THE PROJECT SELECTION BIAS
AGAINST
MANAGEMENT SUPPORT SYSTEMS

Robert M. Alloway
Mark J. J. Jonikus

September 1982

CISR WP #97
Sloan WP #1380 - 82

Center for Information Systems Research
Massachusetts Institute of Technology
Sloan School of Management
77 Massachusetts Avenue
Cambridge, Massachusetts, 02139
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INTRODUCTION

Information systems are now crucial to most business functions, not only at the operational level but also in helping managers to compete effectively and efficiently in the market place. Consequently, companies are faced with the problem that demand for new computer-based information systems greatly exceeds the systems development capacity of their I/S department. This underlines the importance of the project selection procedures which should allocate scarce systems development resources in a manner that will provide the best leverage for the company’s objectives.

How do most companies discriminate between different project requests? More importantly, does the project approval process work effectively? The answer, according to the research results discussed herein, is mixed.

The current project approval methods were developed alongside the evolution of traditional transaction processing systems and are thus most appropriate for evaluating those specific system types. We will argue that the typical project evaluation process is not valid when it comes to assessing systems whose main purpose is to support managerial decision-making. Applying current project approval methods to management support systems can eliminate potentially valuable systems, accept systems of little value, or worse -- prevent them from even being proposed.

Management support systems need a separate evaluation procedure. The type of system under consideration should be determined at an early stage and the evaluation process suitable for that particular system type should be followed. Use of the appropriate evaluation process will do much to satisfy current demand for new systems while an inappropriate process will be an impediment to the successful evolution of the I/S function.

This paper starts with a review of current user demand for systems. This will reveal that although management support systems are generally recognized as being especially appropriate to managers’ most important tasks, the number of these systems being developed does not match their increased demand.

Then we focus on the current project approval process. On the basis of a survey carried out among user managers, the relative importance of various criteria in project proposals is discussed. This survey also enables us to understand how managers judge the budget and schedule estimates presented in project proposals. Additionally, it shows managers’ perceptions of the different factors regarded as important in project approval and of the influence carried by various managers in this process.

On the basis of this evidence we present a critique of the current project approval process. Transaction processing and managerial support systems are fundamentally different in their justifications. Incremental modifications to tighten-up the current process miss the point altogether. Our recommended dual-track process insures effective evaluation of all system types. This new approach to project approval should also prove useful in the evaluation processes associated with further developments of computer-based applications such as CAD/CAM and office automation.

* The authors would like to express their thanks to Judith Quillard for her constructive comments. Part of the data used in this paper was presented by Hong-Kien Ong in an unpublished MIT Master’s thesis supervised by Dr. Robert M. Alloway.
TRENDS IN THE DEMAND FOR NEW SYSTEMS

We will first look at the nature of the demand for new computer-based information systems in a number of typical industrial companies. The data comes from an extensive questionnaire, the User Needs Survey (UNS), administered to 1058 user and I/S managers in nineteen companies. A more exhaustive analysis of user needs based on this survey is presented in Alloway (1, 2, 3 and 4) but we would like to select certain points to emphasize the project selection issues.

For the purpose of this study systems were divided into four types - monitor, exception, inquiry and analysis. These are defined in Figure 1. The first two types, monitor and exception, are often referred to as transaction processing systems (TPS). These are often the "life-blood" of the company -- of prime importance at the operational level. Examples are accounts receivable/payable, inventory, order entry and purchasing. These systems capture, store, manipulate and report large volumes of structured data. Collectively they constituted eighty percent of all installed systems in our sample.

Inquiry and analysis systems are often referred to as management support systems (MSS). These are usually interactive systems whose purpose is to support the effectiveness and productivity of managers and professionals. Such systems need to be flexible and under the user's direct control, i.e., the user determines the output contents of an inquiry or the analytical sequence of analysis systems. Another characteristic worth noting is their evolutionary nature. Users request new functionality on the basis of their increased understanding of the decision itself gained, in-part through the use of the system. For this reason it is not always easy to define the scope of an MSS project in the proposal stage. Typical examples are cash flow projections, dynamic production scheduling, and sales forecasting.

In the companies studied the overall demand for new systems was 274% larger than I/S's capacity to supply. This level of demand is unlikely to be met in the near future, either by attempts at increased programmer productivity or by incremental increases to the new systems development budget. This inability to meet user demand stresses the importance of determining which systems should be developed and therefore the importance of a suitable method of assigning priorities for system development.

The structure of demand by system type offers further insights. Figure 2 shows that only 37% of total demand can be supplied. However, looking at demand by system type, we see that monitor and exception systems (TPS) have a materially better supply/demand ratio than do inquiry and analysis systems (MSS). Monitor and exception systems had 52% and 47% of demand satisfied while inquiry and analysis systems had only 33% and 19% respectively. Considering the disproportionately low percentage of demand for analysis systems being supplied, does this imply a consistent bias against the approval of these types of projects?

