

A Conceptual Framework for IS Project Success

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Abstract. The global IT development is becoming ever more dominant. Notwithstanding, most of the projects of IS are not satisfied – the IS projects are still experiencing failure. This research reviews the IS project success with the multi-dimensional and multi-level approaches. Various works in academic journals and conferences from 1992 to 2016 were elaborated. The findings indicate that empirical studies are crucial. Interestingly, a mutual relationship between three themes of works (project success, IS success, and acceptance and use of technology) has been identified. Consequently, a conceptual framework provides the comprehensive explanation for IS project success is shown, which could be a promising avenue of IS research.

Keywords: IS success · IS project success · Acceptance and use of technology

1 Introduction

The global information technology (IT) development is becoming ever more dominant [43]. Notwithstanding, most of the information systems (IS) projects are not satisfied – a failure of the IS projects. There are roughly 60% of the projects of IS are a problem about cost and time [64]. According to highly cited CHAOS, the success rate of the IS project is only about 29% to 39% in the period of 2004–2013 [5]. This estimation provides the IS success rate should be ameliorated, inasmuch the majority of the projects of IS were not satisfied.

The works on the technology acceptance (Davis [16]); acceptance and use of technology (Venkatesh et al. [81, 84]); IS success (DeLone and McLean, [18–20]); and project success (Belassi and Tukul [3]; Pinto and Prescott [48, 49]), which have accommodated the theoretical models for the project management and IT/IS. There are several works on the project success, IS success, and acceptance and use of technology. However, the studies did not provide all factors which impact on the effectiveness of IS projects – the IS project success, the relationship between those factors and project success, especially, the discrimination among them (IS success, project success, acceptance and use of technology). Therefore, a work about the IS project success is the indispensable study.

This research literatures articles from the academic papers in 3 research topics: (1) acceptance and use of technology (TRA [23], TPB [1], TAM [16], TAM2 [80], TAM2' [77], TAM3 [79], UTAUT [81], UTAUT2 [84]); (2) IS success (DeLone and McLean [18–20]); (3) project success (Belassi and Tukul [3]; Pinto and Prescott [48, 49]; Pinto and Slevin [50, 51]). A more correlated list of works (Hughes et al. [27]; Nguyen [40]; Petter et al. [45–47]; Rai et al. [53]; Seddon [60]; Tate et al. [69]). Correspondingly, the authors consistently synthesize scientific review of respectable papers for providing an entire list of sources of related works on the IS project success. Besides, a conceptual framework provides the comprehensive explanation for IS project success is shown, which could be a promising avenue of IS research.

2 Related Works

2.1 Literature Review

Acceptance and Use of Technology. Technology Acceptance Model (TAM) exculpates the acceptance of technology, and the elements can account for the system usage behavior [16]. TAM is extensively used in illuminating use intention and use behavior of IS users. Nevertheless, TAM requires convenient effusion, exposition, and prognostication is limited. Thus, usefulness on TAM2 [80] and ease of use on TAM2' [77], and both on TAM3 [79] which engraved immemorial the forces of prior works, evidently TAM to paraphrase use intention in the cognitive processes and social influence.

Venkatesh et al. [81] had proposed Unified Theory Acceptance and Use of Technology (UTAUT), explaining the IT/IS use intention and use behavior. This model cited from some theoretical frameworks, namely TAM [16]; Theory of Planned Behavior (TPB) [1]; Theory of Reasoned Action (TRA) [23]; TPB and TAM integrated model [70]; Diffusion of Innovations (DOI) [55]; Model of Personal Computer Utilization (MPCU) [71]; Motivation Model (MM) [17]; and Social Cognitive Theory (SCT) [9]. Venkatesh et al. [84] added more factors to UTAUT, called UTAUT2.

