

Definitions of Information Technology Project Success

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ABSTRACT

Researchers, Information Technology project's managers and other stakeholders of projects have found many approaches to assess the success of IT projects. As a result, there are currently many definitions of successful Information Technology projects such as traditional definitions, definitions which relate to views of customers or other stakeholders of the projects, value co-creation view definitions. However there is still no official definition which is widely accepted. In this paper, all these important and classical definitions of IT project success will be discussed and preconditions and research questions of successful IT project are also given as assessing foundations of successful projects. From all these discussions and foundations, suitable definitions of specific IT projects can be formed with contributions of various groups which involved with the IT projects.

Keywords: Project management, IT Project success.

INTRODUCTION

There are many definitions of Information Technology (IT) project success. In this paper, the classical definition and its expansions will be surveyed first. Later this report will discuss definitions that relate to customers and different perspectives of various groups involved with the project. Then an idea of successful IT projects from "value co-creation" view will be given. This report also examines the ways to avoid risks of IT project. Lastly some research questions of IT project success will be created.

The traditional definition of IT project success and it's expansions

Traditional definition of IT project success is 'the project met scope, time, and cost goals' [1]. Many authors have similar definition of IT project success with three factors: meet budget, time, user's requirements and specifications [2]. This definition is called "Iron Triangle" or "Golden Triangle". But this definition has some problems for example how a project's success can be the same for every stakeholders. Tuner and Cochrane claimed that '...the time-budget-requirements definition of project success is solely directed at

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the interest of the vendor and supplier' [3]. Chan and Chan concluded that this definition is only the basic criteria for project success [4]. They believe more dimensions need to be added to the basic criteria to make new expansions.

This approach later was used by Morris and Hough, Atkinson, Powers and Dickson. Morris and Hough (1987) claimed that there are four criteria of success, (Fig. 1), [5]. The first one is that the project delivers its functionality. Yes of course, because 'a project is a temporary endeavor undertake to accomplish a unique product, service or result' [6] and the project should have all functions of the product or service. The second one is the Golden Triangle. The project is also profitable for the contractor. Commercial success is very important but it is not mentioned in above definitions. But it is not correct in all circumstance, for example some noncommercial open source software is very successful. Projects should not only provide some valuable thing for contractors but also for all people who take part. And the last one is cancellation of the project have to make on a reasonable basis and the project stop efficiently. Some people will argue about this idea because an incomplete IT project cannot be a successful one.

Based on the definition of Morris and Hough, Turner built a new definition with six successful criteria, (Fig. 2), [5]. The first and the second criteria mean that the IT project brings the profit for all parties concerned. The fourth and sixth

mean that it meets all parties' requirements. But this definition may be too perfect because there are not much projects that can supply all six requirements.

The success framework made by Atkinson called "the square root" with four criteria [7]. The first one is the Golden Triangle which is mentioned above. The second is the information system, the third is the profit of users and organization, and the last one is the profit for the stakeholder. Karlsen and Gottschalk develop the idea of Atkinson and add one more factor (system implementation). The first factor is Golden Triangle. The second factor is project outcome, this includes '...system maintainability, reliability, validity and information-quality use' [7]. The third factor is system implementation which concerned about '...successful introduction, installation, training, use, and modification of new IS' [7]. This factor should be added to definition of IT project success. The last two factors are benefit for client, organization and stakeholders. Actually all these definitions above do not mention about the feeling of users/customers with this project. This can be a very good product on the technical view and give the benefit for every people involved... but it cannot useful for users because it may not meet their real requirements. Can we consider this product as a successful IT project?

Powers and Dickson noted that '...met time, cost, user satisfaction (meeting information needs) and impact on computer operations' is

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- **The project delivers its functionality;**
 - **The project is implemented to budget, on schedule and to technical specification;**
 - **The project is commercially profitable for contractor;**
 - **In the event of a cancelled project, was the cancellation mode on a reasonable basis and was the project terminated efficiently.**
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Fig. 1. The definition of Morris and Hough [5].

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- **It achieves its stated business purpose;**
 - **It provides satisfactory benefit to the owner;**
 - **It satisfies the needs of the owner, user and stakeholders;**
 - **It meets its predated objectives to produce the facility;**
 - **The facility is produced to specification, within budget and on time;**
 - **The project satisfies the needs of the project team and supporters.**
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Fig. 2. The definition of Turner [5].

definition of the project success [5]. This definition also includes the computer operations. IT projects are different with other kind of projects because they involve software [8]. The environment of software's operation is computer so that we should consider computer operations when define project success. An IT project may be very successful on the other factors but it may be not suitable with the computer system of users. This project cannot be assessed as a successful one. Actually computer operations are a part to provide satisfaction to users, an important factor for IT project success that we shall mention later.

