Stakeholder Dissonance: Disagreements on project outcome and its impact on team motivation across three countries

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ABSTRACT

When a project perceived to be a failure by one set of stakeholders is perceived as a success by another set of stakeholders we have outcome disagreement. Our objective is to discover if team motivation is affected when developers and managers disagree on a project’s outcome. We also investigate if culture influences team motivation. We collected questionnaire data on 290 completed projects from software engineering practitioners based in Australia, Chile, and USA. We asked if the respondent considered their project was successful and if higher level management considered the project a success. We found that more projects were perceived successful by management than by developers. Also, successful projects are associated with higher levels of team motivation than failed projects or projects with outcome disagreement. Culture makes a difference to levels of team motivation for both failed projects, and projects with outcome disagreement. An over-riding influence on team motivation is agreement with other stakeholders. To motivate practitioners, stakeholders need to agree on what constitutes a successful or a failed project before the start of the project.

Categories and Subject Descriptors


General Terms

Management, Performance, Human Factors.

Keywords

project success, project failure, project outcome disagreement, team motivation

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1. INTRODUCTION

Motivation is the software engineering factor reported to have the single largest impact on practitioner productivity [1] and software quality management [2]. People, in general, are the most critical component of any software development project. “Good people, with good skills and good judgment, are what make projects work” [3]. In a DeMarco and Lister survey low motivation was found to be one of the most frequently cited causes of software development project failure [4]. However, motivation continues to be ‘undermined’ and problematic to manage [2] and often takes a back seat to other project factors that might be less important; perhaps this is because motivation is extremely difficult to quantify. As McConnell [2] notes, “Every organisation knows that motivation is important, but only a few organizations do anything about it. Many common management practices are pennywise and pound-foolish, trading huge losses in motivation and morale for minor methodology improvements or dubious budget savings.”

Studies on motivation, since the 1980’s, present mixed findings on whether or not software engineers form a homogeneous group with similar motivational needs. For example, a previous study found that culture (in terms of developers operating in different countries), needs to be considered as this affects software engineer’s individual characteristics [5]. Rarely discussed, although implicit in the motivation literature, is whether having a motivated team of software engineers will lead to better project outcomes, i.e., success or failure. Procaccino et al [6] suggest that software engineers perception of project success, consistent or not with reality, can dramatically affect the software engineers involved, and hence the health of a project.

There are many different definitions of project success and how success is defined depends on which stakeholder you ask. Management’s view of what constitutes a successful project in many cases may be different from that of a project manager while developers and users may take another quite different view [6]. Differences in viewpoint can be attributable to different perspectives, motivation and responsibilities typically associated with the role taken on a project.

We therefore ask
(1) How do differing views of the success or failure of a particular project affect team motivation?
Leading on from our first question we ask a second question,

(2) “When there are differing views on a project’s outcome is any relationship between team motivation and project outcome affected by culture?

As noted in [5] much of the research into software engineers' motivation provides a western view of motivation. However, it is important to investigate not just the views of software engineers in developed countries, but also in less developed countries, particularly given the increasing importance of global software engineering worldwide.

We answer our key questions through an analysis of questionnaire responses from software engineers in two developed countries, Australia, and USA, and a less developed country, Chile. The questionnaire we used considered the wider issues related to what practices lead to project success [7, 8]. A previous study, using data from Australia and the US, found that high staff turnover was significantly related to team motivation, and that the higher the turnover, the lower the motivation [9]. We extend this work by exploring the relationship between project outcome and team motivation, by country.

2. BACKGROUND
In this section we consider some background to motivation, project outcome and the importance of understanding a project’s cultural environment.

Researchers have found that making money is not a primary motivator of software engineers [10]; their motivation is somewhat different and is made up of two factors; the first factor deals with the personal aspects of the work and includes “a sense of achievement, professional growth, satisfying work, delivered quality”. The second factor has a customer/user focus and can be described as “meets all customer/user requirements, customer/users are involved, and have realistic expectations”.

