Prioritizing IT Projects: An Empirical Application of an IT Investment Model

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ABSTRACT

Information Technology projects are organizational investments that anticipate positive returns. When viewed as such, the development of a diversified "portfolio" of projects helps reduce risk from a single project failure, and results in an overall positive return. Positive returns on IT projects are usually indirect, since they have value only insomuch as they enable the accomplishment of larger organizational goals. We present here a model that integrates elements of risk, cost, and internal rate of return that can be applied to individual IT projects. The model produces a numerical score that can be used to rank potential IT projects. Projects with higher scores return more value to the organization, and therefore should be given a higher priority. We apply the model using the IT project portfolio of a large state-charterd credit union. The results indicated that the credit union was prioritizing projects with more visibility but lower returns that other projects with less visibility but that offered greater returns. The implications of applying the model in other organizational settings are discussed.

INTRODUCTION

Organizational leaders have a multitude of factors to consider when prioritizing IT projects. There are a variety of potential tools for project prioritization, however, when leaders must decide which technology investments to allocate funding to it can be difficult to decide what factors are the most important. Organization leaders should include fiscal responsibility, strategic direction, and resource availability when prioritizing projects. Net present value (NPV), internal rate of return (IRR), return on investment (ROI), and other measurement tools are useful, but used separately, provide incomplete answers. When a variety of measurement tools are combined, a more complete measure of value can determined.

In this research we consider information technology projects as investments that an organization makes with expected positive rates of return. This philosophy is not new (Applegate, McFarland, & MCKenney, 1996). We combine NPV, IRR and RIO formulas into a single investment model that can be used to evaluate the expected return from an IT project. When applied to all of the potential projects that an organization might initiate, it produces a numerical score that can be used to rank IT projects.

We have applied our model to the IT portfolio of a large credit union and compared the results to current priority rankings. We discovered that before the model was applied, projects tended to be prioritized by management visibility and knowledge, rather than by less-biased measures of potential returns. Management acceptance of the model seems high, and some projects that were originally slated for completion this year have been postponed or cancelled in favor of projects with greater or more immediate returns.

LITERATURE

Information Technology plays an important role in almost every business enterprise. In the early days of business computing, managers had to decide whether a certain process should be "automated" or not. Today, the question isn't so much whether a process should use information technology as to how information technology can be appropriated use for that process. (Stallings, 2001) refers to this problem of "too many choices" as the "manager's dilemma". Traditional investment models are of limited help in making these decisions, because of the difficulty in quantifying the benefits of technology innovation since the benefits may provide "non-traditional" sources of value (Brynjolfson, 1993) (Ives, 1994). As information technologies become more widely recognized as a "strategic necessity", management decision-making has increasingly focused on choosing information technologies that "align" with overall corporate strategy. These strategic perspectives often fall short of being able to quantify the contribution that a specific information technology will make to organization goals (Boar, 2001) (Cassidy, 1998). (Ahituv, Neumann, & Riley, 1994) state that most of the criteria for prioritizing IT projects are probably intangible. Alternatively, (Applegate et al., 1996) suggests that information technologies are investments just like any other capital expenditure, and that they have costs and expected rates of return. They suggest that an organization's IT projects should be considered as an investment "portfolio" that balances risk and rates of return. Businesses use a variety of formulaic techniques for justifying capital expenditures. Return on Investment (ROI), Internal Rate of Return and Discounted Cash Flow / Net Present Value are some of the most common methods used (Cassidy, 1998). We suggest that both the strategic and investment perspectives must be considered when deciding the priority to give different IT projects. This paper summarizes our work to develop a financial costing model that integrates both strategy and investment values to produce a quantitative ranking of IT projects by overall expected contribution to business goals.

MODEL DEVELOPMENT

The model used to prioritize information technology projects is called the Credit Union Return on Technology (CURT) model, since it was developed to consider those factors most important to a credit union's business model. This model is designed to prioritize the information technology projects within the organization's information technology "portfolio." The result of applying the model to a given information technology project is a number. The higher the CURT number, the higher overall return that the project has to the credit union. In this context, the term "return" has a broader definition than the typical monetary return that is most commonly discussed. "Return" is described as having positive impact in three distinct areas: Financial, Strategic, and Resourcefulness. Except for situations where the project is being driven by emergency and/or regulatory compliance, the higher CURT number projects should be performed first to unleash the largest positive impact to the organization.