If true, the seriousness of such a bias is apparent from a look at a measure of the importance of the different system types to managers. Figure 3 shows how the four system types were rated for being relevant and appropriate to managers' most important tasks. For example, the 144 Analysis systems represent only 10% of the systems frequently used by managers, however, fully 83% of these systems are relevant and appropriate for those managers' most important tasks and decisions. Conversely, 908 monitor systems are frequently used by managers, whereas, only 36% of them are considered both relevant and appropriate to managers' most important tasks. This dramatic contrast, 83% versus 36%, has resulted in the equally dramatic shift in user demand reflected in Figure 4.
DEFINITIONS OF SYSTEMS TYPES

COMPUTER-BASED INFORMATION SYSTEMS

CBIS

TRANSACTION PROCESSING

TPS

MONITOR

EXCEPTION

MANAGEMENT SUPPORT

MSS

INQUIRY

ANALYSIS

SHORT NAME | DESCRIPTION OF I/S SYSTEMS TYPES
---|---
MONITOR | THE SYSTEM MONITORS DAILY DETAIL TRANSACTION ACTIVITY PRODUCING STANDARD REPORTS ON A FIXED SCHEDULE (DAILY, WEEKLY, AND/OR MONTHLY).
EXCEPTION | THE SYSTEM PROCESSES DAILY DETAIL TRANSACTION ACTIVITY BUT PRODUCES EXCEPTION REPORTS WHERE THE DEFINITION OF THE EXCEPTION CONDITIONS ARE FIXED.
INQUIRY | THE SYSTEM PROVIDES A DATABASE WITH FLEXIBLE INQUIRY CAPABILITY ENABLING MANAGERS TO DESIGN AND CHANGE THEIR OWN MONITORING AND EXCEPTION REPORTS.
ANALYSIS | THE SYSTEM PROVIDES POWERFUL DATA ANALYSIS CAPABILITIES (MODELING, SIMULATION, OPTIMIZATION, OR STATISTICAL Routines) AND THE APPROPRIATE DATABASE TO SUPPORT MANAGERIAL DECISION MAKING.

Figure 1. Definitions of Systems Types

TRENDS IN THE DEMAND FOR NEW SYSTEMS
TRENDS IN THE DEMAND FOR NEW SYSTEMS

Figure 2. Systems Supply and Demand by Type

52% 47% 33% 19%
PERCENT SUPPLY/DEMAND RATIOS BY TYPE
TOTAL SUPPLY/DEMAND (557/1524) = 37%

CISR 13 INDUSTRIALS
(C) DR. R.M. ALLOWAY 1982
Figure 3. Relevant and Appropriate Systems by Type
TOTAL DEMAND GROWTH RATE = 274%

CISR 13 INDUSTRIALS
(C) DR. R.M. ALLOWAY 1982

Figure 4. Demand Growth Rate by Type
To summarize, the level of demand for new systems is substantially greater than the available systems development capacity. The demand mix by system type has also changed, with a significant increase in the demand for MSS. Yet, in spite of this, a dramatically smaller percentage of MSS systems are being developed (19%) than would be suggested by the relevance and appropriateness of MSS to users' most important needs (83%).\(^1\) We suspect that only a systematic, ingrained bias against MSS projects would have been able to produce such an anomaly in modern business.

\(^1\) (For an indepth discussion of user managers' systems needs, see Alloway (2).)
PROJECT INITIATION WITHIN THE PROJECT LIFE CYCLE

The previous section discussed the serious mismatch between managerial needs and available systems which are both relevant and appropriate. A significant imbalance between supply and demand by systems type is the result. But, what is the cause? We contend that the project selection process is biased against approving MSS proposals. This section discusses the steps in the project initiation stage to determine key managerial decision points which explain where biases may affect the project approval decision.

The complexities associated with systems development have prompted numerous methodologies and models (5,6). These conceptualizations are the result of questions raised by first and second generation systems projects. Most of this literature has emphasized the design and programming phases as these are the most readily perceived areas of budget overruns. The postulated ideal has been a plan of the phases in a project's life, accurately predicting their duration and resource requirements. The project initiation process, that is, the very real and critical activities which precede project selection and funding, has been largely ignored. This is a surprisingly important omission considering the financial implications of selecting the wrong projects, implemented but irrelevant systems, and outright project failure. Even more damaging are the promised benefits which are not realized; the alternative investment opportunities which are lost; and the misappropriation of management time and attention.

Why has so little emphasis been placed on the project initiation stage? Because, it is generally assumed that the "right answer" is already known: that project selection should be based solely on hard cost/benefit analysis. As we shall see later, this perception is shared by a majority of the respondents to the User Needs Survey. The belief is that each project can be reduced to a calculation of discounted cash flows, return on investment, or pay-back. We will later examine the validity of this assumption.

We will use a model of the project life-cycle defined in Alloway (7). The steps involved in the initiation stage are summarized in Figure 5. The process starts with opportunities generated by changes within the organizational context or in its relevant external domain. Successful informal or formal search results in a recognized felt need. Innovative insight combines a potentially feasible solution with a felt need to create an embryonic task. These tasks have to be sold informally within the user department and to the I/S department which will be asked to participate in preparing the proposal. Only a small proportion of the opportunities (represented by the wavy lines) ever become proposals involving computer-based information systems.

Proposal preparation is a small project in its own right requiring a certain amount of resource allocation. To activate this process, task planning and some ground-work needs to be done by managers with a vested interest in the outcome. Only if the ideas behind the project can be sold (without a proposal) will the investment in proposal preparation actually be made. The proposal work thereafter is divided between the I/S department which assesses the technical feasibility and estimates the development costs, and the user department which estimates the benefits. This preliminary conceptualization of the system, its functionality and design, and the cost/benefit estimates constitute the project proposal which is evaluated during project selection. The proposal is usually incomplete and incorrect; patched together by user and I/S managers with ambiguous objectives, other full-time responsibilities, and an understandable motivation to "cook-the-numbers" until the project promises the required financial return. The project approval committee, however, has dozens
Figure 5. Project Initiation Stage of the Project Life Cycle
of projects to evaluate and compare, and its knowledge of each is usually limited to the contents of the proposal itself.
The User Needs Survey asked managers about the required contents of project proposals in their companies—what topics must be included. Managers rated 15 potential topics on a scale from desirable to required. These topics are listed in Figure 6 in descending sequence of their average ratings on the seven-point scale. The top four topics are definitely required in project proposals. The middle seven are very desirable but not always present. And, given the realities of too many issues and too little time, the bottom four are seldom actually included in proposals, although they would be desirable.