Studies on motivation are divided as to whether software engineers form a homogeneous group with similar motivational needs [5]. The majority of the research tends to support the idea that software engineers do form a recognisable group, e.g. [11-22]. Myers [23] refined the studies of Couger and Zawacki and colleagues to show that although software engineers form a distinct group, they vary among themselves by job type. More recent work that presents software engineers as a distinct group includes: e.g., [24-29].

However, several studies take a contrary view. For example, Ferratt and Short [30, 31] found that software engineering employees and non-software engineering employees could be motivated equally using the same underlying constructs. More recent work that presents software engineers as a group that cannot be distinguished from other occupations when considering motivation includes [32, 33]. However, whether software engineers are different from, or the same as other professional groups is not important when we focus directly on teams of software engineers and try to identify the relationship between team motivation and project outcome and whether culture makes a significant difference to this relationship.

2.1 Project Outcome
Software has been developed since the 1960s but still little is known about how to ensure that software projects are successful. Software development projects are affected by a series of problems, such as low organizational maturity, lack of senior management involvement, poor project management, budget shortages, changes in requirements and scope, poor quality software and under-motivated developers [5, 34-36]. Over the years experienced project managers, organizations and researchers have attempted to trap the essence of what is behind project success, a difficult and elusive concept with many different meanings.

Although there is extensive literature on the topic of project success, few studies have examined how project success is defined in practice, and the implications of defining and measuring success on project outcomes [37]. Many studies have shown that project success and failure is a question of perception and that the criteria could vary from project to project [38-41]. The same project can be defined as successful or as a failure from the point of view of different groups of stakeholders [42]. In a 1999 Lindberg study, practitioners declared a project to be one of the most successful they ever worked on, while other stakeholders considered the same project to be a failure. This particular project was over budget by 419%, over schedule by 193% and over its size estimates by 120%. By all the traditional measures, one would consider this project at least troubled, if not a failure.

When asked to explain what factors lead to project failure, practitioners mentioned schedule pressure, a poor schedule estimate, poor understanding of the resources needed, and poor understanding of the problem to be solved [43]. Other researchers have suggested that stakeholders could perceive a partial failure, a project that was in fact successful in achieving near optimal results [37]. Sponsors of a project may on the other hand, view success as the survival of a project, in which case project success may be perceived even if the project did not perform in an optimum manner [37].

Baccarini [44] stated that project success criteria consist of project management success and product success. He also noted that project management success covers meeting time, cost and quality objectives, while product success deals with the ability of the project's final product to meet the project owner's strategic organizational objectives; satisfaction of users' needs and satisfaction of stakeholders' needs where they relate to the product. This definition relates to that of Procaccino and Verner [10], described earlier. A survey by Shokri-Ghasabeh and Kavoousi-Chabok [39] found that 43% of the professionals surveyed believed that project success is indeed project management success, while 46% of respondents indicated that they are totally different.

It appears that idea of considering a project successful when it merely meets the time, cost and quality purposes is now becoming outdated [39]. This is supported by Collins and Baccarini [45] who believe that time, cost and quality are not the only project success criteria and that there is an urgent need to educate project managers to consider criteria other than these three. Thus, researchers should realize that it is important to consider from whose eyes they wish to define success; it is very important not to
generalize the definition of success to all project’s stakeholders since success is perceived differently by different stakeholders [39]. How success is achieved and who evaluated success affects the final judgement of success and failure; it has been recognised that it is possible to have management success without business success and vice versa [37].

Procaccino and Verner [46] suggest that developers take a mainly inward-looking view of project success and that they concentrate on the things that affect them and their ability to do their job properly; for example a sense of achievement when working on a project and doing a good job. It has been suggested that this view of success has to do with the learning experience of practitioners on a particular project that provides skills the developers can use on other projects [47]. Even a cancelled project may give practitioners a sense of achievement and allow them to learn something new. The largely intrinsic goals of a sense of achievement, of delivering quality, and provision of a challenging and creative work environment for both project managers and practitioners have positive implications for motivation and [1, 2, 10, 43]. Procaccino and Verner [10] found that, in general, both project managers and practitioners can find some measure of “success” in projects that may be considered at least a partial failure from an organizational perspective.