Investigation of theory based works revealed the acceptance and use of technology are divided into two branches that are TAM and UTAUT: (1) Based on TPB, TRA and the related theories (DOI, PMCU, MM, SCT) for building the technology acceptance model (TAM, TAM2, TAM2', TAM3...). (2) Unified theory of acceptance and use of technology (UTAUT, UTAUT2). A common trouble in the acceptance and use of technology work, the authors only cite the original models (TAM, UTAUT) without the extending frameworks [78] – a mark Venkatesh et al. [82] was commencement previous eight years. In the global, every day, enduring many studies on the acceptance and use of technology was jactitation, but they do not show any new theory. However, ideas necessitate the technology adoption works, e.g., the approach at TAM3's three levels (organization, team, and individual); adding more variables; considering new work contexts (managers and consumers); and proposing new mechanisms (hedonic motivation, habit, and net impact). Therefore, that accommodates the approaching works well-founded the technology adoption (project success and IS success).

IS Success. There are nearly as many measures as IS success; it is comprehensible when considering that “*information*”, a message or an IS output in a communication system, can be measured at 3 levels, including technical, semantic, and effectiveness [18]. In the communication, *technical level* as the system efficiency and propriety that information effectively; *semantic level* as the information success in promulgating intended meaning; and *effectiveness level* as the information impact on the receiver (Shannon and Weaver [63]). Thus, “*effectiveness*” as “*influence*” and information as “*event hierarchy take place at an information system receiving which may be used to identify the various approaches that might be used to measure output at the influence level*” (Mason [35, p. 227]). The events include the information application and information receipt, controlling a transform in system performance and recipient behavior [18].

DeLone and McLean [18, p. 88] propounded that “*the model of IS success clearly needs further validation and development before it could serve as a basis for the appropriate IS measure selection*” after proposing an original D&M model. Besides, some authors deprecated that the original IS success model is insufficient and recommended that more factors should be included in this model or presented other models. Then, Seddon [60]; Seddon and Kiew [61] advocated that the original D&M gaps comprehensiveness and further re-specified the IS success model by discriminating actual and expected influences, as well as by usefulness in TAM [16]. The correlated works contributed the general knowledge of the IS success theme. They construct that the works of IS success extensively reviewed the organizational and individual levels (Petter et al. [45]; Tate et al. [69]), not revised at the team level – these are theoretical gaps for developing other models on the IS success. Then, DeLone and McLean [19] updated the IS success design from the original D&M, and other authors also enhanced other IS success models from the D&M models (Gable et al. [25, 26]; Seddon [60]).

Besides, the IS success (DeLone and McLean [18–20]) and the acceptance and use of technology (TAM, UTAUT), there is the relationship among two theories. Distinctly, use intention and use appearing in both subjects [25, 60, 91]; the research on the sufficient model between the IS success and acceptance and use of technology [6, 57]. Also, the IS success works related to the success of project [22, 40].

Project Success. Schultz et al. [58] proposed the first efforts classify critical factors. The element groups at two accomplishment phases affecting project performance, top management support, project mission, project schedule. For each stage of works, Pinto and Slevin [50] invented success factors as Pinto and Prescott [48] provided the relative importance of once. That found the success factor correlation at different project periods. “*Success factors*” was proposed by Daniel [12]. The relationship between the project “*critical success factors*” (CSF) and the project success via the success criteria [12], e.g., Subiyakto and Ahlan [65] proposed the IS project success model from the project success criteria and project criteria. Rockart [56] had developed CSF as a management term for a factor indispensable for achieving its mission of the organization. CSF is a major factor in consolidating the organizational success, e.g., user involvement is one CSF for an IT/IS project success.

Accordingly, the scholars were only respected in the success of the project from the fundamentals of project management, e.g., infrastructure, project goal, top management

support, team capabilities [10, 11]. Then, scholars were interested in the customer satisfaction, project quality, project economic [14, 39]. Thus, for a success of IS project, the study propensities related to IS success as well as acceptance and use of technology. The studies involved constituting the project success CSF list [3, 13, 48–50, 73], these are the criteria can increase project success's likelihood. Although the study has tried to propose many models that deputize the successful concepts [18–20, 24], but has not served all IS project success key factors. The authors also impale on testing the success standards in the context of the acceptance of project [2, 21, 29]. The project success or failure depends on the CSFs alignment for project implementation and the matching competence of the success criteria [27].

