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# Success: A divergent phenomenon which need to know for making a software project successful

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### ABSTRACT

Success is a disputed concept which is difficult to exactly define and quote. This study is related to Software Engineering field in which success factors and perception of key stakeholders (i.e. top management, core team and clients etc.) about software project success is tried to identify. Study postulates that there are so many dimensions which are behind of a successful software project. Success has different meanings and varies according projects to projects in Software Engineering industry. It is due to conflict in determination and selection of success factors among stakeholders. Software project stakeholders may differ based on their organizational culture and related goals, current market structure and their customized needs satisfaction (as a client or end user) from intended use of software. Qualitative technique has been applied by using thematic analysis on articles between the time frame of 1991-2010 with major three keywords of “software project success”, “project success” and “perception of stakeholders”. Study provides better understanding why there is a divergent view of success which stakeholders of a software project perceives and must need to know.

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### Introduction

Success is a notion of which perception varies from individuals to individuals, business to business and industry to industry[1]. For someone, success might be the efficient delivery of product for which it is supposed to be delivered. While for others, cost might be the major concern and some prioritizes distinctive features which makes the product unique among competitive brands.

The proposed research is aimed to postulate why there is conflict in perception of software project success among different stakeholders (i.e. senior management, project managers, team leaders, developers and customers etc.). Researches in the past have been focused on identification of key success factors and deviation perception of stakeholders for successful software project. However, past researches are silent to discuss why there is deviation in perception among stakeholders? Projects in Software Engineering (SE) are based on application of engineering tools [1]in designing, specification and execution. They are significantly different from other engineering projects (e.g. civil, electrical and industrial etc.)[1]. It is because software projects are intangible in nature which causes non-stable context during project execution.

This is the area of research in Software Engineering and Project Management which holds minimum attention by the researchers and practitioners in the past [10]. However, it has been explored in collective manner but in depth analysis is ignored most of the time about identification of success factors with perception of stakeholder groups. Only 3% of 3000 project management studies were published in top management journals [10]. It is also found in the past studies that software project management industry found difficult to convey their message about defining success to other industries. [11].

According to traditional definition, quality of a successful project is viewed in three perspectives [2] which are:

Within time;

Within cost;& meets the customer requirements (scope of the project);

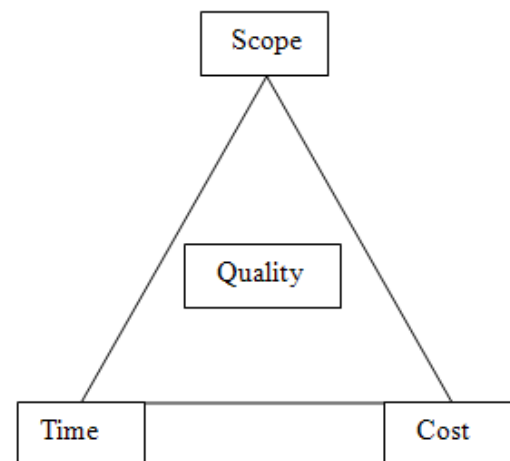


Fig. 1. Iron Triangle

However, modern philosophy of software project success is not subjected to only three traditional factors[3]. Rationale is that such projects are related to hi-tech industry which is considered most vibrant, falls in dynamic environment, facing severe competition and conflicting perceptions [1,2] of different stakeholders.

Above discussion leads to the understanding of divergent phenomenon of “success” which should properly be addressed by the researchers and technical experts to make software project successful.

The rest of the paper is organized as follows:

Section II gives an intensive overview of related work (Literature Review). Section III describes the rationale about intended study, formulation of theoretical framework, discussion

about development of research questions, measurement and analysis technique. While, section IV presents findings and results from intended analysis. Section V elucidates the whole study in conclusive manner with addition to limitations of research and future work implications.

### Related Work

Most of the researches in past have been conducted with view to identification of factors critical for the success of software project and deviating perceptions of stakeholders.

A software project is considered successful when it delivers value to various stakeholders (i.e. people, groups or organizations) who are actively involved in a project [2, 4].

CHAOS definition [5] of project success “on time, within budget and intended functionality”, with all features might not reflect opinion of all stakeholders. Evidence about perceived project failures in software industry suggests the need to audit those factors in detail which are subjected to such causes. Literature proposes about deviant perception of stakeholders which constitutes about project success and efficient performance under such criteria [12, 13].

