PROJECT SUCCESS IN IT: AN ATTEMPT TO DEFINE AN AMBIGUOUS CONCEPT IN AN INCREASINGLY AGILE, CUSTOMER-CENTERED WORLD

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Abstract

As projects have advanced to value drivers in the IT Services industry, their success is increasingly crucial to organisations. Success is a complex concept. This paper draws on new empirical evidence as to what constitutes success in IT-services projects. Traditional project management frameworks define project success using easily measurable indicators such as budgetary control. This approach neglects the complexity of the subject matter. Newer approaches in the IT industry projects now emphasize qualitative success indicators such as customer satisfaction. An on-line questionnaire was used to examine the extent to which the success factors defined and used by current project management frameworks have kept up with the industry changes. The study identified that it is necessary to have an appropriate mix of both qualitative and quantitative measures in order to check the degree of success of such projects. This indicates that project success in IT is a multidimensional concept. It also shows that the more quantitative approach established within project management frameworks promulgated throughout the industry is insufficient for the holistic nature of what success means to the different actors. This study is important as it can serve as a catalyst for the development of an improved framework for practitioners to use to measure success in a way that meets the changing landscape of actors' expectations towards what success means and lead to more informed decision-making.

Keywords: project success, agile, project management, performance measurement, KPIs
JEL Code: M15

Introduction

It is the long-established consensus that in order to assess success, it must be clearly defined and measured in meaningful ways that fit the definition of success in the field in which it is applied. There is extensive research on success and performance especially in the areas of organisational and occupational psychology (Gleich, 2001, p. 34; Thorpe, 2008, p. 58), but a unified approach towards the topic on an operational and project level has yet to be defined. Standardising performance measurement has proven fruitful in industries such as financial services, production and construction (Atkinson, 1999, p. 338) as these industries share a characteristic: their organisational success historically depends on easily quantifiable performance measures of resource efficiency and productivity (Mamaghani, et al., 2011, p. 12). Measuring these success indicators is rather straight forward as the data are easily quantifiable, but the approach is piecemeal (Sureshchandar & Leisten, 2005, p. 12). These early systems reflected an organization's output criteria and neglected the effort needed to achieve them (Barrett, 2004, p. 12). As subjective judgment lies at the heart of business management (Hoffmann, 1999, p. 25), it almost seems like a natural development that – in order to avoid this

bias – systems to achieve quantifiable evaluation of performance were put in place. While established traditional and integrated concepts such as the Balanced Score Card (Sureshchandar & Leisten, 2005, p. 12) have been adapted for the IT Services industry (Van Grembergen, et al., 2004, p. 131), these efforts only address the issue on a governance level (Van Grembergen, et al., 2004, p. n.a.), not on an operational level and again set a focus on quantitative measures such as financial efficiency. While quantitative performance indicators are highly relevant from an overall organizational viewpoint, this paper hypothesises that this approach does not sufficiently address all aspects of performance and success relevant to value drivers such as projects. Given the changing focus and importance of IT-related projects, to what extent are traditional performance related measures an effective measure of success? How do organisations define project success today? This paper sets out a case for change.

The IT Services industry and project success

The IT Services industry is diverse and complex. IT projects have evolved to become the industry's core value driver and a strategic asset (Judgev & Müller, 2005, p. 20). Projects are now the main unit of operation (Xia & Lee, 2004, p. 10) and key to organisational advancement (Shenhar, et al., 2001, p. 701). As value drivers directly contribute to organisational success, delivering successful projects is key. Project management frameworks such as the Project Management Body of Knowledge or the Agile Manifesto have attempted to create a definition and measurement approach for success on the project level and broaden the definition of success by also considering qualitative factors. This is in line with the research community's view that success is, in fact, multidimensional (Aguinis, 2009, p. 78) even though historically the focus was on easily quantifiable indicators.

Defining "Project Success"

In order to *assess* success, organisations must determine what *constitutes* success, so they can employ suitable measures. In other words: success is assessed by measures of both quantitative and qualitative nature, depending on its definition (Tadeu de Oliveira Lacerda, et al., 2009, pp. 133-135).

These two aspects of performance and success are also reflected in the delivery models established for projects in the IT Services industry, which approach the concept of "success" from opposing directions. The Guide to Project Management Body of Knowledge (2013) represents a general and classic view on the subject that neglects qualitative aspects of project management itself and how they may relate to project success (Tadeu de Oliveira Lacerda, et al., 2011, p. 133). Agile delivery models address this shortcoming by placing high value on qualitative indicators and yet place lower value on budgetary and time-related concerns.