Definitions that concern the customers

Schwalbe stated that projects must satisfy customers/sponsors [1]. Making users satisfying happens on this definition. One project which meets initial scope, time and cost goals but if customers do not satisfy can be considered as a failure project. The reasons may be the IT project does not supply enough business functionality for the user or the maintenance services are bad or their result is not effective. On the other hand successful projects may be not meet scope, time, cost goals but they make customers happy. Customers are the people who work with projects for a long time and they have the right to evaluate projects. Schwalbe also noted that a project must meet its main objectives [1]. The main objectives may be saving money, proving benefit... For example, a company wants to implement a new project to replace the old which cost a lot of money to maintain. Main objectives are very important factor to evaluate a project because it is the purpose why customers want to make a project. In some cases when a project achieves its objectives to satisfy the users. With the company above a project that can save cost of maintenances (main objective) is the one that can make them happy. Successful IT projects must achieve their main objectives and their objectives should be real [9].

Baccarini noted that project success combine

the project management success and project product success [10]. Cooke-Davis also has a similar idea [11]. Project management success means that the project is on time, within budget and to quality specifications. Actually a project can be a success although the project management is not satisfied. Meanwhile '...product success is not readily defined, although it is generally regarded as being a product that satisfies user requirements [10]. To meet the requirements of the users and to make them happy again becomes the main factor that makes the IT project successful.

Definitions and survey that relate to different perspectives of various groups involved with the project

Feelings of users are important factor for a successful project but views of other involved people have to be mentioned. In 1998 De Wit confirmed '...the important of including various stakeholders' perspectives in defining project success' [3]. Stewart also agreed with that opinion [12].

Wateridge bases on definitions of Morris and Hough, Turner and make a survey to prove that users and project managers have different views for IT project success. Wateridge continue to expand the criteria of project success (Fig. 3), [5]. In his research users and project managers were asked to decide most important criteria for project success. After the interview, Wateridge records results (Figs. 4, 5) and he made conclusion. Users want a project which can meet their require-

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- **It is profitable for the sponsor/owner and contractors;**
 - **It achieves its business purpose in three ways (strategically, tactically and operationally);**
 - **It meets its defined objectives;**
 - **It meets quality thresholds;**
 - **It is produced to specification, within budget and on time;**

Fig. 3. Wateridge's criteria of successful IT project [5].

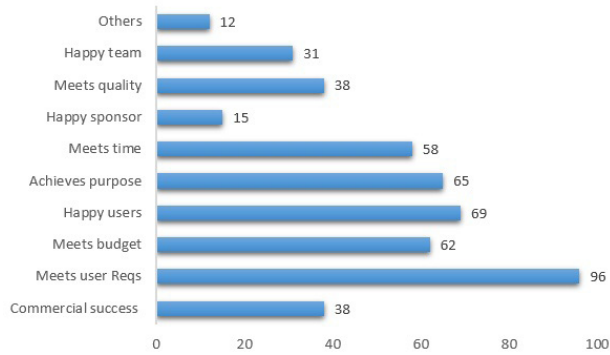


Fig. 4. User's criteria for success in survey of Wateridge [5].

ments and make them happy. Project managers also concern the user's requirement. But on the other hand they think that the time and the cost are very important. Two factors are crucial with them because the boss use this to evaluate managers. The views of users and project managers are different and conflicts will appear.

Wateridge's survey somehow affirms his sixth criteria of successful IT project: 'all parties are happy ...' [5]. Actually this is sometimes impossible because a project can be considered as success with one party but actually it is a failure with other parties involved in that project [13]. Wateridge gave a new factor about successful projects gain profit in three ways. He mentioned about quality of project. Having the same idea as Schwalbe, he confirmed that the successful project must meet the initial objectives. However he did not point exactly what is objective and it makes readers confused e.g., when the initial objective is not real, for example the sponsor wants unreal profits. The project only can meet acceptable objectives.

The success of IT project is not only defined by the users and the project managers but it is also defined by the sponsor/key stakeholder and the project team [12]. There are always relationships between the contribution of project teams, stakeholders, users, sponsors and project managers so that project managers must have relationship competence to resolve conflicts [14].

