT itself is too broad. This raises the question: which factors are critical to which type of ICT projects? In this study, the researchers were cognisant of this fact such that for all the articles considered, the type of ICT project studied was noted. Surprisingly, all the articles included in the final and crucial analysis referred to software development projects. It is therefore worrisome as to how other types of ICT projects can use the CSFs identified in literature. Such projects as computer networking, hardware installation are not found in the literature. Montequin, Fernandez, Fernandez and Balsera (2016) argue that the huge amount of lists of success factors and failure causes which appear in literature vary depending on the study and the type of the project, therefore, there is no general consensus about them. Information and communication technologies are major enablers in the private and government sectors in today's knowledge-driven economy (Ommar, Bass & Lowit, 2016). Projects irrespective of type and industry are initiated to provide value to the organisation (Nazeer, 2014). ICT projects are transitory undertakings like any other conventional projects and require the use of resources, incur costs and are expected to produce deliverables over a period of time. Projects are meant to solve problems and meet challenges (Macapagal, 2010).

ICT projects are however different from other projects, they are more complex due to their being subject to potential hazards of all kind (complexity, teams with multiple members, difficulty in control and management, lack of work discipline and clear specifications and absolutely no precision in establishing costs and time) that prevent them from achieving success (Montequin, Fernandez, Fernandez & Balsera 2016:3). The problem with ICT projects is that they do not have a good track record, fail most of the time and do not provide value to the organisation (Nazeer, 2014). Studies have shown that information and communication technology for development (ICTD) projects have a high failure rate, in part because of poor project design and management (Macapagal, 2010).

Another contentious issue in ICT project management is the meaning of success itself. Montequin, Fernandez, Fernandez and Balsera (2016) argue that nowadays, to determine the success or failure of a project has become a more complex issue than before, success is not only perceived differently from one person to another, but also the typology and sector of the project may influence our perception of success. It is difficult to agree on a common definition of success. Neverauskas, Bakinaite and Meiliene (2013:2) argue that a lot of different project success factors are found in literature which tends to confuse project managers. They question which part of the project should be considered successful? Does a successful project always produce a successful product for which it was initiated or maybe a successful is determined by good project management practice? They concluded that the success of a project is a function both the project management success and the product success. Essentially, a project may produce a poor product with successful project management. In other

words the product of the project must not be used to measure the success of the project management process.

Ram and Corkindale (2014:25) propound that success and performance are measured in diverse ways leading to difficulties in the empirical validity of critical success factors. Also it is difficult to use a common basis for establishing whether critical success factors affect ERP implementation or performance. Projects have implementation, outcome, process etc making it difficult to generalise the critical success factors. Ram and Corkindale (2014) propose that many critical success factors need to be robustly empirically tested for their actual influence on some aspects of ERP success. The eventual result is that the delivery of successful projects is more complex a task than meeting costs, time and specifications. Although there has been significant research on information and communication technology project success, there are still gaps around this field resulting in the need for further understanding in both theory and practice to ensure the level of ICT project success (Bin Ahlan & Subiyakto, 2013).

This paper provides meta-synthesised literature to ICT project practitioners in different domains of ICT such that they apply the critical success factor model to specific ICT projects appropriately thereby increasing their chances of success. In as much as much research output is available, time to go through it is not always available and is not economic. This paper is a short and precise synthesis of hundreds of research articles on the critical success factors on ICT projects.

Methodology

Qualitative meta-synthesis was used in this study. Erwin, Brotherson and Summers (2011) define qualitative meta-synthesis as an intentional and coherent approach to analysing data across qualitative studies. It enables researchers to identify a specific research question and then search for, select, appraise, summarise and combine qualitative evidence to address the research question. Zimmer (2006:2) defines qualitative meta-synthesis as a type of qualitative study that uses as data, findings from other qualitative studies linked by the same or related topic. The sample of a meta-synthesis is made up of individual qualitative studies selected on the basis of their relevance to a specific research question posed by the synthesist. It is the synthesist's interpretation of the interpretations of primary data by the original authors of the constituent studies.