As success depends on its context, any attempt of gaining an understanding of what constitutes "project success" will be fruitless if it is unclear what success indicators are important to organisations. This paper provides an understanding of what constitutes success in IT Services today and to what extent the traditional view on success and its measurement prevails.
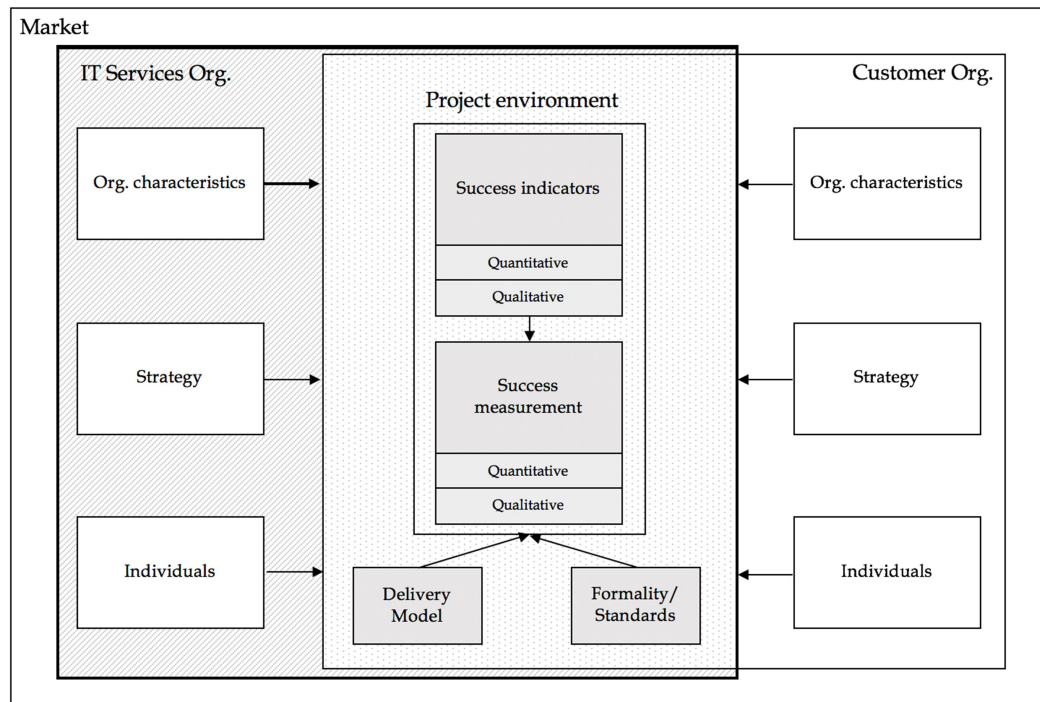
This was achieved by addressing the following assumptions:

1. Performance is multidimensional. Quantitative and qualitative aspects of performance are considered important and contribute to an organisation's understanding of project success.

2. While the research community has become more aware of qualitative success indicators, it is still a fact that quantitative performance measures are more easily assessed than qualitative ones; measurement strategies reflect this.

3. Attempts to standardise performance and success assessment in a universally applicable framework for projects in the IT industry have not yet been of any avail. The available delivery frameworks emphasise opposing aspects of performance and success and provide guidance for their assessment. These frameworks, however, are one-sided, and their values oppose each other.

4. Projects are the value drivers of the IT Services industry. Project success determines organisational success. Meaningful assessment of the same is key, but complex.

Research approach and methodology

This study was based on identifying the current methods used by IT professionals to measure success in IT-service projects and comparing these with existing study results identified in the literature review and the methods promulgated through industry-wide frameworks. A set of hypotheses were formulated to establish a view on the definition of project success in IT services industry and on how this definition shapes the current approach towards measurement. These tests were steered towards exploring to what extent traditional, quantifiable project assessment frameworks still carry weight in the industry, since newer delivery frameworks such as SCRUM also direct their focus towards customer satisfaction and work quality, thus substantiating the consensus in research that performance is in fact multidimensional, no matter what its area of application is. The definition and measurement of project success should reflect varied organizational settings to be effective and provide strategic benefit.

Fig. 4 **Theoretical Model. Aspects relevant to thesis shown by grey highlights.**
Figure designed by authors.

