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ABSTRACT

Organizations are increasingly interested in improving IT project management in a multi-project or portfolio environment. This research presents a project assessment methodology based on defining a common risk-return vocabulary between IT and business stakeholders. The proposed methodology could help project managers highlight any differences in perceptions between business and IT that might impact the project negatively, if not managed properly. The use of the assessment methodology in a multi-project environment is illustrated using data from a diversified company. A number of managerial implications are then drawn highlighting how the methodology could be useful in practice.

Keywords

Shared Understanding, Information Technology Project Management, Information Technology Project Risk Management, Information Technology Value Management

INTRODUCTION

The high failure rate of IT projects is a cause for concern in many organizations. A study by Standish Group showed that approximately 18% of IT projects fail and 53% are challenged in-terms of meeting budget, schedule, and quality requirement (Hartmann, 2006). Although some obstacles facing project success are hard to control or predict, others could be assessed and managed. One of these obstacles that could be assessed and managed is any misunderstanding between business and IT staff regarding projects specifications (or factors). Previous project implementation studies have suggested that differences in users and IT expectations of completed project could lead to its failure (Ginzberg, 1981).

The importance of shared understanding of projects between IT and business has been recognized in the literature (Bassellier and Benbasat, 2004; Ginzberg, 1981; Jiang, Klein, Wu and Liang, 2009; Petter, 2008). Nelson et al. (1996) found that increasing levels of shared understanding between IS and other departments in the organization leads to increased IS performance measured by the IS group's quality of work and their efficiency. Keil et al. (2002) found that the lack of a common understanding of project specifications between IT managers and business users could lead to difficulties in project management. Shared understanding (or knowledge) has been defined as the ability of IT staff and business users "to understand and be able to participate in the others' key processes and to respect each other's unique contribution and challenge" (Reich and Benbasat, 2000). This shared understanding between IT and business stakeholders can help remove barriers to acceptance and increase the ability of both groups to work toward a common goal (Bassellier and Benbasat, 2004; Nelson and Cooprider, 1996). On the other hand, the lack of such shared understanding might translate into missed opportunities for the organization (Nelson and Cooprider, 1996) or jeopardize performance (Ginzberg, 1981).

This paper discusses the use of an assessment methodology to guide managers in reducing any misunderstanding among IT project staff and business users. The methodology presents a scorecard to be ranked by one business and one IT stakeholder.

The results of the scorecard are then displayed visually using a diagram, allowing project managers to quickly uncover any differences in opinion toward projects specifications that might eventually result in troubled project if they are not managed properly.

Past literature has stressed the importance of assessing and managing several specifications (or factors) critical to project success such as scope, risk, and most recently benefit (return) (Cooke-Davies, 2002; Mirani and Lederer, 1998). This paper focuses on two factors: risk and return. Risk management deals with managing factors that could adversely impact the ability to complete the project on-time, within-budget, and meet user's specifications. Examples of such factors include clear definition of project scope and prior experience with similar projects (Gemino, Reich and Sauer, 2008; Schmidt, Lyytinen, Keil and Cule, 2001). Return management, on the other hand, deals with assessing factors expected upon project completion, such as cost savings (Mirani and Lederer, 1998), which are often considered important in post-project reviews (Nelson, 2005) and could influence funding of future projects.

The items used in the scorecard for assessing business and IT understanding of risk and return factors are derived from previously published work on IT project risk (Schmidt et al., 2001) and IT project returns (Mirani and Lederer, 1998). As previously mentioned the results of the scorecard completed by business and IT are then used to form a diagram. This diagram also builds on prior research (Weill and Vitale, 1999) in developing a multi-dimensional, visual, model that is easy for business and IT stakeholders to understand.

This article has the following objectives:

1) To describe a methodology that can be used to measure, map and create a shared understanding of risks and returns of projects in a multi-project environment.
2) To explain how a shared understanding of risk-return specifications of projects can help project managers better manage projects.

