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Kailash Joshi
University of Missouri

Somendra Pant
Clarkson University

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A CLASSIFICATION FRAMEWORK TO ASSESS AND GUIDE IT INVESTMENTS

Kailash Joshi

School of Business Administration
University of Missouri
joshi@umsl.edu

Somendra Pant

School of Business
Clarkson University
pants@clarkson.edu

Abstract

Assessing the economic feasibility of IT projects remains a challenge for most organizations. On one hand there are concerns for the rising IT costs, on the other hand organizations may lose significantly if they do not make an appropriate investment in IT. Considering the range of IT projects, a single, standardized capital budgeting approach may not serve the best interests of organizations. This research presents a classification of IT projects along a discretionary - mandatory dimension into four types: purely discretionary, mainly discretionary, mainly mandatory, and purely mandatory. A set of factors are identified that may influence the final classification of an IT project into one of the four types. This classification is used to arrive at suitable IT evaluation techniques and methods.

Keywords: IT evaluation, information systems, IT investment, IS strategy, IS policy, IS project, project management, feasibility analysis

Introduction

Information technology (IT) presents major opportunities and challenges to organizations in today's turbulent and globally competitive environment. In a survey of 213 CEOs, A. T. Kearney reported that IT related issues top the CEO agenda, ahead of issues such as product quality, quality staff, and customer orientation (Kearny, 1998). While it is generally agreed that IT investments are beneficial to an organization, evaluating and measuring the contribution of IT to the bottom line can be difficult. A Computerworld survey of CIOs also reports that in the years to come, business executives will force IT management to pay even greater attention to the value IT brings to the business. Similarly, findings of IT research firms like Gartner and Meta Group Inc. and other authors suggest that IT departments will have to more clearly demonstrate how their investments impact both the organization and its customers (Wagle, 1998, Saia, 1999). Consequently, IT evaluation and project feasibility analysis has been a major theme of IS research (Ragiwsky, 1996, Santos, 1991, Bacon, 1992, Clemons, 1991, Schell, 1986, Shank, 1992, Ranta, 1990, Willcocks, 1992, Bennett, 1987, Riel, 1998, Kaplan, 1986).

Some firms follow a well-defined, quantitative evaluation approach for all IT projects. However, this approach may lead to a significant but unnecessary expenditure of resources. In many cases, MIS and user departments are forced to resort to creative estimates to get needed project approved. As all projects are handled through a standard capital budgeting procedure that is generally focused on detailed quantitative analysis, much effort is spent on cost and benefit estimates even for projects that must be approved irrespective of the financial numbers involved.

In this research we propose a classification scheme for identifying the degree of discretion that an organization may have in implementing an IT project. This analysis can be used to classify IT projects, and to determine appropriate evaluation processes and to make the resulting evaluation more efficient, streamlined, and accurate.

A Typology of IT Projects on Discretionary vs. Mandatory Dimension

One important aspect of IT projects is the degree of choice available to the organization in undertaking a project. However, the importance of this dimension has not been fully recognized in the information systems literature. Many IT projects may be totally mandatory due to technical, legal, regulatory, or other issues related to the business environment. In considering such projects for execution, organizations have little choice or discretion. On the other hand, there are projects that are fully discretionary and an organization can choose whether or not to undertake them, as well as choose a timeframe for their execution. Thus a classification of IT projects based on the degree of discretion may be useful for evaluating them. We propose a classification of IT projects along the discretionary - mandatory dimension, into the four categories outlined below.

Purely Mandatory Projects

When IT projects are purely mandatory (PM), or non-discretionary in nature, too much effort on detailed economic analysis may not be warranted or be very helpful in arriving at the investment decision. Examples include regulatory requirements for a power plant, compliance with internal revenue service (IRS) guidelines, and in fulfilling recommendations of external auditors, and infrastructure projects like network links, backup and recovery.

Mainly Mandatory Projects

In the case of mainly mandatory (MM) projects, organizations may have some choice, yet there are overwhelming factors those demand implementations of these projects. Some of these projects may even represent investments that may be too good to pass by and for which a classical financial analysis would not give an accurate picture. Some of these investments may also have no immediate payoff, but they provide future options to the organization by creating a marketing presence or by giving them some technological competencies. Examples include some infrastructure investments like database software, software upgrades, Electronic Data Interchange (EDI) linkages, and network enhancements. These IT projects have to be undertaken, but an organization may be able to postpone them for some length of time.

Purely Discretionary Projects

There may be projects that are considered purely discretionary (PD). In such cases organizations have complete flexibility in undertaking these projects as well as in choosing the timeframe for their execution. Examples include conversion of applications from one platform to another, application downsizing and office productivity enhancement tools such as pooled scheduling, calendar. These projects will be undertaken if they are justified on economic grounds and can be postponed indefinitely or dropped altogether if not economically attractive.

Mainly Discretionary Projects

Some projects may be considered to be mainly discretionary (MD) in nature, with some factors other than purely economic issues affecting their choice. These projects may relate to frontline technical developments and industry trends that are not always necessary for a firm to emulate. A good example in this category is that of enterprise resource planning (ERP) systems. Adoption of ERP systems is mainly discretionary for most organizations, although such adoption by major competitors and other players in the industry creates a push for their implementation by a firm. Such projects can be postponed indefinitely or for a significant length of time.

The placement of IT projects along the PD-PM (purely discretionary – purely mandatory) dimension on the basis of the four level classification presented above can be a useful step for organizations in evaluating their IT projects. Such placement provides an opportunity to consider and analyze a range of project related issues for arriving at an appropriate classification of the project.