Figure 1: CURT Model

$$\text{CURT} = \frac{(IRR - Discount\ \ Rate) + (Emphasis\ \ /100)^{Payback\ Period}}{\sqrt{(Time \times Labor)}\ /100}$$

CURT	Credit Union Return on Technology
IRR	Internal Rate of Return
Discount Rate	Weighted average loan interest rate subtracting the Cost of Funds
Emphasis	One of three whole numbers that add up to 100. Projects may have one and only one "Emphasis." The "Emphasis" that a project receives is chosen by the Senior Management Team.
Payback Period	The number of years required to cover a project's cost.
Time	The length of time that the project will necessitate Technology resources. This is measured in weeks.
Labor	The quantity of Technology full-time equivalent (FTE) staff that will be utilized during the project.

Numerator

The top portion of the formula is comprised of two halves. These halves are the Financial and Strategic portions.

The Financial portion is the Internal Rate of Return (IRR) for a particular project subtracted by the Discount Rate for the credit union. The IRR is calculated by using the standard accounting practice of forcing the net present value of a give project to equal zero (Meredith, 2003). The Discount Rate is determined by obtaining the highest opportunity cost (FinAid, 2003) which in this case would be the weighted average loan interest rate (7.40%), minus the Cost of Funds, which is currently 2.01% for Orange County's Credit Union according to the 5300 Report (NCUA, 2003). Other measures might well have been used, such as ROI, PV, NPV, etc., however, neither of those tools had an accurate enough depiction of the monetary impact that technology projects have on the organization. When using any one of these tools by themselves, it is difficult to determine the scope of the project (CIOview, 2003).

As the financial factor increases, the potential for higher revenue increases. This is the measurement of the actual monetary impact the project has on the credit union.

The Strategic portion of the formula is comprised of two characteristics: emphasis and payback period. The "emphasis" is one of three areas of concentration that the senior management team

determines during the strategic planning session at the beginning of the year. According to (Chapman, 2003), the three possible emphases that all credit union information technology projects can have are member service, infrastructure, and internal efficiencies. During the strategic planning session the senior management team will determine what weight each emphasis will have. When all three emphases are combines, the total number should equal 100. Essentially, they are stating how much focus the organization should have on each of the emphases. It does not mean that at the end of the year the organization will have preformed exactly to that specification; it is merely a target goal. For example, member service = 35, infrastructure = 10, and internal efficiencies = 55. This would mean that, strategically, the senior management of the organization desires a greater focus on internal efficiencies for the upcoming year and very little on infrastructure building. This number can be thought of as a percentage; however, for the purposes of the model, until it is divided by 100, it is not. The "emphasis" divided by 100 is brought to a power of "payback period." "Payback period" is defined as the duration of time, measured in years, which it takes to receive back the dollars invested (CIOview, 2003).

The strategic factor will remain high if the emphasis is high and the payback period is quick. If the payback period is long, the emphasis becomes weaker. This is due to the fact that senior management would like to implement projects with the correct emphasis that quickly reimburses their investment.

Denominator

The bottom half of the equation covers the resource factor. It is simply "Time" multiplied by "Labor," squared, and then divided by 100. "Time" is a measurement of how many actual working weeks it will take to complete a project. "Labor" is the quantity of full-time equivalent (FTE) technology staff needed to complete the project.

Due to the fact that time and labor are usually quite limited in the technology arena, the Resource factor weighs heavily on the overall model. As the amount of time that is fully dedicated to a given project increase, the CURT number will decrease. This is also true with labor. As the number of technology FTEs dedicated to a given project increases, the CURT number decreases.

CREDIT UNION CASE STUDY

The table below is a matrix displaying twelve projects of the information technology investment portfolio for Orange County's Credit Union (Figure 2).

Figure 2: Information Technology Investment Portfolio

PROJECT NAME	CURT	RISK	ROI	NPV	IRR	TIME TO IMPLEMENT	COST	ORIG PRI
RPL AND FEE	197.82	11.00	437%	$134,695.78	151.00%	1.00	$40,000	8
LENDING SYSTEM	127.25	12.00	781%	$2,053,710.26	284.00%	8.00	$301,500	2