Furthermore, Ika et al. [30]; Westerveld [90] manifested, it has conspicuous between the project success and the CSFs. For instance, Subiyakto et al. [67] based on Davis [15]; DeLone and McLean [18–20]; Espinosa et al. [22]; Sudhakar [68] pointed out an IS project success model. Next, Putra et al. [52] inherited this model to suggest another IS project success model...

IS Project Success. Wateridge [87] cited from the Morris and Hough [38] and Turner [74] works to propose an IT project success model with the project factors (sponsor, manager, team, and user) can impact on the IT project success criteria (characteristics, time, cost, and user requirements). Wateridge [88] added some IS project success criteria (quality and user satisfaction). Espinosa et al. [22] inherited and built the IS project success from previous studies. For example, DeLone and McLean [18–20]; Ika et al. [30]; Pinto and Slevin [50]; Wateridge [87] with several factors: compliances (time and cost), success (economic and product), user satisfaction. Subiyakto and Ahlan [65] developed an IS project success model. Accordingly, the framework cited from the common collaboration and comparison. Davis [15] designated according to HIPO (process), the project success theory (Wateridge [87]), DeLone and McLean [18–20], the environmental projection theory (Lim and Mohamed [34]). A model is delegating the relationship among the CSF (user satisfaction, system use, and IS project success) and the IS project criteria (stakeholders, resources, and environment).

Besides, the project success works (Belassi and Tukul [3]; Pinto and Slevin [50, 51]); IS success (DeLone and McLean [18–20]). The IS project success works (Nguyen [40]; Subiyakto et al. [66]); the study inquired the relationship among these papers. Service quality, system use, user satisfaction, and net benefits emerging in both themes (Espinosa et al. [22]; Subiyakto et al. [67]). In addition, the works of project success also showed the studies of acceptance and use of technology. User satisfaction, acceptance of project emerging in both topics (Ika et al. [30]; Schultz et al. [58]).

2.2 Research Method

There are four phases of this work: (1) identifying a specific material item; (2) determining the particular period for searching scientific documents; (3) selecting the related studies; (4) proposing a conceptual framework.

Identifying a clear material item that was as discriminating, the academic journals published the papers of the leading authors. In addition, the top MIS journals [89] are

considered. Besides, the MIS journals in the top rankings are also examined [59]. The best MIS international conferences are also examined. Determining the appropriate period for searching scientific documents. With the acceptance and use of technology, review from 1987 to 2016; with the IS success, the period between 1992 and 2016 was considered; with the project success, literature from 1987 and 2016. The research reviews the theoretical background will be searched for the theories’ starting point. After that, from the variety of published sources in the period (up to 2016), choosing the articles related to 3 topics. All papers had been searched in *Google Scholar* selecting articles for the literature review. Completing the selection process, examining the paper list on the success of IS projects, remove unnecessary items. Based on related studies, the authors accentuate a conceptual framework for IS project success.

3 Research Results

3.1 Article Results

There are 169 re-selected items from roughly 200 papers were initially searching criteria (Sect. 2.2). The related sections are analyzed and reviewed in detail. There are 58 articles described in “*review study*” or “*none-empirical/conceptual study*” and 101 papers “*empirical study*”.

The works of “*none-empirical/conceptual study*” are disjointed on the left (Fig. 1), comprising “*speculation/commentary*”; “*review study*” “*conceptual/framework model*”. In 58 papers, there are 43 papers on framework/conceptual model (Davis [16]; DeLone and McLean [18–20]; Venkatesh et al. [81, 84, 85]), and 6 articles on commentary/speculation (Gable et al. [25, 26]; Rai et al. [53]). Also, there are 8 papers on “*literature review*” (Hughes et al. [27, 28]; Urbach et al. [75]; Venkatesh [78]).