Studies have previously found that motivation is particularly associated with turnover and staff retention e.g., [9, 13, 20, 48-57]. As noted earlier, we extend this work by considering the relationship between team motivation and project outcome, in the context of culture, when the outcome i.e., project success, or project failure, may be considered differently by senior management and the software engineers who worked on the project.

2.2. Motivation and Culture
Software engineering is an increasingly global activity with many organisations operating in a cross-cultural environment. Software engineers participate in the development of software that often transcends cultural barriers [58]. The global nature of software engineering requires the formation of multi-cultural project teams where management must take into account the different expectations and motivational patterns of software engineering staff worldwide. Culture is highly cited as a factor in the software engineering motivation literature [15, 17, 22, 51, 56, 58-60]. For example Anderson [61] found that IS professionals in Japan and Norway are different, both in terms of their general culture and in their views on life and work, “they also differ in terms of IS job satisfaction and values”. Whereas [58] found that there was a severe mismatch between expectations of software engineers in Hong Kong and the USA and concluded that this was because of significant differences between the two cultures. The growing use of globalization and outsourcing has intensified this problem [58], but if teams are to work effectively cultural difference is one of the most important issues to address [62].

This paper is organized as follows: in the next section we discuss our research methodology; then in Section 4 we present our results. In Section 5 we discuss limitations to our research, and in Section 6 we discuss our conclusions and further research.

3. RESEARCH METHODOLOGY
In our study we use a questionnaire that was developed in order to gain a better understanding of the state of software development practice, project outcomes, and team motivation, based on the perceptions and experience of software engineers. In this section we discuss our research methodology including: (1) a description of the questionnaire, (2) questionnaire administration, selection of respondents and data collection, and (3) data analysis.

3.1 Questionnaire description
The questionnaire was developed after discussions with software engineers and an extensive review of the literature on project success and failure. Participants were asked to discuss a recently completed software development or maintenance project in which they had participated. The questionnaire addressed major software project success factors in seven broad categories: (1) management, (2) customers and users, (3) requirements, (4) estimation, (5) development process, and staffing, (6) the project manager, (7) software development personnel. While the questions covered major project risk factors identified in the literature, respondents were also asked if they considered their project was successful or not. In addition they were asked if higher level management considered their project was a success or not. This second view of project outcome is a perception of what the developers considered was management’s view, not in actual fact a view obtained from management itself.

We also asked respondents to comment on the reasons for any differences in perception of project success for management and developers. When discussing developer motivation it is the perception that the developer has that is important, whether or not that perception is grounded in reality. In addition to the questions described above we included some general questions including: country of development, whether the project was a maintenance or development project, respondent position on the project and whether a defined development methodology was used on the project.

The questionnaire was initially administered in the U.S.A., Australia, and then Chile. While the organisations in the USA and Australia were involved with in-house developments the Chilean organizations were split between those developing in-house software and those who were working for vendor organizations developing outsourced software some of which was for North American clients.

3.2 Questionnaire administration, selection of respondents and data collection
We first investigated software engineering practices with practitioners from U.S.A. with a pilot study. The questionnaire was initially distributed to 21 software engineers in a large U.S. financial institution who each responded by answering it twice, once for a recent project they personally considered was successful and once for a recent project they personally considered was a failure. These software engineers were based in a number of different U.S. locations and they reported on 42 different projects. Our second group of respondents were a group of 70 software engineers from a number of different business organizations in the United States (i.e., insurance, financial,
pharmaceutical, and local utilities) who answered the questionnaire once; nearly all 70 projects they addressed were developed for in-house use, i.e., not developed for a third party.