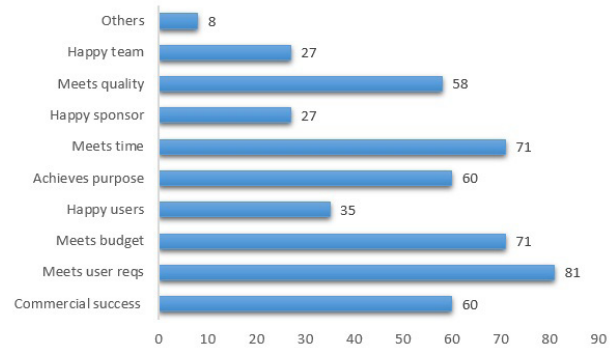


Fig. 5. Project manager's criteria for success in survey of Wateridge [5].

Thomas and Fernández make a definition of project success on the view of companies. This is 'the criteria used by companies to define success were coded and grouped into three categories: project management success, technical success and business success', (Fig. 6), [11].

Value co-creation view of project success

Some of the above definitions already indicated that IT project should make one or some IT project's parties happy, especially definition of Wateridge (Fig. 3) mentioned that IT successful project should make all parties (users, sponsors, project team) happy during and after the project. However Wateridge's research was only for users, sponsors, project managers and system analysts [5]. But what about other parties such as senior executives and directors of project, they may have different standpoint about successful project and of course different value will make them happy. Chang and other authors, Eskerod and Riis made comprehensive researches about value that projects contribute to all stakeholders and showed "value co-creation" view of project success [15 - 16].

Chang and other authors agree that iron-triangle is a core requirement of a project success [15], however this "product-centric" view is considered the most important requirement only with project members with high levels of certainty and clarity or with projects where

Success criteria	Category		
	Project management	Technical	Business
On-time	X		
On-budget	X		
Sponsor satisfaction	X		
Steering group satisfaction	X		
Project team satisfaction	X		
Customer/user satisfaction	X	X	
Stakeholder satisfaction	X	X	
System implementation		X	
Met requirements		X	
System quality		X	
System use		X	
Business continuity			X
Met business objectives			X
Delivery of benefits			X

Fig. 6. Criteria used by the participants to judge success [11].

delivery of products is most important target. Meanwhile senior executives and directors only consider the iron triangle is useful to assess successful project, they have “value-centric” view of project management, with them ‘whether or not value ... is created and captured is critical in assessing project success’ [15].

Values are specific characteristics of product, job, product..., such as speed, quality or performance of systems, or aesthetics features of product... [15]. There are two sides of the value creation: content and process, content will show what is valuable, who values what and where is the value, and the process show differences between value capture and creation [15]. Chang and other authors [15] indicated that a project should be considered as value-creation process of all stakeholders. These result based on standpoints of many project’s members in their research (CEO, program manager, chief of staff, project director, project manager, senior system engineer...) about project success. They also noted that the value is subjective and dynamic, subjective means different stakeholders to have different value and dynamic means that the value can be changed over time [15]. These two characteristics of value make it harder to research about how value can be co-created [15]. To make it easier to research,

Eskerod and Ostergen [17] classified the value into three groups named efficiency, legitimacy, power and control. The efficiency group contains value that can make efficient use of project’s resources, the legitimacy group have value that can help project to be perceived as legitimate so stakeholders trusts project work and give more resources, the power and control value can supply ‘management levels with a means to retain control over different projects’ [17]. Later Eskerod and Riis [16] add one more dimension named stakeholder satisfaction.

In a successful project, all these values need to be “co-created” by all stakeholders of the project and thus requiring a successful n engagement of stakeholders ‘in a continuous process of value creation and capture’ [15]. There are many ambiguities inside a project, so it is hard to make sure that value can be received as it was planned at the beginning of the project. For example the current technology can make users happy now but may it will out-of dated and will not considered as a factor to make users happy when project is released. Value creation still continues ‘during the implementation or delivery stages as a result of growing stakeholder knowledge through continuous (intra- and inter-) organisational learning’ [15]. So it is absolutely needed a continuous process of value

creation and capture which require engagement of all stakeholders. Stakeholders need to have open communications about change of value to keep project on track. Good relationship between stakeholders is the key to improve the quality of communications, to make teams function better and as a result to improve the chance that the project to be successful. Flyvbjerg and Budzier [18] showed a successful example of Emirates Bank in 2006, one of the main reasons of success is that they assemble the right team to enhance relationships. Chang and other authors [15] stated that there are two elements that can help co-creation process successful, one is having open communications within project team and between stakeholders, and second is having governing structure.