There is a strong pattern in the ratings of these topics which favors "hard measures" over "soft issues". Figure 7 groups these topics into four categories based on "hard" versus "soft" and technical versus economic considerations. As illustrated in the accompanying bar chart, "hard measures" of economic issues dominate the current requirements for proposal contents. "Hard" technical topics follow closely, whereas, all "soft" topics fall below average. "Soft" economic topics rate so low as to be practically excluded from the proposal preparation process.

Thus the consensus is that proposals do emphasise "hard" economic topics over "soft" economic topics. However, few managers would argue that soft economic benefits (topic K) are not important in many, if not most, application systems. Organizational change planning (N) is commonly accepted as important for successful systems development and implementation (O). Ignoring clerical job enrichment (M) carries hidden costs in terms of job turnover, training, morale and resistance to change (see Markus [8]).

Why then are such "soft" topics not required in project proposals? We contend it is simply because they are difficult to quantify. "Hard" and "soft" are really inappropriate terms—it should be "easier" and "difficult" to quantify. Note especially, that the "hard" topics are more appropriate for evaluating TPS and that "soft" economic topics dominate the justification for MSS. Nonetheless, the majority of effort in proposal preparation is spent in building up arguments on seemingly objective, quantifiable criteria, because the proposal will appear more authoritative and defensible when it is backed by figures promising a good financial return.
## Proposal Contents, Ratings by Criteria

<table>
<thead>
<tr>
<th>Rank</th>
<th>Rating</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.33</td>
<td>J. 'Hard' Benefits</td>
</tr>
<tr>
<td>2</td>
<td>5.11</td>
<td>F. I/S Development Costs</td>
</tr>
<tr>
<td>3</td>
<td>5.11</td>
<td>A. Technical Feasibility</td>
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<td>5.03</td>
<td>L. Impact on Users</td>
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<td>5</td>
<td>4.84</td>
<td>H. I/S Operating Costs</td>
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<td>6</td>
<td>4.81</td>
<td>C. User Development Costs</td>
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<td>7</td>
<td>4.75</td>
<td>I. User Operating Costs</td>
</tr>
<tr>
<td>8</td>
<td>4.68</td>
<td>O. Implementation Planning</td>
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<tr>
<td>9</td>
<td>4.65</td>
<td>C. I/S Staffing</td>
</tr>
<tr>
<td>10</td>
<td>4.60</td>
<td>E. Project Design</td>
</tr>
<tr>
<td>11</td>
<td>4.60</td>
<td>D. Operations and Hardware Impact</td>
</tr>
<tr>
<td>12</td>
<td>4.47</td>
<td>K. 'Soft' Benefits</td>
</tr>
<tr>
<td>13</td>
<td>4.14</td>
<td>B. Software Feasibility</td>
</tr>
<tr>
<td>14</td>
<td>3.96</td>
<td>N. Organizational Change Planning</td>
</tr>
<tr>
<td>15</td>
<td>3.46</td>
<td>M. Clerical Job Enrichment</td>
</tr>
</tbody>
</table>

**Hard, Technical Criteria:** A, D  
**Hard, Economic Criteria:** F, G, H, I, J  
**Soft, Technical Criteria:** B, C, E  
**Soft, Economic Criteria:** K, L, M, N, O

Figure 6. Proposal Contents, Ratings by Criteria
### Proposal Contents, Ratings by Category

<table>
<thead>
<tr>
<th>TECHNICAL</th>
<th>ECONOMIC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HARD</strong></td>
<td>F, G, H, I, J</td>
</tr>
<tr>
<td>! A, D</td>
<td>!</td>
</tr>
<tr>
<td><strong>SOFT</strong></td>
<td>K, L, M, N, O</td>
</tr>
<tr>
<td>! B, C, E</td>
<td>!</td>
</tr>
</tbody>
</table>

**Figure 7.** Proposal Contents, Ratings by Category
Given the degree of emphasis unanimously attached by the companies to "hard" economic criteria an investigation was made into a suitable Return on Investment (ROI) range for project approval. The question was put: "If you could demonstrate hard dollar cost savings for a new information system, what level of ROI would be necessary to get easy approval?" The responses, as shown in the frequency bar chart in Figure 8 reflect that there is no strong consensus. Although most respondents favoured the 20 - 30% range, over 35% of the responses were above this range and 15% of the responses gave figures greater than 50%. These figures are well in excess of the financial targets a company would set itself in its annual report and offer strong evidence that a subjective discount is applied to the "hard" economic estimates in proposals.

Further evidence of discounting was provided by a question in the User Needs Survey about estimates for budget, schedule and benefits. Managers were asked what kind of revisions they would expect of project estimates at various stages in its life. The average results are shown in Figure 9.

The variation in estimated benefits was not large, down 10%. The revisions for budget and schedule, however, do show that managers will apply a significant discount to estimates put before them. The proposal may 'promise' a good ROI but the typical manager will expect a project budgeted for $100,000 to come in at $158,000 and take over 1.6 times longer to complete than scheduled. Any ROI figure presented will be reduced by these subjective discounts resulting from a manager's experience with the development of previous information systems. For example, consider the simplest payback analysis graphed in Figure 8. For a project originally estimated to have a 20 month payback the anticipated actual payback would be 33 months, 65% worse.