Factors That May Influence Placement of IT Projects along PD-PM Dimension

Technical Factors

There are many trends and developments in technology that force organizations to consider and undertake new IT projects. Consideration of such trends and developments can be helpful in the placement of a project along the PD-PM scale. Technical developments such as software upgrades, development of relational databases, application downsizing, movement towards client-server architecture, development of Java and thin clients (network computers), distributed processing, GUI interfaces, and trends in programming languages and operating systems (e.g., shifts from mainframes to Unix, and from Unix to Windows 2000) present organizations with new decisions and different degrees of choice.

Functional Requirements

Many functional requirements of the business also push IT projects toward the mandatory status to different degrees. For example, the adoption of euro currency by the European Union has made it mandatory for organizations that deal in European currencies to undertake projects to upgrade their systems. Similarly, for major suppliers of a large organization that transacts business largely through EDI, related EDI projects can be purely mandatory. While other organizations that operate in industries with predominant use of EDI, such projects become mainly mandatory.

Relationship of IS Plan and Objectives to Business Strategy

An organization's business strategy plays a crucial role in determining the criticality of its IT projects. Several different contexts are possible. For example, the organization may have a strategy of leading the market with the help of innovative new technology-based business approaches. In such cases IT projects need to be evaluated jointly with the business strategy for their economic viability. Once the overall strategy is decided upon and accepted for execution, evaluation of individual IT projects directly related to the strategy may become mandatory in line with a firm's business plan. Thus IT projects can be examined on the basis of their criticality to meet key IS plan objectives. This can make some projects mainly or purely mandatory.

Competitors' Actions and Industry Trends

Some organizations may find themselves in a catch-up mode to match the offerings provided by their competitors. Such organizations do not lead with information technology, but follow the trend set up by early adopters of IT. This factor may push the related IT projects from discretionary towards mandatory status.

Time Frame for Project Completion

The time frame required for completing an IT project can also influence the placement of the project on the PD-PM scale. When there is no pressing time limit, projects can be considered to be discretionary because the flexibility of the timeframe can permit organizations to postpone the project and match its implementation to the availability of internal funds. Thus projects that have a relaxed timeframe can be classified as mainly discretionary. However, when there is a strict time limit for completing a project, then the project becomes mandatory. Some IT projects move from the discretionary to the mandatory end of the scale over time.

Government, Regulatory, Contractual, and Legal Requirements

In several industries, there are regulations and government requirements for systems and reporting that makes certain IT projects mandatory. Similarly, there may be requirements for reporting environmental data, tax and accounting data, employment data, cost and production data to meet federal, state, or local government regulations, contractual obligations (e.g., defense), and conditions imposed by auditors. These requirements make the related projects purely mandatory.

A Framework for Evaluating IT Project Investments

Once a project has been placed on the PD-PM scale, it may be possible to identify suitable evaluation methods. Clearly, projects that are considered purely discretionary should withstand a higher standard of approval. Hard data about costs and benefits should be used to justify these projects. Purely discretionary projects also have flexibility in terms of the timing of their execution. Therefore, an organization may decide to postpone the project until resources are available to undertake it. For purely discretionary projects, evaluation techniques like payback period, internal rate of return, and net present value analysis seem to be appropriate. Such IT projects should compete with other investment opportunities available to the organization. Thus, even if a project has favorable net present value, it may not be undertaken if other more rewarding and less risky non-IT projects are available to the organization.

For projects that are mainly discretionary, it may be necessary to bring in additional methods of analysis when the quantitative methods do not yield a favorable evaluation. Methods based on the analysis of non-tangible benefits and overall value, for example value analysis and information economics, may be suggested for such projects. In considering such projects, it may be helpful to study technology forecasts, industry trends, and experiences of companies that have implemented similar IT projects.

When projects become purely mandatory, organizations have no choice in accepting them; these projects have to be given the top priority. In some instances, there may be some flexibility in terms of a timeframe for the execution of projects, which may permit an organization to spread the project over two or more budget cycles. For purely mandatory projects, organizations should avoid spending too much time and effort in the evaluation process as such resources may be better spent on developing cost effective alternative approaches to meet the project requirements. Where sufficient internal funds cannot be directed to the project, alternative sources of external funds should be explored. For projects that are mainly mandatory, most of the analysis requirements noted above should apply.

Conclusions and Discussion

This research presents a classification framework to assess and guide IT investments. It suggests an alternative approach to the traditional, standardized quantitative analysis of all IT projects. The classification framework proposed in the research focuses on analyzing relevant factors and using them to classify an IT project based on a discretionary – mandatory scale in the first stage. Subsequently, appropriate analyses are suggested based on the initial classification of the IT project. Such analyses may also include rigorous, quantitative financial analysis where warranted. Thus the framework presents a streamlined IT evaluation process that uses a customized analysis for each project type and has the potential to be more efficient and accurate.

The framework is based on an analysis of the IS literature and a study of IT project evaluation practices and related problems encountered in the industry. This information was obtained through interviews with several executives involved in evaluating investments in information technology.

Problem of IT investment decision remains complex due to several organizational factors, including a lack of IT knowledge among senior management. Therefore, IT evaluation processes and methods need to appeal not only to information systems managers but should also to other senior management of a company. Our framework is expected to provide a simple yet powerful means of analysis as it gives decision makers an opportunity to consider a range of issues pertinent to IT investment decisions before embarking upon detailed, time consuming financial analysis of IT projects.

Future research would focus on the validation of the framework and consider possible refinements. It may also be interesting to examine and classify different IT projects undertaken by different organizations and the actual evaluation/decision processes employed. Since top management plays a key role in the final approval of IT projects, future research would also examine the degree to which different IT project evaluation methods are viewed to be logically convincing by senior management. The evaluation process proposed in this research can also be compared with other evaluation methods to examine its effectiveness in arriving at the correct investment decision.

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