LITERATURE REVIEW

Multi-project Management

This is the concurrent management of multiple projects at the organizational level or the business unit level. These projects typically share common resources and might contribute to the same outcome. Portfolio management is the concurrent management of groups of projects that could help the organization achieve its strategic objectives and long-term benefits (PMI, 2006). Portfolio management can be very challenging. The methodology proposed in this study will help project managers identify troubled projects in a portfolio that requires their immediate attention.

Return and Risks for IT Projects

There is an extensive body of literature on the business value of IT (Devaraj and Kohli, 2003). Previous studies have presented several methods for evaluating the return of IT projects. These include traditional financial measures (Ross and Beath, 2002) and other more intangible measures (Mirani and Lederer, 1998). The literature has classified benefits into three categories: strategic return (competitive advantage, alignment, and customer relations), informational returns (information access, quality and flexibility), and transactional returns (communication, system development and business efficiency) (Mirani and Lederer, 1998). This paper uses return measures spanning these three classifications derived from (Mirani and Lederer, 1998). Table 1 presents some of these factors such as customer satisfaction, increased reliability, improved revenue, reduced cost, and others.

Research on IT project management views risk as the possibility of negative outcome in terms of budget, schedule, or requirements of the project's deliverables (Wallace and Keil, 2004). There are several studies on identifying risk factors for IT projects (Schmidt et al., 2001), as well as managing risk factors in IT projects (Wallace and Keil, 2004). Risk factors identified in these studies can be used to develop a project risk score. As shown in Table 2, project risk is conceptualized using several factors such as technology risk, sponsor support, team structure, project schedule, and others. The selected return and risk items could be modified based on the organizational context. Individuals may vary in their perceptions of the relative importance of different risk and return factors for a project.

Selected Return Items: The project is expected to…
Improve operational efficiency
Facilitate quicker response to change
Improve customer satisfaction
Enable management planning and control
Enable reliable and accurate information
Enable flexible and quick access to information
Provide data security
Increase revenue generation
Enable regulatory compliance (safety, environmental, others)
…

Table 1. List of Selected Return Items (Mirani and Lederer, 1998)

Selected Risk Items
The project requires significant changes to existing organizational procedures
Users are not actively involved at multiple stages of the project
The number of different departments involved in the project is large (more than 4)
The user departments are not committed to the project
This project requires significant coordination between team members at different locations
This project shares critical resources (people and technology) with other projects
The project scope is poorly defined
This project has several team members who spend no or little of their time on this project
…

Table 2. List of Selected Risk Items (Schmidt et al., 2001 and some added during interviews)

Shared Return-Risk Understanding in IT Projects

This study views shared understanding as the common knowledge of IT project risk and return factors among business and IT personnel. Large differences in knowledge of risk related to the project implementation and return expected from that implementation could be an early warning signal for future trouble, if not managed properly. For instance if the business expects the new system to provide data security but IT did not think data security was important, then when the system is built, it might fail to meet user's requirements. Similarly, if IT feels that the new system requires changes (for example) to organizational procedures and the business did not perceive those changes to be necessary. This might result in slow change management effort and eventually a challenged project. The project manager could use information regarding differences in knowledge to better manage project risk factors and project return expectations of both business and IT staff.

In order to measure the differences in risk and return knowledge between IT and business, the following equation is used based on (Ginzberg, 1981).

$$\text{Knowledge difference} = \sum_{i=1}^{N} \left| (BusKnow_i - ITKnow_i) \right| / N \qquad (1)$$

Where,

$Busknow_i$, refers to the business representative's response to item i,

$ITknow_i$, refers to the IT representative's response to item i, and

N, refers to the number of items included in each category (risk or return)--N could be different for risk and return. Dividing by N gives the average difference for each category. This equation weights each risk and return item equally. However, depending on the context, a weight measure (W_i) could be assigned to each item to indicate its importance and its probability of occurrence. In the next section we apply this equation to measure differences in business and IT risk and return understanding in a real-world setting.