In another study about air flight cancellation which results from the insufficient testing system for baggage in which passengers was found unable to check whether their luggage is oversized or not, gives attention to consider the perception and views of customers which are considered as stakeholder of project outcome [14,15,16]. Despite of considerable investment in new strategies that can lead to project success (i.e. incremental upgrades in tools and methods) [14, 17], still 24% results of ongoing projects are failed and 44% are challenged [5]. In a survey conducted by The Standish Group [18], it has been reported that highest failure rate in 2009 in over a decade ponder the attention why projects are still failing.

The 21<sup>st</sup> century is more centered on about stakeholders' view about project success which is dependent on the project life cycle and not considers wide range or long term goals [13]. So, there is a gap which needs to be examined organization's point of view combining both short and long term goals.

There is also a growing recognition about the importance of sponsor and owner involvement in the success of a software project. Some studies assumes both as interchangeable [19, 20] while some other suggests a clear difference between these two [13]. Turner et al. [13] claims that measurement of success based on multiple stakeholder groups and their perceptions is conducted rarely. From their point of view, success of project must be assessed from the perception of different stakeholders. Literature also suggests that there must be independent evaluation and questioning about different areas within an organization from those who are involved in project and business [21]. Business people should be asked about business area and technology people should be asked from their area of expertise. Some other research also suggests that stakeholder may judge [13] all levels of results related to a software project. Empirical studies by Xue in 2009 which is cited in the study conducted by Turner et al. [13], validates the deviating view of multiple stakeholders across outputs, outcomes and impact of project life cycle stages.

There is another recurring point of view about users of the system (i.e. users, clients, customers) and buyers who are considered as having impact on the success of software project [19, 20]. This is aligned with empirical studies of the past.

Barry Boehm's win-win approach reveals that a successful project is a project which is viewed as successful by all the stakeholders [22]. Win-win strategy is possible when there is a minimal conflict about key success factors and features by

stakeholders of with divergent perspective. For example project managers usually consider on time delivery of the software project as successful and for this they might also enforce project members to do extra effort. While this extra effort might lead the developers to actually obtain Lister's effect [23], in which it is considered that people under time pressure don't think faster. Due to this effect quality might be compromised which is and indicator software project failure rather than its success. In this situation, stakeholders' discussion about complexity of the tasks and operating procedures with consideration of time and available resources should take place. In this way agreement among stakeholders relates to different factors which results in successful projects provides a path for better teamwork.

Wateridge [20] concluded that meeting user requirements is the most important success criteria by the users and project managers. But the perception about user requirements by them is totally different. Users might be considered happiness if software project meet their requirements, while project managers might be more associated with meeting the requirements within budget and schedule targets. Others [24, 25] have considered project success factors as quality of product, delivery time, customer satisfaction, revenue and profitability with obtaining of business goals. While Procaccino et al. [10] found that successful software products are those which are considered as easy to use and meeting the requirements. Subsequently, success of a software project in the view of one stakeholder might be considered as failure by another [26].

There is an in-depth analysis required about perception of different stakeholders as well as identification of indicative and critical success factors across different software projects in different or similar environment. There is an extensive search for critical success factors which has been taking place from last four decades [27]. Apart from traditional factors of success (i.e. time, scope, cost with conformance of quality) and perception of stakeholders, research is in progress about discovering more criteria and factors to measure software project success which might entails as client and end user satisfaction [28]. In another study [29], some distinct dimensions have been found out which might lead to a successful project. These dimensions are impact on customer, preparing for the future, business success and project efficiency. Among these four, business success is viewed as short term orientation while preparing for the future is viewed as strategic orientation which has long term impact by the stakeholders of a software project.

From the extensive review of literature and related work in the past, we have come to know that perception of success by the stakeholders in software industry and project management is viewed in terms of different key success factors which are not limited to initial concepts of time, cost and functionality features with conformance of quality. There are so many dimensions and key factors which are perceived differently by the stakeholders and have importance for project success.

### Analysis

Literature review in Section II states two important aspects for successful software project: critical or key success factors and perception of success by stakeholders who actively participate in software project life cycle stages. However, literature has been found silent or little attention towards identification why there is conflict in perception about success.

### Rationale of the Study:

So in view of above discussion, rationale of conducting research is:

“To elucidate why there is difference in perception among stakeholders about ‘success’ which is considered as deviating

phenomenon and need to know for making a software project successful?”