Figure 1 shows the complexity of the subject matter and how they relate to the components addressed in this paper (highlighted in grey). This paper describes the components that lie at the heart of this model, the project environment. The learnings from this study serve as basis in understanding the added complexity and possible variability of the subject matter when considering the involved organizations and cultures in further research

Data collection

The research aimed at accomplishing two goals: 1) identifying the dominant project success indicators in the industry and 2) looking into possible correlation between success assessment practices and the importance of project success indicators. The data was collected by means of an online questionnaire. A representative sample of the population of professionals working on projects in the IT-Services industry was obtained through non-probability, purposive, and expert sampling. The sample frame was set by explicitly reaching out to communities of professionals working in IT Services organisations via professional network sites online. As the representative sample of individuals is otherwise hard to address, randomization was not possible; snowball sampling was also employed to obtain a representative sample; the risk of sampling error was mitigated by clearly stating the target group and by approving suggestions made before the survey was forwarded to other individuals by a participant. 55 completed surveys were submitted by professionals working for organisations located in Central Europe and one in South Africa; ranging in size from <100 to

>10.000 employees. All participants were working as a project manager or in a similar role at the time at which this survey was conducted. The data were prepared following the CRIPS-DM standards and checked to match standards of completeness, accuracy and validity.

Measures

To accomplish the goals described above, the questionnaire addressed these topics from the perspective of the participant, from the view point of her respective organisation and was designed to investigate possible correlations between variables. The variables were organised along three dimensions: success indicators, assessment and organisational factors. While only some variables were used to perform the statistical tests necessary to test the hypotheses, several supporting variables were addressed in the questionnaire. These were applied to analyse differences and trends in support of the general research topic and serve as input for further research. The statistical analysis, however, was conducted irrespective of these additional variables and focused on those pertaining to the three dimensions described above.

Project success

As this paper builds on the theories stating that there are two sides to project success – indicated by quantitative indicators on the one side and qualitative indicators on the other – these were applied to cluster the individual success indicators into two classes:

Quantitative Success indicators	*Qualitative Success indicators*
Budgetary control	Customer satisfaction
Adherence to timeframe	User satisfaction
Delivering the defined scope	Building intellectual capital through learning and teamwork
Quality of end product	Uncovering potential for innovation

Fig 5 *Table representing the two categories of success indicators applied in this research.*

Table by author. Success indicators based on indicators from the PMBOK (2013) and agile methodologies (Scrum Alliance, 2014).

These variables were partly derived from theory and partly based on the research of Shenhar et al. (2001, pp. 707-709), who suggested to clustering project performance and success indicators in this manner. This list, however, is by no means exhaustive but merely representative. The questionnaire employed these variables in the context of actual and perceived importance, as well as in relation to completeness of success measurement. Perceived importance of success indicators was measured along a scale of 1-6 (where 1 is "not important" and 6 is "very important").

Assessment

As discussed in the introduction of this paper, qualitative success indicators are likely to be difficult to measure. Therefore, *completeness* and *type of assessment* were addressed in the questionnaire by employing the success indicators or classes stated above. *Formality of*

assessment was also assessed along an ordinal scale from 1-6, where 1 is "not formal" and 6 is "very formal".

Organisational indicators

This class included two variables: the applied delivery model (waterfall or agile) and the delivery phases during which assessment is conducted. The latter was assigned to this class as the lifecycle phases correspond to the chosen delivery model.
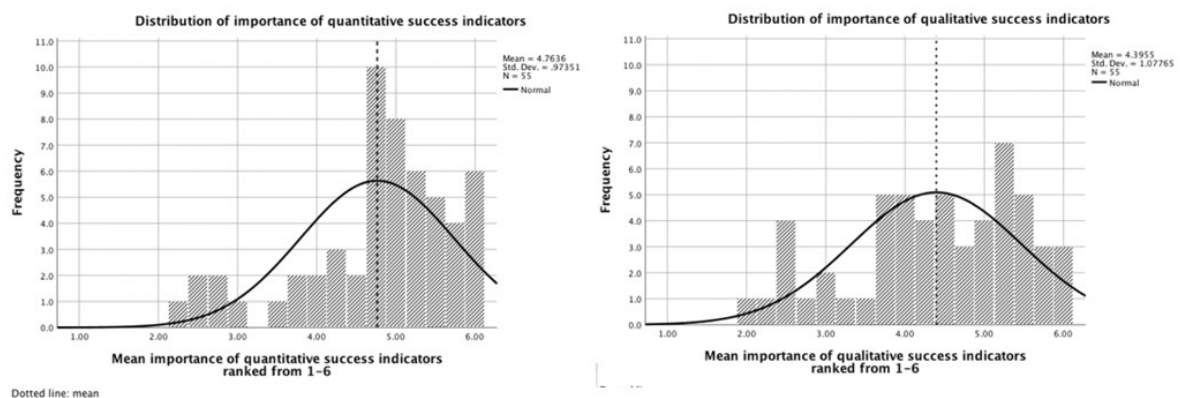
Analysis

Three statistical methods were applied to analyse the data to gain an understanding of project success in the IT industry today: t-tests to identify the dominant success indicator class, single and multiple linear regression to identify a correlation between assessment variables and the success indicators, and moderation analysis to investigate any influence of organizational variables on assessment practices.