Thus although much emphasis is placed on quantifiable "hard" costs and benefits there appears to be little faith in these estimates. Thus, typical project selection procedures are bound to favour those projects where more credence can be given to the estimates -- those with low complexity and uncertainty. For example, it is easier to accurately estimate small TPS than large ones. And, likewise, TPS are easier than MSS.
Figure 8. Required Return on Investment
The area under the ACTUAL curve is 2.6 times greater than the area under the ORIGINAL ESTIMATE curve. Note: This simple calculation ignores the time value of money.

Figure 9. Anticipated Revisions to Project Estimates
THE PROJECT APPROVAL PROCESS

In most corporations the project proposal is brought before the relevant approval committee where its merits are evaluated. There are usually guidelines or policies to help in the decision-making process but, as in the proposal contents, different criteria will carry different subjective weights for each committee member. These will be the issues that will determine the final decision.

The User Needs Survey asked managers to rate the relative importance of 16 potential criteria for approving a proposed system. The criteria are listed in Figure 10 in sequence of their importance based on average ratings.

Figure 10 has been partitioned into high, medium, and low priority criteria. Given that user demand for new systems is 274% greater than the supply capacity of I/S, the top five criteria no doubt determine which projects are approved. The second five criteria are used, if necessary, as tiebreakers or as ammunition when one department opposes a particular project. The bottom six criteria, practically speaking, are nice but irrelevant.

There was general agreement that top management emphasis played the most significant role. Because project approval is normally an expensive, risk-bearing, go/no-go decision one can understand this deference given to senior management. Next came the urgency of the user’s need, then return on investment, followed by criteria related to user effectiveness and efficiency increases. Lowest in the list came interest/challenge to the I/S staff, disproving a long-standing belief among I/S department critics.

The importance of urgency is food for thought. It suggests that I/S project approval is unduly influenced by reaction to short-term needs. Systems planning, ranked 13th, is ineffective in prioritizing or sequencing the systems which will be implemented for business needs. Both the I/S development plan and I/S portfolio balance, ranked 15th, are at the bottom of the list. Managers are either unaware of the rationale behind such plans or regard them as an unnecessary formality. This is unfortunate because a check on portfolio balance could be one of the factors that would recognize the overall nature of demand for different system types, TPS versus MSS. It again indicates a bias of the short-term over the longer term business perspective. We note that “soft” benefits which are closely associate with MSS are again given a low rating; ranked 11th.
### Project Approval Criteria Ratings

<table>
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<th>RANK</th>
<th>RATING</th>
<th>CRITERIA</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>5.1</td>
<td>H. TOP MANAGEMENT EMPHASIS</td>
</tr>
<tr>
<td>2</td>
<td>5.0</td>
<td>I. URGENCY OF USER NEED</td>
</tr>
<tr>
<td>3</td>
<td>5.0</td>
<td>A. RETURN ON INVESTMENT (or cost/benefit)</td>
</tr>
<tr>
<td>4</td>
<td>5.0</td>
<td>O. USERS' EFFECTIVENESS INCREASE</td>
</tr>
<tr>
<td>5</td>
<td>4.9</td>
<td>N. USERS' EFFICIENCY INCREASE</td>
</tr>
<tr>
<td>6</td>
<td>4.7</td>
<td>K. DEGREE OF USER COMMITMENT</td>
</tr>
<tr>
<td>7</td>
<td>4.6</td>
<td>M. DEGREE OF IMPACT ON USERS</td>
</tr>
<tr>
<td>8</td>
<td>4.4</td>
<td>F. UNCERTAINTY OF OBJECTIVES</td>
</tr>
<tr>
<td>9</td>
<td>4.3</td>
<td>D. IMPACT ON I/S RESOURCES</td>
</tr>
<tr>
<td>10</td>
<td>4.1</td>
<td>B. OVERALL RISK OF PROJECT FAILURE</td>
</tr>
<tr>
<td>11</td>
<td>3.9</td>
<td>G. QUALITATIVE OR SOFT BENEFITS</td>
</tr>
<tr>
<td>12</td>
<td>3.8</td>
<td>P. ADAPTABLE OF ORGANIZATION</td>
</tr>
<tr>
<td>13</td>
<td>3.7</td>
<td>J. FIT WITH I/S DEVELOPMENT PLAN</td>
</tr>
<tr>
<td>14</td>
<td>3.5</td>
<td>C. COMPANY POLITICS</td>
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<tr>
<td>15</td>
<td>3.3</td>
<td>E. I/S SYSTEMS PORTFOLIO BALANCE</td>
</tr>
<tr>
<td>16</td>
<td>2.8</td>
<td>L. INTEREST/CHALLENGE TO I/S STAFF</td>
</tr>
</tbody>
</table>

Figure 10. Project Approval Criteria Ratings
THE PROJECT APPROVAL "COMMITTEE"

The Survey respondents also rated the actual influence of key managers on project approval decisions. Figure 11 lists their average influence in rank order. The primary User Vice-President is the dominate influence, followed by the Vice-President of I/S and the Primary User Manager. The formal committees chartered to make such decisions ranked 4th and 5th. The Programming Manager and Secondary User Managers ranked so low as to be out of the running.

The top ranked project approval criteria was top management emphasis. The reason is now clearer; the Primary User Vice-President has the most influence on the proposal decision. Don't, however, discount the influence of the Vice-President of I/S. The primary user department varies by application. For one project the relevant V.P. is the head of Finance, whereas, for another it is the head of Manufacturing. The V.P. of I/S is the second most influential manager for all projects.