Theoretical Framework

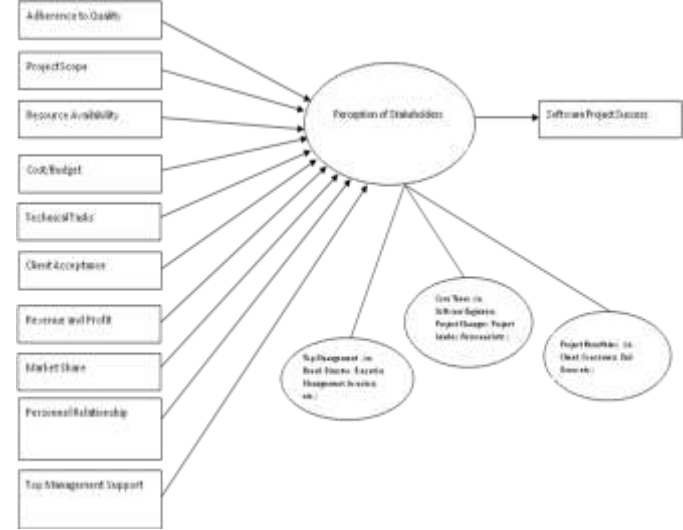


Fig. 2. Theoretical Framework

Time always creates the hurdle in the way of getting things done by own way of the researchers. As a researcher with confined resources and time, current study has considered 10 factors as independent variables which have been included in the study and impact the success of the software project (dependent variable). However, direct relationship cannot be developed between these two without considering the perception of stakeholders as an intervening variable. Perception of stakeholder is also sub-divided into three major categories and they also have been sub-classified in the following table:

Table 1. Sub-classification of stakeholders

Stakeholder group	Classification
Top management	Executive management, board director, investor, senior management, owner, project sponsor, portfolio director
Core team	Software engineer, project leader, project personnel, project team, project executive, team members
Project beneficiary	Client, customer, consumer/users/end-user

Development of Research Questions

After mentioning the rationale and developing the theoretical framework with building cause and effect relationship by highlighting the value of intervening variable. Research questions of the study are as follows.

**RQ1:** Why there is deviation in perception of stakeholders for software project success?

**RQ2:** Which factors have significant impact on success of software project?

Data Collection Sources and Analysis Technique

Time frame for the study is lasting to 20 years about finding the relevant articles from 1991 to 2010. First of all articles have been searched by using keywords “software project success”, “project success” and “perception of stakeholders” between the defined time frame. Google scholars, HEC digital library, Microsoft academic search, accessing the website of SSRN (Social Science Research Network) and using of software called Harzing’s Publish or Perish has been used in searching and getting key relevant studies. As there is low level of attention towards the purposed study in past, therefore most of the relevant articles have been filtered by keeping in view about different dimensions of software project success and critical success factors. There are 76 studies which have been kept under analysis while approximate 103 studies have been cited

for the whole study and different sections (i.e. introduction and related work etc.).

Proposed research falls in qualitative category to analyze and findings the results from the past articles. Thematic analysis technique [6] of qualitative research has been used for analysis purpose which assists in organization and categorization of qualitative data [7] and allows the researcher to identify themes for discussion and subsequent quantitative analysis [8, 9].

For thematic analysis, NVIVO software has been used in conjunction with MS word as both provide keywords and theme search from the articles of relevant topic in efficient manner. However, NVIVO is supposed to generate more in depth analysis and generate results which lead to practical implications and ease in quantification of theoretical data. Apart from this, MS excel is used for frequency percentage analysis and counting of studies in Table III and IV of the study.

Findings

In this section, findings from analysis have been presented with detailed elaboration on key results. There are three tables which have been created by analyzing 76 studies from the past. Table II of the study postulates some influential factors mentioned in different studies that are vital to software project success. In Table III, frequency with percentage analysis have been pointed out in response to identification of 10 key success factors of the study which are mentioned in model of the current study. Table IV highlights the frequency analysis of stakeholders mentioned in different studies who have vested interest in software project success whether directly or indirectly.

From the results of Table II below, it can easily be explained that notion of success for software projects in Software Engineering industry is not confined to traditional definition. There are so many other factors which influence the success of a software project. 6 out of 11 studies have discussed more than four dimensions which influences the success of a software project. Out of these 11, most important studies are Freeman and Beale [30], Turner [32], Devir et al. [34] and Young [39]. Some key influential factors in their studies are discussed as execution efficiency, stakeholders’ satisfaction, impact of business performance, business success and role of project team etc.