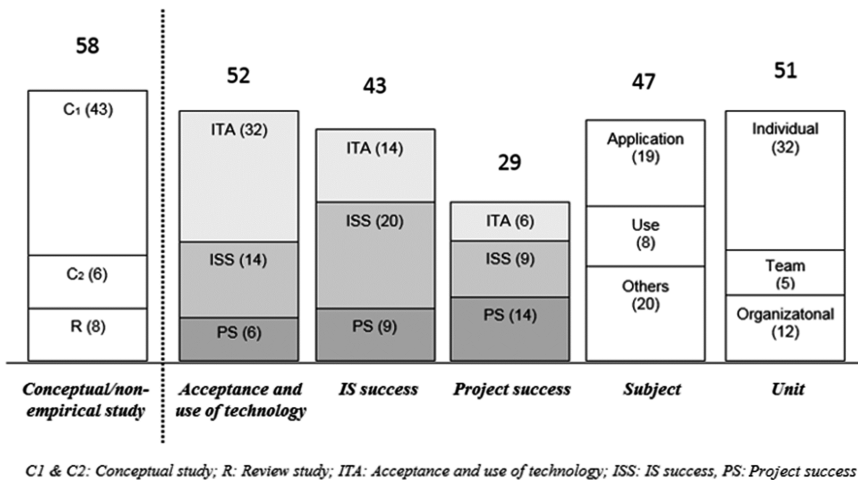


Fig. 1. The research approach summary of the success of IS project [44]

Moreover, the findings of this work externalized that, 47 papers on the application (Byrd et al. [4]; Wang and Yang [86]). Including, 19 papers on the application of IS, 8 articles on the implementation of organizational IS and success of organizational IS are specified, and other empirical works (Chu and Chen [7]; Nguyen et al. [41–43]). It has 32 papers on the individual level (Davis [14]; Petter et al. [45]; Tate et al. [69]), 5 papers on the team level (Jetu and Riedl [31]; Lee et al. [33]). It has 12 papers on the organizational level (Cserhati and Szabo [11]; Gable et al. [26]). Totally, the research results of the synthesis regard the success of IS project, thorough the theoretical basis understanding – acceptance and use of technology; project success criteria; project success; the relationship among 3 themes of the works (IS success, project success, and acceptance and use of technology).

The empirical studies disjointed on the right - 5 bars (Fig. 1). In which, 101 papers are approaching 3 topics of the works (acceptance and use of technology, IS success and project success). It has 52 papers on acceptance and use of technology (DeWit [21]; Putra et al. [52]; Venkatesh et al. [82]). There are 14 papers orderly to IS success (Sambasivan et al. [57]; Subiyakto et al. [67]; Wixom and Todd [91]), and 6 papers orderly to project success (Atkinson [2]; Coombs [10]; Subiyakto and Ahlan [65]). Besides, there are 52 papers on the IS success; there are 14 articles on the acceptance and use of technology (Sambasivan et al. [66]; Wixom and Todd [91]) and 9 papers on the project success (Muller and Jugdev [39]; Westerveld [90]). The research from the original D&M are 8 papers (Renzel et al. [54]) and updated D&M are 21 papers (Wixom and Todd [91]). There are 29 papers on the project success, it has 6 papers interested in the acceptance and use of technology (Atkinson [2]; Coombs [10]; Subiyakto and Ahlan [65]). There are 9 papers on the IS success (Ika [29]; Muller and Jugdev [39]; Westerveld [90]). Differently, there are 4 papers related to 3 themes of the works (acceptance and use of technology, IS success, and project success) (Putra et al. [52]; Subiyakto and Ahlan [65]).