This study entails a comparison, translation and analysis of original findings from which new interpretations were generalised, encompassing and distilling the meanings in the constituent studies as propounded by Zimmer (2006:2). The study selected qualitative studies on the critical success factors for ICT projects and translated the findings into one interpretation that offers a richer, more complex understanding of the phenomenon as guided by Erwin, Brotherson and Summers (2011).

The meta-synthesis of literature on the critical success factors on ICT projects was done following the process stages suggested by Erwin, Brotherson and Summers (2011):

- Formulation of a broad research problem or question
- Conducting a comprehensive search of the literature.
 - Get an exhaustive list of studies on the subject
 - Identify keywords
 - Include dissertations, theses and research reports
 - Criteria for inclusion or exclusion of articles.
- Conducting a careful appraisal of the research studies for possible inclusion.
- Select the articles for inclusion.
- Conducting the meta-synthesis
- Reporting- present synthesis of findings across studies.
- Reflect on the process – methods used, how many people were involved in the appraisal, validity and credibility.

Search strategy used

Key terms were used in searching articles from the Internet on the subject under study. The two sections that follow show the key terms used in this research followed by the databases and search engines from which the search was done.

Key terms

The following were the key terms used in the search through the literature;

- Critical success factors
- ICT/IS/IT project success factors/ critical success factors
- Computer networking project success factors/ critical success factors
- Software development project success factors/critical success factors
- Database project success factors/critical success factors
- Computer project success factors/critical success factors

Databases or search engines used

- EBSCOHOST

- ELSERVIER
- EMERALD
- Google Scholar
- Other

Criteria for article inclusion

The articles considered in this research study were selected on the basis of the following criteria

- The topic should focus on the critical success factors on IT/ICT/IS or specific ICT project type.

Research articles vary in many ways. Some articles may seem to be relevant topic wise but upon reading the content one may realise that it does not fall into the expected category. In this research articles were chosen based on the topic first but later qualified upon realising that the content actually talks of the critical success factors on any of IT, ICT, IS or any related domain.

- There must be evidence that the article used a reliable and pronounced basis for establishing the critical success factors.

The methodology was analysed. Articles that had a properly laid out and generally acceptable methodology were selected for the study. Articles which have a set of critical success factors but fail to show evidence of the appropriate methodology used were excluded since the results remain questionable.

- The content of the article should clearly deduce and articulate project critical success factors.

All articles included are those which clearly depict how the critical success factors were obtained from the methodology and the results obtained.

- The research question (s) must be clearly stated.

Every study needs to be addressing at least a single and well articulated research question. So, papers which qualified for inclusion into this study are those which had at one clear and answered research question.

- The research problem must be clear and relevant to ICT project management.

Articles needed to have a clearly stated research problem which also relate to the ICT project management domain.

- The research methodology must be sufficient to address the identified problem.

Summary of studies selected for synthesis

Total references	119
Title stage remaining 15	104
Rejected at the abstract stage remaining 7	8
Total full papers remaining	7
Total papers for preliminary study	7
Rejected on content material remaining 7	0
Final list of included papers	7

Table 1: Final list of articles included for synthesis

Article Code	Article reference
A	Neverauskas B, Bakinaite L and Meiliene E (2013) Contemporary approach to the possibility of projects success increase. Economics and Management journal vol.18(4)
B	Nguyen D. S (2016) Success factors that influence agile software development project success. American scientific research journal for engineering, technology and sciences vol.17(1), pp 172-222
C	Chow T and Cao D.B (2007) A survey study of critical success factors in agile software projects. The journal of systems and software vol. 81(2008), pp 961-971
D	Yeoh W and Koronios A(2010) Critical success factors for business intelligence systems, journal of computer information, vol.50(3) Spring, pp 23-32
E	Doom C, Milis K, Poelmans S and Bloemen E (2010) Critical success factors for ERP implementation in Belgian SMEs, Journal of enterprise information management vol.23(3)
F	Nasir M.H.N and Sahibuddin (2011) Critical success factors for software projects: A comparative study, Scientific research and essays vol.6(10), pp 2174-2186
G	Ram J and Corkinadale D (2014) How “critical” are the critical success factors (CSFs)? Examining the role of CSFs for ERP, business process management, Vol.20(1), pp 151-174