Table III of the study elaborates the 10 key success factors which have been mentioned in framework of the study earlier. For this purpose first studies have been filtered by keywords search with the relevant factors. These studies are falling between the time periods of 1991 to 2010. All papers are then put into NVIVO for in depth thematic analysis by examining the formation and relevancy of the content. After that studies are classified according to the key success factors of the study. Then frequency and percentage analysis has been performed in order to identify the factors which are more significant and those which have less impact to consider as success factors for a software project.

There are total 49 studies which have been identified from the past research that discuss the success factors of the study under consideration. Studies are quantified in terms of frequency of each factor and after that percentage analysis has been performed by dividing the frequency of each factor with total number of studies (49). Quality is the most concerned factor for the success of a software project if we look at the frequency and percentage which are 23 and 46.94% respectively. After that the most concerned factor is the support of top management which is extremely important when comes to planning, designing, and allocation of resources for execution of the project phases.

TABLE II. INFLUENTIAL FACTORS TO SOFTWARE PROJECT SUCCESS

<i>Studies</i>	<i>Influential factors</i>
<b>Freeman and Beale [30]</b>	<ul style="list-style-type: none"> <li>• technical performance</li> <li>• efficiency of execution</li> <li>• managerial and organizational implications</li> <li>• customer satisfaction</li> <li>• business performance</li> </ul>
<b>Belassi and Tukel [31]</b>	<ul style="list-style-type: none"> <li>• factors related to project</li> <li>• factors related to the project manager and team</li> <li>• factors related to the organization</li> <li>• factors related to the external environment</li> </ul>
<b>Shenhar et al.[29]</b>	<ul style="list-style-type: none"> <li>• project efficiency</li> <li>• impact on customers</li> <li>• business and direct success</li> </ul>
<b>Turner [32]</b>	<ul style="list-style-type: none"> <li>• meet its stated business purpose</li> <li>• provide satisfactory benefits to the owner</li> <li>• satisfy the needs of owners, users, and stakeholders</li> <li>• have a deliverable that should be produced to specification, within budget, and on time</li> <li>• satisfy the needs of the project team and supporters etc.</li> </ul>
<b>Cleland and Ireland [33]</b>	<ul style="list-style-type: none"> <li>• the degree to which technical project performance objectives were attained (e.g. time, cost, and scope)</li> <li>• the contribution that the project made to the strategic mission of the firm</li> </ul>
<b>Dvir et al. [34]</b>	<ul style="list-style-type: none"> <li>• the project operated within budget</li> <li>• the project operated in time</li> <li>• the initial identified objectives were attained</li> <li>• quality of the intended functionality and sub-operations</li> <li>• role of project team</li> <li>• importance of the scope of the project</li> <li>• availability of resources</li> </ul>
<b>Bryde and Robinson [35]</b>	<ul style="list-style-type: none"> <li>• define business benefits/requirements</li> <li>• monitor project benefit general management support (training and environment)</li> </ul>
<b>Berntsson-Svensson and Aurum [36]</b>	<ul style="list-style-type: none"> <li>• good requirements</li> <li>• involvement of users</li> <li>• role of project manager</li> </ul>
<b>Procaccino et al. [37]</b>	<ul style="list-style-type: none"> <li>• software project requirements</li> <li>• project goals and planning</li> <li>• team working</li> <li>• skills of team</li> </ul>
<b>Young [39]</b>	<ul style="list-style-type: none"> <li>• project success by achieving within time and cost</li> <li>• satisfaction by stakeholders</li> <li>• quality of the software project</li> <li>• scope of the project</li> <li>• project risk management</li> <li>• project control</li> <li>• project change</li> </ul>
<b>Westerveld [40]</b>	<ul style="list-style-type: none"> <li>• time of software project</li> <li>• project cost</li> <li>• owner and investor satisfaction</li> <li>• importance of project team</li> <li>• controlling measures for project</li> </ul>