3.2 IS Success, Project Success, and Acceptance and Use of Technology

The works of Belassi and Tukul [3]; DeLone and McLean [18–20]; Pinto and Prescott [48, 49]; Pinto and Slevin [50, 51]; Seddon [60]; Seddon et al. [62] are the distinctive work of the project success. Nguyen et al. [43]; Petter et al. [45–47]; Urbach and Muller [76]; Tukul and Rom [73] work on the success of IS. Espinosa et al. [22]; Nguyen et al. [42]; Putra et al. [52]; Subiyakto et al. [67]; Wateridge [87, 88] work on the IS project success. The studies of Ajzen [1]; Davis [16]; Fishbein and Ajzen [23]; Venkatesh et al. [81, 84] are the figurative works of the acceptance and use of technology. The works of Thong [72]; Venkatesh et al. [83] are the standard studies of IS acceptance.

In each topic, there are some gaps, e.g., authors have aggregated testing the acceptance and use of technology theoretical model (TPB, TAM) without propounding any appendage model, do not concentrate more theories. The majority of the related studies manipulated separately for a theme and fragment of research: (1) acceptance and use of technology (Fishbein and Ajzen [23]; Davis [16]; Venkatesh et al. [81, 83]). (2) IS success (DeLone and McLean [18–20]; Petter et al. [45–47]; Seddon and Kiew [61]; Seddon [60]). (3) Project success (Belassi and Tukul [3]; Cleland and King [8]; Pinto

and Prescott [48, 49]; Pinto and Slevin [50, 51]) (Fig. 2). Meanwhile, Venkatesh et al. [82] recommended other authors can expand more theoretical models of acceptance and use of technology the initial model (TAM, UTAUT). Venkatesh [78] has repeated that issue after eight years, no new theoretical models based on TAM or UTAUT. Nevertheless, there are not anymore extend models contributing to the technology adoption [78].

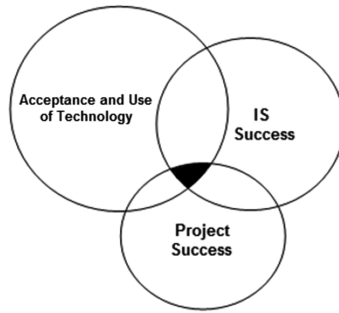


Fig. 2. Acceptance and use of technology, IS Success and project success [46]

The findings of the review have been detailed in Table 1. In which, with acceptance and use of technology, called usefulness, ease of use in TAM [16, 79, 80]; hedonic motivation, facilitating conditions, social influence in UTAUT [81, 84]; attitude toward using in TPB [1], TAM [16, 79, 80]; behavioral intention, use behavior in TAM [16, 79, 80], UTATU [81, 84]; and new mechanisms as the newest recommendation of Venkatesh et al. [85]. With the success of IS, namely information quality, system quality, usage, individual impact, and organizational impact in original D&M model [18], and updated D&M model [19]; service quality, user satisfaction, use intention, and net benefits in the updated DeLone and McLean [23]; other elements in Gable et al. [25, 26]; Petter et al. [45]; Seddon [60]; and new mechanisms as the newest recommendation of Venkatesh et al. [85].

Table 1. Some related concepts of 3 themes of studies

Acceptance and use of technology	IS success	Project success
– Usefulness	– System quality	– <i>Critical success factors...</i>
– Ease of use	– Service quality	– Project performance
– Hedonic motivation	– Information quality	– IS project success ^a
– Social influence	– Use intention ^a	– Project success ^a
– Facilitating conditions	– User satisfaction ^a	– <i>New mechanisms</i> ^a
– Habit	– Usage ^a	
– Price value	– Individual impact ^a	
– Attitude toward using	– Organizational impact ^a	
– Use intention ^a	– Net benefits ^a	
– Use behavior ^a	– <i>New mechanisms</i> ^a	
– <i>New mechanisms</i> ^a		

^aAppearing in the other topics

With the project success, called critical success factors, performance, project success in Belassi and Tukul [3]; Pinto and Prescott [48, 49]; Pinto and Slevin [50, 51]; and new elements in Davis [14]. Besides, with IS project success, there are related concepts in the studies of Espinosa et al. [22]; Hughes [27, 28]; Wateridge [87, 88].

Interestingly, the work related to others, e.g., use intention and usage appear in both of IS success and acceptance and use of technology. Project approval and user acceptance have exposed in the both of project success and IS success; user acceptance appears in the both of acceptance and use of technology and project success.