A third study, involved a group of 41 software engineers from Sydney, Australia, who were also mainly developing in-house software for commercial organizations (i.e., insurance, financial, telecommunications etc.). They each answered the questionnaire once, providing us with 41 projects. Our sample of U.S. and Australian practitioners was not random, but rather a convenience sample of developers to whom we had access; all respondents participated in various project management courses taught by the authors and all respondents, other than those involved in the pilot study, answered the questionnaire once.

The questionnaire was then translated into Spanish and sent to software development organizations, groups and professionals in Chile, whose email addresses were obtained from a directory of Chilean organizations (approximately 5000 emails). In addition we contacted members of the Chilean Association of Software Organizations and asked them to pass the questionnaire to their developers. We specifically targeted, for both groups, software engineers from small, medium and large development teams, with a variety of SE jobs, and varying experience.

One hundred and forty Chilean software development professionals responded to the questionnaire. This is also a convenience sample, as it is very difficult to get random access to professionals in the software development industry. Most of the respondents were from organizations engaged in software process improvement activities (CMM/ SW, CMMI or ISO 9000 models and frameworks).

Our sample therefore consisted of 290 projects although there are a few missing values in some of the responses. Table 1 provides details of the questions used in our analysis while Table 2 provides some details of our data sample.

**Table 1: Survey questions used in our analysis (across three countries)**

<table>
<thead>
<tr>
<th>Question</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>How high was the motivation of team members?</td>
<td>Team motivation</td>
</tr>
<tr>
<td>Did you consider the project to be a success?</td>
<td>Respondent success</td>
</tr>
<tr>
<td>Did senior management consider that this project was a success?</td>
<td>Management success</td>
</tr>
</tbody>
</table>

**3.3 Data analysis**

The data we collected is non-parametric and is either ranked (e.g., Likert scale), or categorical (e.g., yes/no answers). As non-parametric methods make fewer assumptions, their applicability is much wider than the corresponding parametric methods [63]. We investigate the data using frequency analyses, cross tabulation, Chi square tests, and box plots. We also use correspondence analysis (CA) to illustrate aspects of our results where appropriate. CA is a multivariate statistical technique which reveals associations in the data. It uses contingency table data and converts nominal data counts into graphical displays, called “maps” [64]. Such an analysis allows a visual examination of the structure or patterns in the data. Euclidean distances approximate chi-squared distances between row and column categories [65]. CA has been used in the social sciences to display descriptive category associations, see for example [66], and has rarely been used in software engineering with the exception of previous work by Beecham et al [67].

**4. RESULTS**

Because of low numbers in some categories and/or for space purposes, in some cases the results for the variable ‘team motivation’ (which was collected on a five point scale) have been collapsed into a three point scale. In our analysis we first consider team motivation in terms of: 1) all groups perceived the project to have been ‘successful’, 2) all groups perceived the project to have ‘failed’, 3) management only considered the project a success; ‘Management only’ and, 4) only the developer considered the project a success; ‘Developer only’. We call this new variable “project outcome”. With a chi square test there is a significant relationship between team motivation and project outcome, $p = 0.000$, df = 4.

Table 2 provides details of project outcome and shows that in 13% of the cases there was disagreement; managers are more likely to consider a project successful (10%) than are developers (3%). This does not agree with research by Glass [47] and Procaccino and Verner [10], who suggest that practitioners can find some success in projects that may be considered a failure from an organizational perspective and rather suggests that developers may be unhappy about aspects of the development process, of which managers may be unaware e.g., lack of testing, poor design etc. Some comments by the respondents on the ‘management only’ projects illustrate this; for example, “project delivered late and of poor quality”, “requirements met to a minimal, degree”, “GUI looked good but limited functionality and flawed infrastructure”, and “burn out of good people which will hurt the company in the long run”.