Influential success factors mentioned in different studies n=11

**TABLE 3. KEY SUCCESS FACTORS OF THE STUDY DISCUSSED IN LITERATURE**

<i>Success factors</i>	<i>Studies</i>	<i>Frequency</i>	<i>Percentage</i>
Adherence to quality	Schmidt et al. [41], Taylor [42], Jones [43,44,45], Kappelman et al. [46], Whittaker [47], May [48], Yeo [49], Beynon-Davies [50], Drummond [51], Ewusi-Mensah [53], Oz [54], Ewusi-Mensah and Prazasynski [52], Boehm [22], Charette [55], Standish Group [56,57], Clegg et al. [58], Procaccino et al. [24], Oz and Sosik [59], Humphrey [60], Sauer and Cuthbertson [61].	23	46.94%
Project scope	Cooke-Davies [75], Young [39], Hartman and Ashrafi [76], Ward [77], Shenhar and Dvir [78], Shenhar [79], Agarwal and Rathod [80], Schmidt et al. [41], Wateridge [20].	9	18.37%
Resource availability	Kappelman et al. [46], Standish Group [62], Jiang and Klein [70], Baccarini et al. [64], Ewusi Mensah and Prazasynski [52], Milis and Mercken [68], Oz and Sosik [59], Jones [45], Beynon-Davies [50], Leveson [73].	11	22.45%
Cost/budget	Schmidt et al. [41], Jones [43, 44], Whittaker [47], May [48], OGC [63], Beynon-Davies [50], Baccarini et al. [64], Drummond [51], Ewusi-Mensah [53], Ewusi-Mensah and Prazasynski [52], Boehm [22], Charette [55], Standish Group [57], Clegg et al. [58], Oz and Sosik [59], Oz [54], Sauer and Cuthbertson [61].	19	38.78%
Technical tasks	Schmidt et al. [41], Keil et al. [69], Sauer and Cuthbertson [61], Kappelman et al. [46], Standish Group [18, 56, 62], May [48], Jiang and Klein [70], Beynon-Davies [50], Baccarini et al. [64], Ewusi-Mensah [53], Ewusi-Mensah and Prazasynski [52], Boehm [22], Standish Group [57], Milis and Mercken [68], Reel [74], Oz and Sosik [59].	18	36.73%
Client acceptance	Schmidt et al. [41], Keil et al. [69], Sauer and Cuthbertson [61], Kappelman et al. [46], Standish Group [18, 56, 57, 62], May [48], Yeo [49], Jiang and Klein [70], Jiang et al. [71], Glaser [65], Standing et al. [66], Ewusi-Mensah and Prazasynski [52], Charette [55], Clegg et al. [58], Milis and Mercken [68], Oz and Sosik [59].	20	40.82%
Revenue and profit	Schmidt et al. [41], Emam and Briand [82], Rico [83], Reifer et al. [85].	4	8.16%
Market share	Milis and Mercken [68], Paulk et al. [81], Emam and Briand [82], Dion [84], Reifer [86], Dunaway et al. [87], Butler [88].	7	14.29%
Personnel relationship	Schmidt et al. [41], Keil et al. [69], Kappelman et al. [46], May [48], OGC [63], Yeo [49], Jiang et al. [71], Baccarini et al. [64], Humphrey [60], Mahaney and Lederer [72], Ewusi-Mensah and Prazasynski [52], Leveson [73], Charette [55], Standish Group [18], Procaccino et al. [24], Taylor [67], Milis and Mercken [68], Oz and Sosik [59], Sauer and Cuthbertson [61].	19	38.78%
Top management support	Schmidt et al. [41], Sauer and Cuthbertson [61], Kappelman et al. [46], Standish Group [62], Whittaker [47], OGC [63], Yeo [49], Beynon-Davies [50], Baccarini et al. [64], Glaser [65], Ewusi-Mensah [53], Standing et al. [66], Ewusi-Mensah and Prazasynski [52], Taylor [67], Standish Group [18, 56, 57], Procaccino et al. [24], Standish Group [57], Taylor [42], Milis and Mercken [68], Oz and Sosik [59].	22	44.90%