While sample size (N=55) is sufficient to apply these statistical tests, p-values for statistical significance must meet the $p \leq 0.05$ decision rule (Uriel, 2013) for all performed tests. The only exception being the multiple linear regression model, which was accepted even when one predictor variable does not meet $p \leq 0.05$, but $p \leq 0.06$ (as suggested by Boston University (2013)), and all other predictor variables meet the required significance level of $p \leq 0.05$.

Results and discussion

Defining Project Success

The results of the data analysis show that quantitative performance and success indicators are still considered more important than their qualitative counterparts. This assessment consequently shapes the definition of project success. However, when asked to rank the importance of quantitative and qualitative success indicators on a scale from 1 through 6, the mean result differs only by 0.37 units, as shown in the graphs below.

Figure 6 Distribution of mean rating of quantitative and qualitative success indicators. Representation of skewness. Figure by author.

This indicates that – while quantitative performance indicators are still dominant in their perceived importance – the importance of qualitative indicators has gained awareness and is now a defining aspect of project success. This result is also in accordance with the assumption

that – even though there may be a dominant indicator – the concept of performance and success is in fact multidimensional, also in the IT Services industry.

While neither the results of the hypothesis tests nor the available data indicate as to why quantitative indicators are still prevalent in today's definition of project success this may add to the issue discussed at the beginning of this paper: quantitative factors are easy to measure. In addition, the industry environment requires tight control over resources and profit margins, thus making quantitative indicators highly relevant to project success.

Another cornerstone in exploring the definition of project success in the IT Services industry is the possible difference in perceived importance of qualitative indicators depending on which delivery model is applied. Now, as qualitative success indicators seem to have gained an importance overall, it might be suggested that they are also rather significant in the IT Services industry when waterfall models are applied: the research has shown that agile delivery models place significantly higher importance on qualitative indicators, but the rated level of importance still positively deviates from the mean when the waterfall model is applied. Overall, qualitative success indicators also seem to carry weight in organisations in which delivery models with traditionally quantitative focus are applied, and vice versa: Qualitative indicators play a role in organisations that apply a model traditionally focusing on quantitative indicators. While the gap between the mean rating of quantitative vs. qualitative indicators is larger for waterfall than it is for agile, the mean importance is still above average when rated on a scale from 1-6.

The importance of qualitative success indicators is ranked only marginally lower than their quantitative counterparts. This suggests that there is an ongoing shift in awareness, placing higher emphasis on quality and customer involvement. It is interesting to note that, even though the two frameworks that are the subject of this paper have a clear emphasis on their success indicators, the opposing criteria were ranked almost equally regarding their importance. The theory alone would suggest that, for example, in the case of waterfall projects, customer involvement should be ranked extremely low, as the clear emphasis of both the definition of project success and also its measurement lies on budgetary concerns, timeframe and scope (Atkinson, 1999, p. 338), all of which are quantitative indicators. However, all participants ranked both dimensions almost equally.

While organisations may not place exact equal weight on all the measures (Sureshchandar & Leisten, 2005, p. 24), the results show that the concept of multidimensionality of success has reached the industry, regardless of which of the opposing frameworks or respective "ruleset" is applied. Based on these results, the first part of the research question can be answered: Quantitative success indicators still play a large role in IT Services organisations. They seem to carry significant weight in the definition of project success, regardless of whether a traditional delivery model, i.e., waterfall, is applied or not. Therefore, it can be concluded that what is referred to as "traditional definition" of project success is still valid, although challenged by the increasing importance of qualitative success indicators.

Measuring project success

The two opposing delivery models both follow a standardised framework, have a set of values and certain success criteria, and therefore imply specific measurement approaches. This means that some degree of standardisation of success assessment is an inherent part of these models. Waterfall models traditionally emphasise the quantitative definition of success, which influences the assessment approach, since the data are easily obtainable, measures applied are

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rather straight forward, and thus also easily standardised (Judgev & Müller, 2005, pp. 19-20). Agile methods on the other hand value quality, which is influenced by many factors (e.g., the project goal and the customer) and are thus much more complex to define and measure.