THE METHODOLOGY

The methodology used to assess any differences in understanding risk and return specifications and its application is discussed in this section. Using the risk and return scorecards business and IT experts are asked to independently rank a project's risk and return attributes. After the data on each project in the functional unit or organization is collected, scores of each project's risk and return along with differences in understanding can be calculated, and the results can then be displayed using a diagram. The diagram shows four dimensions of each project: risk (Y-axis), return (X-axis), total (risk and return) knowledge difference (size of the bubble), and whether the degree of knowledge difference is relatively1 high compared to other projects in the unit or organization (illustrated by the pattern of the bubble). A project could have one of the following patterns: Type I (High-return and high-risk understanding differences), Type II (High-return and low-risk understanding differences), Type III (Low-return and high-risk understanding differences), and Type IV (Low-return and low-risk understanding differences).

The diagram can give managers a quick and easy way to interpret the relative position and the degree of difference in shared understanding of each project based on the four dimensions mentioned above. This diagram is illustrated using actual project data in the following section.

Example

This section provides an example to illustrate the application of the proposed methodology based on data from a diversified company which we refer to as AlphaCo for reasons of confidentiality. This example is based on a single business unit within AlphaCo. Within this business unit, 10 projects (P1-P10) were identified by senior managers as being representative of different types of projects in the organization. The projects studied ranged from relatively small (project cost less than $500,000) internally developed projects to larger vendor projects (project cost over $3 million).

Data Collection

Project risk and return scorecards were constructed based on prior research (Mirani and Lederer, 1998; Schmidt et al., 2001). The scorecard contained 33 return questions and 26 risk questions. The scorecard was reviewed and modified by business and IT managers in the organization before distributing it to project experts. Selected questions are shown in Tables 1 and 2. A sample of twenty project experts was identified by management: one business stakeholder and one IT stakeholder for each project. These project experts were business users who were actively involved and knowledgeable in the project development and IT project managers who were in charge of the project. In some cases, these project experts sought information from others who they considered knowledgeable. Each pair of experts (IT and Business) provided their input on return (where 1= to a very small extent and 7= to a very large extent) and risk factors of each project (where 1= strongly agree and 7= strongly disagree) independently, during interviews.

Differences between IT and Business

After the data was collected and the differences in risk and return were calculated using equation (1), a diagram of risk-return differences (shown in Figure 1) was created to highlight the degree of shared risk-return knowledge. The diagram is based on

[1] The knowledge difference (risk or return, or both) for a project can be divided by the average for knowledge difference for all projects in the portfolio to assess this.

risk and return scores for the ten projects discussed above. The position of the bubble and its size are the primary indicators of a project's status relative to other projects in the organization. Of the ten projects in the portfolio, six (P3, P4, P5, P7, P8, and P9) have relatively high risk scores. Of these, P4 has relatively low returns. Projects with higher than average expected returns seem to have high degree of risk understanding differences between business and IT. In addition, two projects (P3 and P8) have high degree of risk and return understanding differences. Having performed this analysis, a project manager could immediately pay attention to project with high differences in risk and return and then conduct meetings with appropriate stakeholders to understand reasons for knowledge differences and see whether they can be resolved. It is important to note that discussions regarding risk differences are likely to involve business and IT personnel actively involved in project implementation, while discussions regarding returns are likely to involve a broader set of stakeholders including those who might be involved in project initiation, use of the completed system, and post- project reviews.