Figure 12 presents several alternative scenarios whereby project approval decisions are actually made. Apparently, there is an informal pair-wise negotiation between the I/S and Primary User V.P.'s on a project specific basis (scenario 1). This contrasts with the official process whereby formal committees evaluate by comparison proposals from many user departments (scenarios 3 and 4).

The situation of ten years ago may have been reversed. I/S acting unilaterally can no longer railroad projects over reluctant users (scenario 5). Today, Primary User departments may well have the influence to force projects on I/S (scenario 2).

However, the Secondary Users are as ignored today as in the past (scenario 6). The proportion of new systems impacting multiple user departments is increasing rapidly (most large TPS, database inquiry applications, and common systems). Their only hope is to use the I/S Steering Committee as a vehicle to ensure that what is good for the Primary User is not disastrous for the Secondary Users. Unfortunately, the I/S Steering Committee (scenario 3) is more of a forum than a decision making body. The Primary User V.P. has sufficient influence to remove proposals from evaluation by ROI comparison, forcing the V.P. of I/S into pairwise project specific negotiations (scenario 1) which are subsequently blessed by the I/S Steering Committee or the Corporate Budget Committee (scenario 4).

Realistically, the I/S Steering Committee is both a forum and a decision-making body -- both a rubber-stamp surrounded by informal, sub-rosa decisions and a formal, above-board, evaluative committee. It depends upon the proposed project, whether the intended benefits of the system are primarily cost-displacement or opportunity-fulfillment. There is a dual track for project approval -- the mainline and the override tracks. If the benefits are primarily cost-displacement, then the proposal follows the mainline, being accepted or rejected in comparison with other similar projects based on ROI. For this mainline track, the I/S Steering Committee operates as a formal decision-making body.

When the benefits are primarily opportunity-fulfillment, the project would be rejected by the mainline process. If the qualitative benefits are important enough to the Primary User department, then the mainline rejection decision is bypassed and, thus, avoided. For this override track, the I/S Steering Committee operates as a forum and rubber-stamp.

The existence of this dual track is the result of practical managers trying to get the systems they need but operating with inappropriate policies and procedures. These policies and procedures have simply failed to take into account the basic differences
# SOURCES OF INFLUENCE IN PROJECT APPROVAL

<table>
<thead>
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<th>Rank</th>
<th>Rating</th>
<th>Source</th>
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<td>1</td>
<td>4.9</td>
<td>F. PRIMARY USER VICE-PRESIDENT</td>
</tr>
<tr>
<td>2</td>
<td>4.6</td>
<td>B. I/S VICE-PRESIDENT</td>
</tr>
<tr>
<td>3</td>
<td>4.5</td>
<td>G. PRIMARY USER MANAGER</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td>A. I/S STEERING COMMITTEE</td>
</tr>
<tr>
<td>5</td>
<td>4.3</td>
<td>E. CORPORATE BUDGET COMMITTEE</td>
</tr>
<tr>
<td>6</td>
<td>4.3</td>
<td>C. SYSTEMS DEVELOPMENT MANAGER</td>
</tr>
<tr>
<td>7</td>
<td>3.5</td>
<td>D. PROGRAMMING MANAGER</td>
</tr>
<tr>
<td>8</td>
<td>3.4</td>
<td>H. SECONDARY USER MANAGER</td>
</tr>
</tbody>
</table>

**SCENARIO** | **FORMALITY** | **COMPARISON** | **SOURCES**
---|---|---|---
1 | INFORMAL | SINGLE | F, B
2 | INFORMAL | SINGLE | F, G
3 | FORMAL | COMPETITIVE | A
4 | FORMAL | COMPETITIVE | E
5 | INFORMAL | COMPETITIVE | B, C, D
6 | INFORMAL | SINGLE | H

Figure 11. Sources of Influence in Project Approval

**THE PROJECT APPROVAL “COMMITTEE”**
ALTERNATIVE COALITIONS IN PROJECT APPROVAL INFLUENCE

| + 2 | ! |
| + 1 | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| ! | ! |
| AVERAGE | ! |
| 1 | 2 | 3 | 4 | 5 | 6 |

SCENARIO

1 INFOMRAL, SINGLE PROJECT, HEADS OF I/S AND PRIMARY USER DEPT
2 INFORMAL, SINGLE PROJECT, PRIMARY USER DEPT MANAGEMENT TEAM
3 FORMAL, COMPETING PROJECTS, I/S STEERING COMMITTEE
4 FORMAL, COMPETING PROJECTS, CORPORATE BUDGET COMMITTEE
5 INFORMAL, COMPETING PROJECTS, INTERNAL I/S MANAGEMENT TEAM
6 INFORMAL, SINGLE PROJECT, SECONDARY USER DEPT MANAGERS

Figure 12. Alternative Influence Coalitions in Project Approval

THE PROJECT APPROVAL "COMMITTEE"
between cost-displacement and opportunity-fulfillment. Given that most TPS are primarily cost-displacement and most MSS are primarily opportunity fulfillment, it introduces a project selection bias against MSS.

Severe adverse effects result from this bias against MSS. MSS are forced to go sub-rosa and become dependent upon the power of the Primary User V.P. for approval. Many very valuable MSS are thus never approved and some undesirable MSS do get approved. Pair-wise negotiation between the I/S and Primary User V.P.'s is not a method which assures that the most valuable MSS get approved. Current proposal preparation does not investigate opportunity-fulfillment benefits thoroughly. The override approval process does not compare the qualitative benefits of competing proposals. And the sub-rosa override track seriously weakens the I/S Steering Committee.
On the basis of the evidence we have just presented from the User Needs Survey we will now step back and take a broader view of the approval process. In particular we will try to relate certain aspects of project approval to the characteristics of demand for different system types.