**Table 2: Project outcome data**

<table>
<thead>
<tr>
<th></th>
<th>Failed</th>
<th>Successful</th>
<th>Outcome disagreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Management only</td>
<td>Developer only</td>
<td>Overall</td>
</tr>
<tr>
<td># projects</td>
<td>53</td>
<td>196</td>
<td>31</td>
</tr>
<tr>
<td>% projects</td>
<td>17%</td>
<td>70%</td>
<td>10%</td>
</tr>
<tr>
<td>USA</td>
<td>21</td>
<td>67</td>
<td>20</td>
</tr>
<tr>
<td>AUS</td>
<td>4</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>Chile</td>
<td>28</td>
<td>98</td>
<td>6</td>
</tr>
</tbody>
</table>

The set of projects where both developers and management agree are successful show higher team motivation than those projects that fail, or where developers and managers disagree. See Figure 1 (a CA analysis) below, which shows that failed projects are most closely associated with ‘some motivation’, successful projects are most closely associated with ‘highly motivated’ while the projects with outcome disagreement, i.e., management only and developer only, are most closely associated with ‘no
motivation’. The CA shows two dimensions; Firstly, levels of motivation, where the most common response is that the teams are averagely motivated, and the second dimension captures how developer perceives management and development team agreement on project outcome. There is however, no statistically significant difference in team motivation for ‘management only’ and ‘developer only’ projects – although the CA shows they are both linked to low motivation. (Management only and developer only points on the CA, represent a disagreement in project outcome). For further information on CA’s see Greenacre and Blasius [64].

Medians for team motivation are shown in Table 3, where we see that the medians for the overall data set for the failed projects and for those where there is outcome disagreement are similar. Lowest levels of motivation, in this table, are shown in bold.

When we consider team motivation and project outcome for failed projects, and when there is outcome disagreement we find that the results for the three countries are different (see Figure 2, below).

While motivation is higher for successful projects in all countries, the Australian software engineers are the most sensitive to outcome disagreement with team motivation lowest for projects with outcome disagreement. U.S. developers motivation is lowest for projects that everyone agrees are a failure. There is no difference between motivation for failures and disagreement for Chile. The Australians are much less motivated than the Chilean software engineers or the US software engineers. There is a significant difference between responses for motivation for Australia and Chile (p=0.002).

Table 3: Motivation medians

<table>
<thead>
<tr>
<th>Success</th>
<th>Outcome disagreement</th>
<th>Failed</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Highly motivated</td>
<td>Average motivation</td>
</tr>
<tr>
<td>USA</td>
<td>Highly motivated</td>
<td>Average motivation</td>
</tr>
<tr>
<td>AUS</td>
<td>Highly motivated</td>
<td>Some-average</td>
</tr>
<tr>
<td>Chile</td>
<td>Highly motivated average</td>
<td>Average motivation</td>
</tr>
</tbody>
</table>

Figure 1: CA analysis: Motivation with project outcome

Because we believe that this is an area worthwhile investigating further we split our data into 3 groups, ‘agreed failure’, ‘management only’ and ‘developers only’, and look more closely at the results by country. Figures 3, 4 and 5, and Table 4 illustrate our results.

There are no US projects where ‘developers only’ thought the project a success. For the ‘management only’ projects motivation is higher than for the projects that both groups agree are a failure.

Figure 2. Box Plot: Project Outcome with Team Motivation by Country
For the Australian projects (see Figure 4), motivation is higher for the projects that are agreed to be a failure. Our results may suggest that team motivation is higher for ‘developer only’ projects than ‘management only’ projects (although we have only one data point for ‘developer only’). Lowest motivation occurs if only management consider the project a success.

Chilean developers show their lowest team motivation for the ‘developer only’ projects where motivation is lower even than for projects agreed to be a failure. There is no difference in motivation for the ‘management only’ projects and failed projects.

5. THREATS TO VALIDITY
Because we have unbalanced data sets from only three countries we cannot generalize our results. In addition we have limited data for some categories; for example, we have no US projects, and only one Australian project that ‘developers only’ considered were a success and this makes our results tentative.