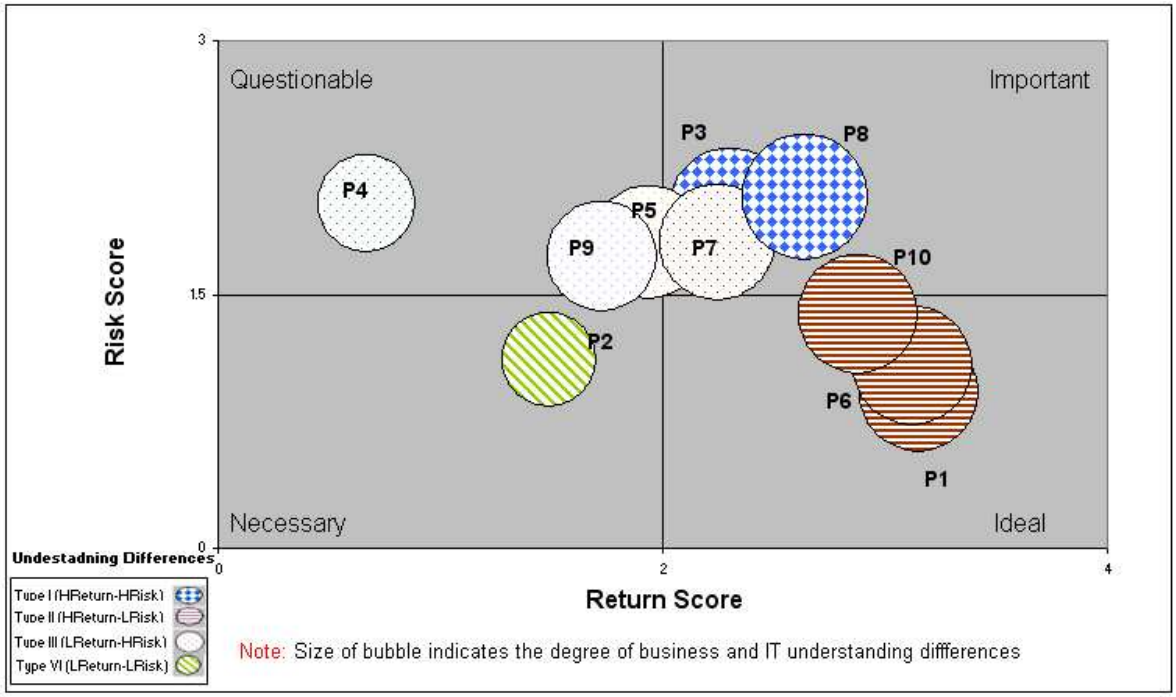

Figure 1. The Risk-Return Understanding Differences Diagram

The diagram (shown in Figure 1) is divided into four quadrants to assist project managers in their decision making process. We label these quadrants *IDEAL, IMPORTANT, NECESSARY and QUESTIONABLE*. Each quadrant has different risk-return specifications. *Ideal* projects are the best projects in the organization. They provide high return and have low risk. *Important* projects provide the organization with high return, but they also have high risk. *Necessary* projects only provide the organization with low return and have low risk. The reason for implementing such projects might be to meet some government regulations or to maintain current systems. Some project managers refer to these projects as the "necessary evil". Although these projects are, in general, low in risk, it might still be important to examine the knowledge risk and return differences. *Questionable* projects have high risk and provide only low return. These projects must be examined carefully to decide whether they are necessary for the business especially in cases where understanding differences are high. Managers could try to move such projects into one of the other quadrants by trying to reduce risk or modifying the project to enhance return. To further illustrate how a project manager can use the assessment diagram, a discussion of one important and one ideal project is presented below. Similar discussions will apply with some minor variation to projects in the questionable and necessary quadrants.

Important— (H-Return and H-Risk): P8 is a human resources system. The project has high risk and high return knowledge differences. Business and IT stakeholders disagree on several return items. For example, IT feels that the new system will enable compliance and operational planning and control, something the business doesn't seem to agree with. Similarly there is disagreement on several risk items. While the IT project manager feels that the team is not familiar with the technology,

business does not recognize this. There is a need for additional discussion between IT and business in order to reconcile expectations, if the project is to meet stakeholder expectations in terms of time, cost, or delivered functionality.

Ideal: (L-Risk and H Return): P6 provides customers with online messages regarding their accounts. The project has high returns and low risk. However, it seems to have high degree of return knowledge differences. Upon examining individual return items, it seems that the business expects the project to improve the flexibility of the infrastructure, collaboration, and the integration with other applications, while IT doesn't feel that this project will impact those three items. Hence, it is likely that even if this project was completed on time, there could be dissatisfied stakeholders during post-project reviews.