To examine real value of successful project, Eskerod and Riis [16] conducted interviews in five companies and then collected value statements and classified using four above groups of value. Based on value statements collected from this research 46 % of statements relate to efficiency, 17 % relate to legitimacy, 13 % relate to power and control and 24 % relate to stakeholder satisfaction [16]. Half of collected efficiency value is similar to conditions of iron triangle. The rest of efficiency value concern with project's environment like better exchange knowledge between project managers, easier communication internally and externally... The stakeholder satisfaction value have customers' experience of professionalism, a better process during project life cycle..., the legitimacy value have customers experience of high credibility and good reputation of company, recognition of project management in other parts of the company, power and control value cover top management involvement, higher resilience to fluctuation among project managers [16]. In this research, value is collected only from five companies but somehow the percentage of value statements show that "value-centric" standpoint is more important to assess project success than "product-centric"

standpoint. Because the percentage relating to the iron triangle is just only 23 % (half of efficiency value) and 77 % are other values.

Preconditions of successful IT projects

Modern definitions of project success change gradually from "product-centric" standpoint to "value-centric" standpoint, but it does not mean that time and budget is not important. Recent research indicated amazingly high numbers of out-of-control projects, reason of failure projects are wrong estimations of time and budget [18]. The consequences of these projects are catastrophic. For example, in 2003 Levi Strauss, a global company which has been founded since 19th century, planned to renew IT systems. Top managers of Levi Strauss want to change from current IT systems which are mixed from country-specific computer systems to only one SAP system. The initial budget was \$5 million. However this project cannot meet demand of customer like Walmart because lack of produces for financial report and internal controls, finally Levi Strauss lost \$192.5 million [18]. This type of projects are called black swam, a terminology of 'high-impact events that are rare and unpredictable but in retrospect seem not so improbable' [18]. Flyvbjerg and Budzier [18] examined 1471 global projects, compared estimated budget and performance with real cost and result and they found out that one sixth of the projects are black swam, with cost and schedule over estimation average by 200 % and 70 %, respectively, this is an incredible high numbers.

There is a solution to avoid black swam projects with two steps. Firstly, managers of projects should ask themselves two questions. First question is if the company have enough resource to handle loss or if this company's biggest technology project goes over budget by 400 % or more and only 25 % to 50 % of project's benefit are perceived [18]. The second question is if the company can handle loss of 15 % of its medium

size technology projects over the initial cost by 200 % [18]. These two questions help managers to predict that their companies are strong enough to handle with huge failure if this happen, but to avoid black swam projects, managers should apply another step. They should break projects into discrete parts which have limited size, controllable complexity and detailed duration and plan solutions to handle with unavoidable risks, use best forecasting techniques with these parts [15, 18].

CONCLUSIONS

According to many researchers, project managers and other project stake holders, the Iron Triangle is actually not very important. For example the Thames barrier project (the UK London flood-protection scheme), which took twice as long to build and cost four times the original budget but it is considered as a success [2]. Nowadays, modern and appropriate definitions of IT project success are more “value-centric”, meanwhile traditional ones are more “product-centric”. The modern definitions also need to care about various stakeholders’ perspectives, and have to have solutions to avoid black swam projects.

In this part, IT project success research questions arise, these questions can help a company to avoid potential failure of an IT project and may lead this project to successful one. The first two questions are based on theory of [18], which help companies to avoid black swam. Last three questions are based on “value co-creation” view of Chang and other authors [15] to build a frame to examine IT project success, first question will find out what will be value expectations of all stakeholders, second one find solutions to solve any confrontation of value expectations at commencement stage and third question find a way to ensure captured value of stakeholders are most similar with their expectations.

1) Does company have enough resource to handle with potential failure of IT project?

a. What percentage of budget and time of the project will over if it failures?

b. Can this company strong enough to absorb this failure?

c. Can company stop unsuccessful project?

2) How to break project to discrete parts?

a. Can company break this project to separate parts which have limited size, complexity and duration?

b. Can company plan solutions for risks of each part?

c. What forecasting technique company should use for each discrete part?

3) What will be the value of all stakeholders of projects?

a. How many types of stakeholders will join the project?

b. What are the value expectations of stakeholders?

4) Value is subjective. How to avoid confrontation about value expectations of different stakeholders at commencement stage?

a. Do stakeholders have any conflict of value?

b. How to solve this conflict?

5) Value expectations of stakeholders may change over time because the value is dynamic. How to keep stakeholders get right value they want?

a. Does this project have governing structure?

b. Will the change of technology/environment affect value of stakeholders?

c. Which is the best way to choose team members that join the project to create strong relationships between them?

d. How can company maintain good relationship between stakeholders/project team?

e. How to make open and regular communications between project’s members, stakeholders? The purpose of communications is identified and solve problem so “co-creating” value will fit the need of stakeholders.

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