The proposal is used in project approval as a framework and basis for evaluation. First, as a minimum requirement, I/S determines if the project is technically feasible. If this is not the case the project gets automatically rejected because the proposal never gets finished. Assuming the project is technically feasible, the discussion will focus on the points most strongly emphasised in the proposal, i.e. "hard" economic benefits. If the project approval committee is persuaded of the validity of the cost and benefit estimates put before them the project usually experiences no problems in being accepted. What remains is to allocate the priority with respect to other systems in the backlog.

What if the project is justified by opportunity fulfillment rather than cost displacement and hence does not fit within the framework implicit in the typical approval process? In this case the proposal contents will be of little use as a basis for evaluation as the criteria emphasised there will serve only to reduce its chances of acceptance. If the advocates have sufficient faith in their project the alternative is to side-step the formal procedure and to engage in informal persuasion and bargaining with the influential members of the approval committee or coming to a separate arrangement with the I/S department. This we will call the 'override' process, usually the scenario is pair-wise negotiation between I/S and Primary User vice-presidents. Here much will depend on the project advocate's ability to play off the cost of the proposed system against its importance and qualitative or "soft" benefits, not to mention personal credits he may have built up with other committee members or members of the I/S department. Thus a further factor will be the political strength of the proponent. This process is shown in Figure 13.

The 'override' process presents a number of problems. The political power of an advocate is not a reliable method to ensure that scarce I/S resources are allocated to the best systems. The trend in systems demand shows that the selection of Management Support Systems needs to be done in a fair but supportive way. Informal bargaining and 'power politics' mark a departure from objective decision-making. Qualitative benefits do not preclude objective evaluation.

Currently, "hard" approval criteria are followed by a string of subjective user-justified criteria. The communication of their validity depends on the negotiating ability of the Primary User VP. The resources and experience of the I/S department should be used to help evaluate the qualitative benefits, to validate their potential and identify the problems and risks of their realization.

One of the questions that needs to be asked is whether the proposal contents make sense in the approval process? The proposal contents place heavy emphasis on "hard" economic criteria while the approval process is most sensitive to top management emphasis, user urgency, and effectiveness increase. The proposal is really an attempt at translating the validity of the system into a financial language that will communicate to top management and will offer a means of comparison between different systems. This translation is necessary because the decision-making process is removed from the ultimate users.

If it really was possible to reliably estimate costs and benefits, management would establish a policy for acceptance and prioritization. With reliable estimates and
MODEL OF CURRENT PROJECT APPROVAL PROCESS

--- PROPOSAL ---

---

--- TECHNICALLY ---

---

--- NO --- REJECT ---

---

--- YES ---

---

--- HARD ---

---

--- yes --- NORMAL ROI ---

---

--- BENEFITS? ---

---

--- NO ---

---

--- OVER-RIDE PROCEDURE ---

---

--- POLITICAL POWER ---

---

--- HIGH LOW ---

---

---

--- C O S T ---

---

--- HIGH LOW ---

---

---

---

NOTE: the over-ride procedure is based on political power and costs, not the merits of the qualitative benefits

Figure 13. Model of Current Project Approval Process
explicit rules there would be no need for any committee process. But this is far from being the case. A description of a system in purely financial terms tends to ignore risk, complexity, uncertainty, and fit with corporate strategy. It is presented in a standardized language managers understand. But to compensate for inherent inaccuracies managers discount estimates put before them according to rules of thumb established from previous experience -- a 65% decrease in payback.

The financial translation is unfortunately very susceptible to loss of meaning and manipulation by those who know how the process works. The process will also favor those systems that lend themselves best to this translation into quantitative cost displacement.

Now let us consider how this process will treat the two system types we discussed earlier - TPS and MSS.

Traditional transaction processing systems constitute the majority of the systems both installed and in development. Companies have more experience and thus greater faith in the cost/benefit estimates involved in developing TPS. The homework done in proposal preparation and the subsequent proposal contents emphasize the "hard" economic and technical topics more relevant to cost-displacement TPS. Also the policies for proposal evaluation have evolved in parallel with the history of these systems, being the result of feedback from these projects. Thus the proposal evaluation will have a bias toward TPS.

What about MSS? It is far more difficult to describe in cost-displacement terms a system whose purpose is to help managers make better decisions. So a proposal for an MSS, adhering to the guidelines for a traditional TPS, is bound to be inappropriate if not inaccurate. Most MSS which do get approved will have been pushed through by the 'override' process. The advocate will have little "hard" economic information to justify the system and will be taking a gamble on the situation. In the event the system is a failure (as defined by its reputation within the company) the advocate loses face and future systems of a similar type will find approval that much more difficult. This constitutes a negative feed-back loop. The next time such a system is suggested less effort will be put into the proposal as the staff will feel less confident that it will be accepted. Moreover, the Primary User VP will perceive more personal risk and encounter greater difficulty in "overriding" the standard ROI decision rule.

A further disadvantage is that the decision to go ahead with an MSS is removed from the eventual users, who at the proposal stage are often still not in a good position to evaluate the future benefits and requirements of such a system. Also the project acceptance process involves considerable delays which nullifies one of MSS's major potential benefits - its timeliness for helping the decision-maker when new opportunities or concerns arise.