It is important to note that that the risk and return scorecards and the diagram provide a common vocabulary around which a shared understanding of project risks and returns can be built. A dialogue using this common vocabulary can help improve communication between IT project managers and business users and improve the project management process. Data regarding risk and return items which frequently have knowledge differences could serve as the basis for dialogue between business and IT and improved understanding of each others roles. In the long run, such dialogue could result in a greater degree of trust and improved relationships between business and IT. The risk and return items presented in Tables 1 and 2 could serve as the starting point for organizations to develop their own items.

MANAGERIAL IMPLICATIONS

The proposed diagram provides key project attributes in a visual format that facilitates comparison of multiple projects. The combination of the bubble size, the bubble position based on risk and return, and the degree of knowledge differences provides business and IT personnel with an easy mechanism to spot projects in need for immediate attention. Table 3 illustrates the managerial implications of relatively high risk or return knowledge differences.

Project Type	High Return Differences	High Risk Differences
Important (High Risk- High Return)	Possible problems during Review. See if returns materialize and use this knowledge for subsequent project planning. Communicate results of reviews to project sponsors.	Possible problems during project execution. More frequent reviews and discussion regarding project risk among business and IT. Update shared knowledge of project risks for future planning.
Questionable (High Risk -Low Return)	Reconsider such projects and carefully document the rationale for taking up such projects.	Increased project execution risk likely to cut into already low returns
Ideal (Low Risk -High Return)	Possible problems during Review. See if returns materialize and use this knowledge for subsequent projects	High risk differences may make the project less attractive in terms of returns
Necessary (Low Risk -Low Return)	Careful post-project review. Information regarding return differences can be useful for future project planning	Evaluate and learn from reasons for risk differences as the project progresses.

Table 3. Managerial implications of relatively high risk or return knowledge differences

The proposed methodology was presented to a group of 32 project managers at a meeting of the Project Management Institute in November 2007. In response to a questionnaire circulated after the presentation, all 32 managers either strongly

agreed (66%) or agreed (34%) that the common risk-return vocabulary and the risk-return diagram could help identify projects with communication issues and reduce communication problems.

The diagram is likely to be particularly useful in multi-project environments. The value of the diagram lies in identifying important projects with relatively large disagreement between stakeholders. Over time, careful documentation of discussions between IT and business, triggered by the use of the diagram could help identify common sources of risk and/or return disagreements and types of projects for which they are important.

The focus on risk or return knowledge differences might be different, depending on the phase that a project is in. For instance, in the early phases of the project life cycle, the project manager might be more interested in project's return factors and any understanding differences in these factors. However, later in the project's design and implementation phase the focus might be on project's risk items and any associated understanding differences. During post-project review the focus may be on understanding the relationships between risk and return. If required, the project manager can break the diagram into two: one that shows understanding differences in return and the other that shows understanding differences in risk

It is important to note that the diagram only represents a snap-shot of time. Therefore, there is a need to identify trigger points in which the data will be collected again to redraw the diagram. Redrawing the diagram at multiple points in time might be required in dynamic projects with long lead times or when there is considerable learning during the course of the project.

Project and business managers should understand that disagreement is not a bad thing. Instead, it generates a mechanism to spot problems early in the implementation process. Time spent on understanding knowledge differences is likely to pay off in terms of improved IT-business alignment.

CONCLUSION

The major objective of this paper is to outline a methodology for defining a common vocabulary around project risk and return that could improve alignment and communication between IT and business in a multi-project environment or portfolio management environment. This concurrent focus on risk as well as return, while common in other kinds of financial investments is underused in IT project evaluation. The proposed method can also be used to map the improvement in shared understanding of a project as it progresses. Risk and return factors that business and IT commonly disagree on can be identified and analyzed in order to better understand why disagreements occur. This improved understanding can then be used to improve communication in future projects.

The proposed method can serve as the first step for different types of future research. This study focuses on the perspectives of business users and IT managers directly involved in the project. It will be interesting to assess the perspectives of senior business and IT managers and uncover any differences in opinion toward the goals of the projects. Another area of future research is the relationship between risk and return understanding differences and the actual project outcome.

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