SMALL BUSINESS	39.25	8.00	210%	$77,040.12	58.00%	4.00	$70,000	5
XP2 PHASE II	17.63	5.00	201%	$342,212.54	53.80%	9.00	$340,000	10
NEW BRANCH	83.47	7.00	552%	$271,340.60	196.00%	9.00	$60,000	7
WEBTALC	130.39	2.00	541%	$22,034.69	192.00%	4.00	$5,000	1
NEW ARS	24.82	9.00	182%	$114,210.29	45.24%	6.00	$140,000	12
PHONE SYSTEM	25.70	6.00	185%	$386,507.33	46.78%	6.00	$455,000	11
INTERNET REDESIGN	48.10	10.00	518%	$83,613.82	183.19%	24.00	$20,000	9
REFERRAL TRACKING/CONTACTS	102.55	3.00	519%	$502,213.42	183.37%	6.00	$120,000	3
SAN/BACKUP SYSTEM	3.34	1.00	121%	$33,748.58	16.37%	12.00	$160,000	6
MCIF SYSTEM	131.00	4.00	639%	$562,943.78	229.65%	4.00	$104,500	4
AVERAGES	77.61	6.50	407%	$382,022.60	136.62%	7.75	$151,333	

CURT Model

During each Annual Strategic Planning Session of Orange County's Credit Union, the Senior Management Team and Board of Directors decides how much emphasis should be placed in each of the critical technology project areas for the upcoming year: Member Service, Infrastructure, and Internal Efficiencies. Once that is determined the CURT model is updated to reflect that strategic direction. Understanding that the 2003 numbers will be finalized during the July 2003 Assets and Liability Committee Meeting, the following percentages were used: Member Service: 35%, Infrastructure: 10%, Internal Efficiencies: 55%.

Before projects are scheduled for the year, the Vice President of Technology ensures all projects have been properly submitted using the "Technology Project Proposal" form. The Technology Management Team assists each project owner in order to properly fill out the necessary fields so that the model will generate an accurate CURT number. It is understood that project requests will occur throughout the year and the Technology Management Team must remain flexible for these changes. The "Technology Project Proposal" is required to be filled out prior to adding any project that requires greater than a $10,000 Credit Union investment and/or takes one or more weeks to complete by at least one member of the Technology Team.

Orange County's Credit Union's Vice President of Technology will coordinate the annual updates of the Technology Plan, which will be reviewed and approved by the Technology Committee and Board of Directors.

The twelve projects in listed in Figure 2 above were input into the CURT Model and have generated reasonable numbers (Figure 3). In addition to the CURT Model, compliance and necessity issues were also reviewed. The project implementation risk, return on investment (ROI), net present value (NPV), internal rate of return (IRR), and the time to implement were also considerations when coming up with a correct prioritization for 2003-2004.

Figure 3: IT Portfolio Ranked by CURT Numbers

PROJECT	CURT
RPL AND FEE RESTRUCTURE	197.82
NEW MCIF SYSTEM	131.00
WEBTALC	130.39
NEW LENDING SYSTEM	127.25
REFERRAL TRACKING AND CONTACTS	102.55
NEW BRANCH	83.47
INTERNET REDESIGN	48.10
SMALL BUSINESS PRODUCTS/SERVICES	39.25
NEW PHONE SYSTEM	25.70
NEW ARS	24.82
XP2 PHASE II	17.63
SAN AND BACKUP SYSTEM	3.34

Even though this plan only covers twelve out of forty-seven projects originally scheduled for 2003, all of the projects that were evaluated have been reprioritized because of the findings. The additional projects will have to be reviewed and input into the model as soon as possible. The Relationship Pricing Level and Fee Restructure project will be occurring in June 2003. The MCIF Project will also be completing in June. The Lending System project will start in June to be carried into July. These projects were initially scheduled for the fourth quarter of 2003, however, because they have higher CURT numbers, shorter implementation times, higher ROI, and higher IRR. It is noted that two of the projects also are the two highest risk projects; however, the estimated return warrants this prioritization. Conversely, the Phone System project, New Automated Response System Project, and XP2 Phase II were scheduled for this year and now must wait until 2004 due to the fact that they have low CURT numbers, low ROI, and low IRR, with medium risk.

The CURT Model incorporates resource requirements within the model. It is, however, necessary for the project owner and technology leader to communicate well during the information technology planning period so that accurate resource requirements are depicted in the model. The initial inputs for the resources were listed on the "Technology Project Proposal" form in and transferred to the CURT Model for final compilation.

SUMMARY

While more complex models might be developed, we believe the CURT model is simple enough to be applied by most business professionals, yet considers a variety of factors necessary to accurately evaluate the business value of IT projects. Management acceptance of any evaluation methodology is important, and we have found that the CURT model is credible and broadly understandable within a financial organization. We believe the model is easily adaptable to other business settings simply by manipulating the inputs. The model has also given the CIO a vehicle for discussing the value of each IT expenditure in terms readily understandable by management within the credit union. We believe the use of tools such as the CURT model can improve the value that organizations derive from their IT investments and allow them to more readily achieve the goals of their stakeholders.

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