Surely, the objective should be to find a common measure for the value of different systems. The popularity of cost displacement is the result of the management controls instituted when the TPS of early I/S lost budgetary control (12). Cost-displacement calculations are significantly more appropriate for TPS than they are for MSS. One can no longer estimate man-power savings when the quality of decisions is the issue. However, cost-displacement is not the only way to assess value. If we agree that value is the relevant measure we must ask ourselves:

- who can best establish the value of an MSS?
- at what stage can value be reasonably established?
- how is this assessment to be performed?
The Decision Support Systems (DSS) literature has investigated these issues in considerable depth for the DSS subset of MSS (9, 10). At the traditional proposal stage, the user manager knows only the goals of the project, not the functionality of the application. The purpose of developing a prototype is to learn -- to learn more about the business decision and how it can be supported. It is at this stage that the value of an MSS can best be assessed. It is the user manager who has participated in the rise of the prototype who can best assess the value. And, it is the degree of improvement in the business function, leveraged by the MSS, which is the basis for assessing the value.

If the end user himself has little sense for the potential value and cost of an MSS until he has used a prototype, then a senior management committee which has had no exposure to the particular application cannot effectively assess its value. The value of an MSS is best established after users have gained some experience with a prototype.

A CRITIQUE OF THE PROJECT APPROVAL PROCESS
SUGGESTIONS FOR AN IMPROVED PROJECT EVALUATION PROCESS

The evidence and arguments we have presented show that the evaluation process favors transaction processing systems over management support systems. In order to satisfy the current demand for both categories of systems the biases at the project initiation stage need to be dealt with and, if possible, there should be incentives to generate those system types that will maximize the value-added to the company.

One of the first steps is to realize the category to which a newly proposed system belongs. Since MSS and TPS have different characteristics they require proposals with different contents and a differentiated project approval process with appropriate criteria for their evaluation. Users must be convinced that they will not be ignored or penalized for proposing a MSS, where a rejected proposal will mean a waste of the user department's resources in its preparation and loss of face and time for the proponents. Awareness of the properties of MSS needs to be promoted, by education of user and I/S personnel and by a change in the company's policies.

So what should be the evaluation process for MSS? We have shown that the present 'define and quantify' approach is inappropriate. A purely qualitative approach also presents problems, as there will be no real means of comparison between projects when the decision is made by a committee with no real exposure to the proposed system functionality. The problems associated with these different methods are summarized in Figure 14.

The proposed solution is to place the decision at the lowest management level possible, while keeping it within constraints that will prevent a misuse of resources. For TPS an allocation of resources can be made on the basis of competitive cost-displacement project proposals. For MSS a better solution may be to allocate a portion of the budget for MSS prototypes to each user department or business unit on an overhead basis. This overhead allocation would include manpower and computer-time and would allow the user department to develop a basic prototype MSS on an as-needed basis. The user department will have to decide for itself which ideas to use its allocation on. This prototype system (called Version 0 by Keen (9)) will be small, quick to develop and cheap, fulfilling only the basic functions required. Any losses will thus be low, not jeopardizing the consideration of any future MSS. The user himself will very quickly get an idea of the value of the system and, together with the analyst working with him, he will get an appreciation of the cost and value-added of further development. On this basis a formal proposal can then be prepared. A summary of this new two-step procedure for project approval is shown in Figure 15.

The other advantage is that the user department will be able to initiate MSS as needs or opportunities arise. They will not have to spend valuable time preparing a premature proposal when for some cases the bare-bones prototype will be sufficient for their needs.

When the user department feels the MSS is worth further development, they can now prepare a more substantive proposal for the approval committee. The company needs to clearly specify what it considers the important and valuable benefits it will use to evaluate MSS proposals. On the basis of these guidelines the approval committee can then decide on the allocation of resources for this system as a separate project and on a priority for its development with respect to the system backlog. A list of benefits that can be considered is given by Keen (9). Further development would then be outside the general overhead allocation for that department's MSS development. This process is shown in Figure 16.
### CURRENT PROJECT APPROVAL PROCESS

<table>
<thead>
<tr>
<th>QUANTITATIVE EVALUATION</th>
<th>QUALITATIVE EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRUCTURED</strong></td>
<td><strong>QUALITATIVE</strong></td>
</tr>
<tr>
<td><strong>TPS</strong></td>
<td><strong>EVALUATION</strong></td>
</tr>
<tr>
<td>COMMITTEE CAN MAKE</td>
<td>INSUFFICIENT TO COMPARE</td>
</tr>
<tr>
<td>VALID DECISION BASED</td>
<td>ALTERNATIVE PROPOSALS</td>
</tr>
<tr>
<td>ON CURRENT PROPOSAL CONTENTS</td>
<td>FROM MULTIPLE USER</td>
</tr>
<tr>
<td></td>
<td>DEPARTMENTS</td>
</tr>
<tr>
<td><strong>IMPOSSIBLE TO MAKE</strong></td>
<td><strong>ALTHOUGH VALID, CANNOT</strong></td>
</tr>
<tr>
<td><strong>REALISTIC ESTIMATES</strong></td>
<td><strong>BE FAIRLY ASSESSED BY</strong></td>
</tr>
<tr>
<td><strong>CURRENT PROPOSALS &amp;</strong></td>
<td><strong>COMMITTEE WITHOUT</strong></td>
</tr>
<tr>
<td><strong>PROJECT APPROVAL IS</strong></td>
<td><strong>EXPOSURE TO APPLICATION</strong></td>
</tr>
<tr>
<td><strong>BIASED TO REJECT EVEN</strong></td>
<td><strong>(VALUE BEST DETERMINED</strong></td>
</tr>
<tr>
<td><strong>GOOD MSS SYSTEMS</strong></td>
<td><strong>BY END-USER, HANDS-ON)</strong></td>
</tr>
</tbody>
</table>