In addition we are relying on the perceptions of developers after their projects have finished so we can expect that their view of the team’s motivation may not be representative of the team motivation during the project, but rather may be biased by the project’s outcome. In addition our software engineers are also relying on their view of team motivation but others in the team may have different views. We cannot say that the low motivation caused the failure. Hence we cannot generalize our results but rather suggest that team motivation affects developers and their attitudes to their work.

6. CONCLUSIONS AND FURTHER WORK
Our overall data shows that management are more likely to consider a project a success than developers. Management are likely to deem a project to be a success when it meets its business objectives in relation to budgets, schedule and customer requirements and the majority of the projects in our sample fit this description. Where does this leave developers? Possibly working under a lot of pressure, taking the brunt of the demands, working overtime, and losing out in terms of job satisfaction and
Developers are shown to place a different emphasis on what constitutes a successful project. The finding that management are more likely to consider a project a success than developers is contrary to prior research that has suggested that developers are more likely to find success in projects that have failed, particularly if they have learned something new.

We asked two main questions in our research: (1) How do differing views on the success or failure of a particular project affect team motivation? and, (2) “When there are differing views of a project’s outcome is a relationship between team motivation and project outcome affected by culture?”

We found that the level of developer team motivation is highest when developers perceive that there is agreement between them and management that a software project is a success. If there is agreement on project success then the development team tend to have an above average level of motivation. If a project is perceived to be a failure by both developers and their management, or if there is disagreement on the outcome of a project, then team motivation drops. Hence, we can say that failed projects and projects with outcome disagreement have similar levels of team motivation which are lower than those software projects that are agreed to be a success. Therefore, in answer to our first research question: in general team motivation levels are higher for successful projects and, if there is outcome disagreement then motivation levels are similar to those that occur when a project is a failure.

The relationship between team motivation and project outcome is however affected by culture when there is disagreement on project success. However, these results are somewhat tentative because of limited data in some cases. In the USA, we did not find one case where a developer believed that the project was a success when management perceived that the project was a failure (w ‘developer only’ projects). Developers in the main were in agreement with management as to whether or not the project was a success. This suggests the a successful outcome as viewed by management is very important to US developers; particularly as motivation levels for the development team was higher when the manager thought the project was a success (‘management only’ projects), than if everyone agrees the project a failure.

The Australian data suggests that they have quite different attitudes from the US developers even though culturally Australia and the US are considered fairly similar. The lowest levels of team motivation, for the Australians, is in the ‘management only’ projects. The next lowest levels of team motivation are for ‘developer only’ projects. The projects that everyone agreed were a failure had higher motivation levels than the projects with outcome disagreement. These results suggest that Australian software engineers are de-motivated by conflict or lack of consensus as to what constitutes a successful project.

The Chilean software engineers’ motivation levels show some similarities to the US software engineers with the lowest team motivation levels for the ‘developer only’ projects, their motivation levels are lower than even when everyone agrees the project is a failure. There is no difference in team motivation for the ‘management only’ project success and those projects everyone agrees are a failure.

We believe that though culture does make a difference, software engineers are likely to be de-motivated if they feel they have been working towards some project ideal and then find out they and management disagree on the outcome. If success is defined at the start of a project and everyone agrees early on what the success criteria are, team motivation is likely to remain high. Thomas and Fernandez suggest that organizations who define the characteristics of a successful project and where everyone is aware of this definition are more likely to succeed than those organization who do not define project success [37].

Further work suggested by this research includes collecting outcome and motivation data from multiple stakeholders involved in the same project. We also need to investigate motivation levels during a project and after project completion to monitor motivation changes over time, and how motivation is affected by project outcome. Further research is also required into the effects that culture has on team motivation. Finally, we need a clear definition of what developers perceive to be a successful project and what developers perceive management’s view is of a failed or successful project. This is an essential first step towards turning the de-motivational dissonance identified in this study into a single vision where all stakeholders are working towards similar goals and objectives.

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8. REFERENCES