3.3 A Conceptual Framework for IS Project Success

Because the IS projects have seemingly had more complicated than those in other areas [36], it is evident that the related studies should take both multiple perspectives (technical, organizational, personal) as indicated in Mason [35]; Mitroff and Linstone [37]) and multiple levels (individual, team, organization) [32] approaches. Consequently, a conceptual framework is depicted in Figs. 3, 4, and 5. It should be noted that IS success could be both mediator and moderator in the relation between project success and acceptance and use of technology.

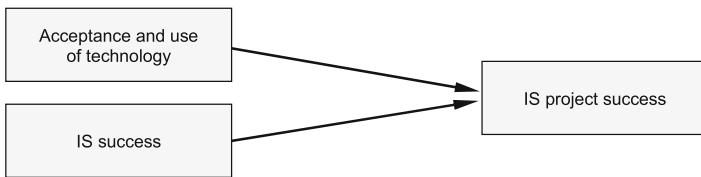


Fig. 3. Direct effect model

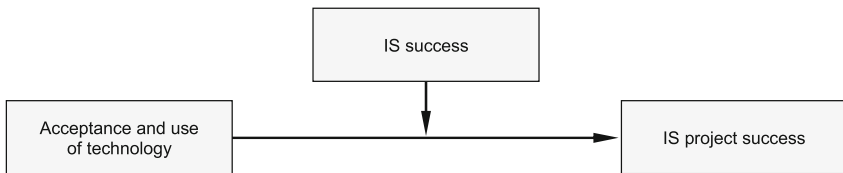


Fig. 4. Moderator effect model

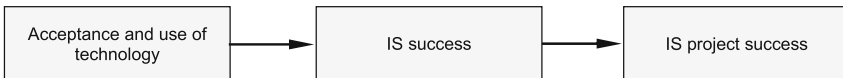


Fig. 5. Mediator effect model

In the author’s conceptual framework, there are 3 effect models:

- (1) *Direct effect model* (Fig. 3): acceptance and use of technology – independent dimensions (usefulness, ease of use, social influence, price value, habit and new mechanisms), and IS success – independent dimensions (service quality,

information quality, system quality, and new mechanisms). Project success – dependent dimensions (performance, IS project success, project success, and new mechanisms).

- (2) *Moderator effect model* (Fig. 4): acceptance and use of technology – independent dimensions (ease of use, usefulness, social influence, price value, habit and new mechanisms). Project success – dependent dimensions (performance, IS project success, project success, and new mechanisms). IS success – moderator dimensions (service quality, information quality, system quality, user satisfaction, use intention, usage, and new mechanisms).
- (3) *Mediator effects model* (Fig. 5): acceptance and use of technology – independent dimensions (ease of use, usefulness, social influence, price value, habit, and new mechanisms). Project success – dependent dimensions (performance, IS project success and new mechanisms). IS success – mediator dimensions (user satisfaction, use intention, usage, and new mechanisms).

The concepts of technology adoption are viewed as the independent dimensions. The concepts of IS success are viewed as the moderator dimensions and also viewed as the mediator dimensions on the relation to the concepts of IS project success – dependent dimensions. That will establish opportunities for work trends in the future.

4 Conclusions

This work synthesized the project success, IS success, and acceptance and use of technology studies as a review using the methods of multi-dimensional to explore the relationship among three theoretical key constructs. This work analyzed 200 articles from 1992 to 2016 in the top academic journals and conferences to identify the theoretical foundation and approaches to deal with the mutual relationship among three themes, as acceptance and use of technology, IS success, and project success. The findings propose a conceptual framework for IS project success, which maintains that the antecedent – the acceptance and use of technology, an outcome – IS project success, but IS success ranging from the precursor, the moderator to the mediator of this triadic relationship. Given the increasingly important role of IS projects in nowadays, the conceptual model for IS project success may indicate a high flow of IS works in entire.

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