Research suggests that traditional assessment approaches of project success are very formal: The Project Management Body of Knowledge, codifying the waterfall approach, focuses on Phase Gate Reviews and other formal aspects of review (Project Management Institute, 2013); agile delivery methods assess project success almost constantly by promoting rigid success assessments during every cycle (Abrahamsson, et al., 2002, p. 30). Therefore, the underlying assumption is that when following traditional approaches such as waterfall – since they also focus on easily measurable aspects of success – the assessment process must be formal. However, the results show that this is not the case: The degree of formality of the assessment and review processes is not directly related to the delivery model applied. A reason for this may be that formality suggests that "all bases have been covered", that formality goes hand in hand with the frequency and completeness of measurement.

The analysis showed that the more formal the review process is, the more likely it is that many aspects of performance are measured: This includes quantitative and qualitative aspects, as the participants were asked to select them from a list including both types of indicators. This relationship is even stronger when success is assessed throughout the project lifecycle. This is in line with the consensus discussed in research on organizational performance: Holistic measurement models increase the complexity of assessment (Frigo, 1999, as cited in Currle, 2002, pp. 15-16).

So, does this relationship prove that both quantitative and qualitative performance indicators are being measured, and a shift towards a holistic performance measurement approach has occurred? Unfortunately, this is not the case. The relationship explored above merely indicates a trend, which states that when more data is assessed, assessment processes tend to increase in formality. When the mean completeness of measurement across both indicator types is analysed in relation to formality, the data show that the more that is measured, the more formal the assessment process is. The authors can merely hypothesise that this is caused by organisation's need to understand, learn and adjust to sustain competitive advantage for which proper documentation is a must. When it comes to the question of what is *actually* measured, the data show that more often than not, qualitative indicators – while they are considered important – are *not* measured!

Success indicator: Budgetary Control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	measured	39	70.9	95.1	95.1
	not measured	2	3.6	*4.9*	100.0
	Total	41	74.5	100.0	
Missing	System	14	25.5		
Total		55	100.0		

Success indicator: Customer satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	measured	16	29.1	39.0	39.0
	not measured	25	45.5	*61.0*	100.0
	Total	41	74.5	100.0	
Missing	System	14	25.5		
Total		55	100.0		

Fig. 7 **Degree to which quantitative/qualitative success indicators are assessed, expressed in % of participants who indicated that their organizations' assessment is incomplete.**
Figure by authors.

The graph above shows that 41 out of 55 participants indicated that not all success parameters were measured, and 61% responded that their organisations do not assess customer satisfaction, as opposed to budgetary control, which is not measured by only 4.9% of respondents. Given these results, it becomes apparent that the shift towards a multidimensional definition of project success is still more conceptual than actual.

Conclusion

Neither the definition of success nor its measurement is dogmatically defined by a framework, be it waterfall or agile. Even though these and other traditional frameworks have a strong foothold in the industry and seem to influence the definition of success as well as the assessment process, other contributing factors are likely to be shaping these concepts as well. The shift towards including qualitative success indicators in the definition and measurement of project success is noticeable and is applied irrespective of the boundaries set by project management frameworks. Traditional concepts are still valid today but share an almost level playing field with their counterparts emphasising quality. Data regarding measurement reinforce

the prevalent opinion that quantitative success indicators are likely easier to measure. Still, organisations seem to be striving to find ways to include qualitative success indicators in their assessment process

Given the complexity of the industry and the broader project environment, aspects such as size of the organisation, the customer environment, as well as the individual people involved shape the assessment process. It seems to be a question of organisational culture. However, this is merely one conclusion drawn based on the literature review and the results at hand.

Limitations and further research

This study explored the definition of project success and revealed the relevance of traditional measurement approaches by assuming a closed system, where only the view of professionals regarding their respective organisations was considered. However, project environments are more complex. The impact that customer organisations have on the definition of project success as well as the assumption that "success" is a context-specific concept can only be tested by broadening the scope of research. This research does also not consider the causality of the established relationships i.e. *why* a change in the predictor variable *causes* a change in the dependent variable. This, too, may be subject to further research.

This paper is merely the first stepping stone towards a much broader area of research, with aspects ranging from organizational psychology to business administration. To take this research one step further, the authors suggest an exploratory case study involving customer organisations as well as delivery organisations with project setups of varying complexity and homogeneity. Such an approach could be useful in discovering not only how flexible the definition of project success really is, but how the concept morphs, for example, when opposing or two similar cultures come up against each other. Since the data has shown a shift towards multidimensionality in assessing project success, developing a standardized, modular scorecard that can be shaped to the individual differences of project environments and considers varying organizational needs poses an interesting challenge for the future.

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