Frequency and percentage analysis of key success factors with total studies n=49

**Table 4. Stakeholders Mentioned In Literature Having Interest In Project Success**

<i>Stakeholder group</i>	<i>Stakeholders</i>	<i>Studies</i>	<i>Frequency</i>	<i>Percentage</i>
Top management	Executive management	Barclay and Osei-Bryson [89], Atkinson [5], Standish Group [62].	3	18.75%
	Board director	Smith-Doerr et al. [90], Jugdev and Müller [19]	2	12.50%
	Investor	Barclay and Osei-Bryson [89], Turner et al. [13]	2	12.50%
	Senior management	Jugdev and Müller [19], Keil et al. [69], Wateridge [20].	3	18.75%
	Owner	Jugdev and Müller [19], Lim and Mohamed [91], Pinto et al. [92], Turner [93], Turner et al. [13], Wang and Huang [94], Wateridge [20].	7	43.75%
	Project sponsor	Barclay and Osei-Bryson [89], Cooke-Davies [75], Freeman and Beale [30], Jugdev and Müller [19], Müller [95], Müller and Turner [96,97], Turner [32,93], Turner et al. [13], Wateridge [20].	11	68.75%
	Portfolio director	Turner et al. [13], Müller and Turner [96,97].	3	18.75%
Core team	Software engineer	Smith-Doerr et al. [90], Wang and Huang [94].	2	12.50%
	Project leader	Smith-Doerr et al. [90], Wateridge [20].	2	12.50%
	Project personnel	Müller and Turner [96], Tishler et al. [98].	2	12.50%
	Project team	Barclay and Osei-Bryson [89], Belassi and Tukul [31], Bounds [99], Cooke-Davies [75], Smith-Doerr et al. [90], Jugdev and Müller [19], Shenhar and Dvir [78], Toor and Ogunlana [100], Turner [32,93], Turner et al. [13], Müller and Turner [96,97], Wang and Huang [94], Wateridge [20].	15	93.75%
	Project Executive	Turner et al. [13].	1	6.25%
	Team members	Atkinson [5], Belassi and Tukul [31], Tishler et al. [98], Turner and Müller [101].	4	25%
Project beneficiary	Client	Atkinson [5], Barclay and Osei-Bryson [89], Belassi and Tukul [31], Bryde and Robinson [35], Jugdev and Müller [19], Müller and Turner [96], Munns and Bjeirmi [103], Shenhar et al. [29], Toor and Ogunlana [100], Turner et al. [13], Turner and Müller [101], Wateridge [20].	12	75%
	Customer	Atkinson [5], Barclay and Osei-Bryson [89], Cooke-Davies [75], Freeman and Beale [30], Jugdev and Müller [19], Lim and Mohamed [91], Shenhar et al. [29], Shenhar and Dvir [78], Tishler et al. [98], Tukul and Rom [102], Turner et al. [13], Wateridge [20].	12	75%
	Consumer/users/end-user	Atkinson [5], Jugdev and Müller [19], Lim and Mohamed [91], Müller and Turner [96], Munns and Bjeirmi [103], Standish Group [62], Tishler et al. [98], Toor and Ogunlana [100], Turner [32,93], Turner et al. [13], Turner and Müller [101], Wateridge [20].	13	81.25%

Frequency analysis of stakeholders having interest in project success with total studies of n=16

This factor has percentage of 44.90%. Acceptability of the software project by the client is also deemed as important because that is the time when return on investment starts. So, this factor must be kept in mind when an organization is intended to do financial analysis and viability of the software project. Apart from this, budgeting and skills to perform technical tasks and complexity of those tasks are also very important. Both have been weighted almost equally with minor difference of percentages which are 38.78% and 36.73% respectively. Budgeting and variance analysis is important for all phases of a software project which enables the management and software executives to find the gap between actual and forecasted allocation and consumption of finances.

If we look at the results of remaining factors, then it can be said that project scope and availability of the resources are not mentioned too much in the relevant studies. This is so that both factors are considered in those phases where impact on success is untraceable or ignorable. For example, an organization have ample resources but if it is inefficient about allocation at right place with right amount at right time for execution then wastage of these resources can be observed which ultimately effects the costing of the project. While on the other hand, functionality and features of the software project are based on client acceptance and market image and appearance of the brand. Revenue and profit with share of market are two factors which are associated with financial aspects of the software project. Although such factors are totally ignored or give less priority in technical field of Software Engineering, but now a days they are becoming important in software industry where severe competition with high rate of product and service failure is observed.

Now, if we move on next table of the study which basically postulates those studies that have mentioned the stakeholders who are directly or indirectly influenced and have impact on software project activities. As per proposed model of the study, perception of stakeholders is considered as intervening variable which is must to know for making a software project more successful. Stakeholders have been classified into three main categories as top management, core team and beneficiary who are further sub-classified as nested sections of basic three categories.

Same process of analysis has been applied for stakeholders' analysis as in which first studies are being identified who have mentioned different stakeholders or multiple stakeholders into sub-categories and then quantification of the studies is completed with statistical frequency distribution. After that percentage analysis has been performed by dividing the frequency of each sub-category with total number of studies which are 16 for Table IV that falls in the time frame of 1991 to 2010.