The type of ICT project studied**Table 2:** Types of ICT project studied

Article	Type of project studied							
	Business Intelligence	General ICT	Computer networking	Agile development	ERP	Database	Web	software
A		X						
B				X				
C				X				
D	X							
E					X			
F								X
G					X			
Total	1	1	0	2	2	0	0	1

Table 2 has a total of 8 project categories which form a subset of ICT projects. Though the researchers of the included articles tend to focus on different types of projects, they are all software projects. Agile software development projects aim at producing software the only difference is the development methodology. Business intelligent systems are also software. Yeoh and Koronios (2010:2) define a business intelligent system as an integrated set of tools, technologies and programmed products that are used to collect, integrate, analyse and make data available hence software. ERPs are also software as Doom, Milis, Poelmans and Bloemen (2010:3) define ERPs as extensive, integrated software systems supporting the internal operations of an enterprise. This shows that ERPs are also software. Yeoh and Koronios (2010:2) acknowledge that the implementation of a business intelligent system is not a conventional application-based IT project, it shares characteristics with other projects e.g. ERP implementation.

Most research focus on software since software is as important for all facets of the modern world as noted by Chow and Cao (2008:2). However, the software development process itself is not perfect. In as much as software is that important, it should be realised that software runs on hardware systems hence research needsto also address the hardware related projects. Research has to establish those factors specifically critical to each type of ICT project e.g. computer networking projects or hardware installation projects.

Identification of critical success factors for ICT projects

The researchers analysed the seven identified articles and listed a union of all the critical success factors in all the seven articles. The process obtained fifteen critical success factors. The critical success factors were listed in table 3. The researchers then went on to identify all the articles in which each of the critical success factors were listed as critical. The counts were indicated with an X in table 3. The articles were coded A to G as in table 1. As an example, the factor “strong customer involvement” was named in articles A, B, C, D and E showing that generally research found it to be critical and the factor “delivery strategy” was named only in one article”. The results of this analysis are shown in table 3.

Table 3: Identified critical Success factors for ICT projects

Critical Success Factor		Article						
		A	B	C	D	E	F	G
1	Strong customer involvement	X	X	X	X	X		
2	Good agile project management processes		X	X			X	
3	Priority and engagement of stakeholders		X					
4	Good agile engineering techniques and practices		X	X				
5	Good technologies and development tools	X	X					
6	Delivery strategy			X				
7	Team capability	X		X	X			
8	Team environment							
9	Committed management support and sponsorship				X	X	X	
10	Clear vision and well-established business case	X			X	X	X	
11	Business driven and iterative development approach				X			
12	Business driven, scalable and flexible technical team				X			
13	Sustainable data quality and integrity				X			
14	Clear and frozen requirements					X		
15	Realistic establishment of schedule and budget					X		

Article G on table 3 focuses on the empirical validity of the critical success factors on explaining why it does not dispute or suggest any critical success factors.

From table 3 it is inferred that the literature on ICT project critical success factors mainly consider the following as critical;

- Strong customer involvement
- Clear vision and well-established business case
- Good project management processes
- Team capability
- Team environment
- Committed management support and sponsorship

Conclusions and recommendations

Research in ICT project management is mainly focusing on the management of software projects leaving out other types of ICT projects that include computer networking projects, hardware installation projects, Database systems development, website development etc. The available literature delves into ERP implementation and agile software developments with a few focusing on ICT projects in general. This research discovered that literature on ICT projects consider the following as critical success factors in ICT projects specifically software development projects:

- Strong customer involvement
- Clear vision and well-established business case
- Good project management processes
- Team capability
- Team environment
- Committed management support and sponsorship.

ICT project managers are therefore advised not to take any list of ICT project management critical success factors at face value. In actual sense, there is need to consider the type of projects before applying the critical success factor model.

There is therefore need to carryout research in other types of ICT project types should be established. The project managers need specific information to use in each type of ICT projects.

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