As per results from the below table, we can see that top management group is divided into seven sub-categories of stakeholders which have been mentioned in different studies of the past. They are mainly; executive management, board director, investor, owner, senior management, project sponsor and portfolio director. Although we know that top management support is very critical to project success but it is not clear from the previous table which sub-category is most important or which have less impact in top management support. From the result, we can see that owner and project sponsor are considered as more vital to success of a project as they are those who basically build the foundations for a theoretical concept into practical application by acquiring and providing the resources. 7 out of 16 studies (43.75%) have discussed about the owner and 11 out of 16 (68.75%) discussed about importance of project

sponsor (who are they are considered as most important out of all sub-categories of top management). There is less attention which has been paid to other stakeholders of top management in earlier studies.

In the next group of stakeholders (which is considered as backbone of every software project and success of technical aspects is associated with them), 6 sub-categories are identified as software engineer, project leader, project personnel, project team, project executive and team members. They all more or less are engaged in operational phase of developing and completion of a software project which is intended to sell in the market. As we know that most of the tasks are interconnected in the software industry, so the concept of team building and team works is essential for making a software more perfect, bug free and successful in the market. Research indicates that 15 out of 16 studies have given the importance to project team which is over 90% of total studies. After that the term team members is considered which has the weight of 25% out of total studies of 16. While remaining sub-categories have been given too less importance or their role is defined whether at start of the operational execution of a software project or at the wind up stages.

Moving to the third group of stakeholders which consist of those who directly or indirectly use the software with related services or they have intention to sell to others. They are being sub-categorized as client, customer and consumer/users/end-user. First two categories fall in those who might be regarded as user of the software or they tend to sell or transfer the right of their ownership. Both client and customer have equally mentioned in past studies with 12 out of 16 studies that is weighted as 75% of total 100%. In terms of marketing and management, end-user/users or consumer are those who directly use the product and get the desired benefits. There are 13 out of 16 studies which have discussed about the users of a software project.

Overall findings from the Table IV are more inclined towards project beneficiary. Other two groups have mixed importance and opinion in the view of past studies in the field of project management and software engineering.

### **Conclusion, Limitations and Future Prospects**

#### **Conclusion**

The purpose of this paper is to draw the attention about a general term 'success' and its different dimensions in the field of Software Engineering where it had associated with traditional definition [2] and concept based on achievement of a software project is on time, within budget and scope of the project with conformation of quality. However, modern philosophy [10] of success is not confined to iron triangle of traditional definition. The proposed research has considered 10 key success factors which are vital to project success in software industry. However, this success cannot be achieved without identification of those who are directly or indirectly influenced by the process of success. Their perception leads the notion of success to think in different dimensions.

Qualitative analysis has been performed after getting the support from literature and collection of research articles and relevant studies between the time periods of 1991-2010. Thematic analysis has been performed after collecting the data with the help of Google Scholar, SSRN, Harzing's Publish or Perish and Microsoft Academic search. There are total 76 studies which have been used for analysis in which 11 studies are used to mention influential factors to project success, 49 studies for key success factors and 16 studies for stakeholders and their perception about success in the field of Software

Engineering. After classifying the studies into different groups and sub-categories, overall results elucidate that there so many other factors which influence the success of a software project. In this regard top management support, adherence to quality, budgeting and technical tasks are considered as most significant success factors to current studies which have been highlighted or perceived by different stakeholders in the past studies. Study also highlighted that client, users, owners and project sponsor have more impact on a project success in the groups of top management and project beneficiary. While core team which is considered as backbone and active members of in the process of a software project, draw the attention about the importance of project team and team members in the perception of success which have been mentioned more frequently in the past studies.

### Limitations

Apart from conclusion, this study has some limitation as shortage of time and using of limited key success factors (only consider 10 factors) with limited groups of stakeholders who have vested interest in the success of a software project.

### Future Prospects

Although there are so many studies in the past which have highlighted plenty of key or critical success factors essential for making a software project successful but silence is being observed in the sense why these are important, which are most critical in terms of stakeholders' preferences and why success is a conflicting concept among different stakeholders. Current study is not only an attempt to combine all these issues at one plat-form but also refine the earlier studies by building the strong nexus between key success factors and perception different stakeholders about the notion of 'success' in the field of Software Engineering.

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