Figure 14. Current Approval Process

---

**SUGGESTIONS FOR AN IMPROVED PROJECT EVALUATION PROCESS**
PROPOSED PROJECT APPROVAL PROCESS

<table>
<thead>
<tr>
<th>USER DEPARTMENT MGMT</th>
<th>APPROVAL COMMITTEE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(FIRST STEP)</strong></td>
<td><strong>(SECOND STEP)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TPS</th>
<th>MSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECISION TO PREPARE PROPOSAL</td>
<td>DECISION TO APPROVE PROPOSAL</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>DECISION TO DEVELOP PROTOTYPE ON BASIS OF OVERHEAD ALLOCATION</td>
<td>DECISION FOR FURTHER DEVELOPMENT BASED ON RESULTS OF PROTOTYPE</td>
</tr>
</tbody>
</table>

Figure 15. Proposed Approval Process
RECOMMENDED PROJECT APPROVAL PROCESS

influence on I/S STRATEGIC PLAN

needs recognition

I/S DEPARTMENT: DIAGNOSE SYSTEM

I/S STEERING COMMITTEE: MSS PROTOTYPE OVERHEAD

ALLOCATED BY USER DEPT

TRANSACTION PROCESSING SYSTEMS

USER & I/S DEPARTMENT:
PREPARE TPS PROPOSAL

done

I/S DEPARTMENT: no
technical feasibility

I/S STEERING COMMITTEE: FURTHER DEVELOPMENT

USER & I/S DEPARTMENT: ASSESS VALUE-ADDED OF

FURTHER DEVELOPMENT

USER & I/S DEPARTMENT: PREPARE MSS PROPOSAL

APPROVAL COMMITTEE: EVALUATE COMPETING PROPOSALS ON QUALITATIVE BASIS

MSS BACKLOG

APPROVAL COMMITTEE: REPRIORITIZE BACKLOG

MANAGEMENT SUPPORT SYSTEMS

USER & I/S DEPARTMENT:
DEVELOP MSS PROTOTYPE

USER & I/S DEPARTMENT:
PREPARE MSS PROPOSAL

APPROVAL COMMITTEE:
EVALUATE COMPETING PROPOSALS ON QUANTITATIVE BASIS

MSS BACKLOG

SUGGESTIONS FOR AN IMPROVED PROJECT EVALUATION PROCESS

Figure 16. Recommended Project Approval Process
The process so far suggested has been reactive. It is still dependent on users taking the initiative and developing prototype MSS and then, dependent upon the value of Version 0, submitting Version 1 proposals. Given the importance credited to MSS by managers the process should probably be more proactive at the budget allocation stage. As was shown in the trends section, the increased demand for MSS will require a greater budget allocation for this system type.

A further refinement would recognize the type of system that would be of most value to a strategic business unit (SBU) in each stage of its product development life cycle. SBU's at an early stage are primarily concerned with entrepreneurial issues -- flexibility, growth, market placement, product modification, etc. MSS can be of strategic importance at this stage because of their flexibility and effectiveness orientation. A more mature SBU would place greater emphasis on efficiency issues and thus lean towards transaction processing systems. In either case a plan for allocation by systems type will provide the most valuable support for the company's strategies. Allocation would be by the two system categories - TPS and MSS- for project development with a supplemental allocation for MSS prototypes based upon the SBU's or user department's strategy or product life cycle. This is shown in Figure 17.
## RECOMMENDED I/S BUDGET ALLOCATION

### DISTRIBUTION WITHIN S.B.U.s

<table>
<thead>
<tr>
<th>TPS PROJECTS</th>
<th>MSS PROJECTS</th>
<th>MSS PROTOTYPES</th>
<th>% TOTAL BUDGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>18%</td>
<td>2%</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>42%</td>
<td>38%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>10%</td>
<td>60%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>85%</td>
<td>10%</td>
<td>5%</td>
<td>12%</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### NOTES

The total budget for MSS projects and prototypes should equal the overall allocation for MSS — moving over time to match user demand of 58% and correct the supply/demand ratios by systems type.

The MSS budget should be split approximately 1/3 for prototypes and 2/3 for subsequent development of MSS.

The total by department should equal that S.B.U.'s strategic value to the corporation — with the breakout by systems type related to its entrepreneurial/maturity stage.

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Figure 17. Recommended I/S Budget Allocation

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SUGGESTIONS FOR AN IMPROVED PROJECT EVALUATION PROCESS 32
CONCLUSIONS AND RECOMMENDATIONS

This paper has presented evidence that the current project approval process does not reflect the greatly increased demand for systems designed to support managers. Further, we have suggested that a major reason for this is a bias in the typical project evaluation methods being used; a failure to distinguish between cost-displacement and opportunity-fulfillment. To correct this situation we offer some recommendations for project approval:

1. Objectives and supporting procedures should take into account the fundamentally different natures of TPS and MSS projects. This will ensure an unbiased selection of those computer-based information systems that offer the best contribution to the company's strategy.
2. When system requests are received by I/S they should be categorized as either TPS or MSS.
3. TPS should follow the current proposal and approval process.
4. For an MSS, a prototype should be developed -- funded by the users' allocated MSS prototype budget. (Approximately 1/3 of the MSS budget should be set aside for MSS prototypes and allocated to user departments.) Thus the decision of which prototypes to develop would be located closest to the actual need yet constrained from wasting resources by the limitations of the user department's MSS prototype budget allocation.
5. If the user department decides the MSS prototype is worth further development a proposal should be prepared based on the experience with the prototype. This would enable the user department to better assess the value of the system and the I/S department to better estimate its cost and required functionality.
6. Project approval, prioritization, and resource allocation can now be made more objectively for both TPS and MSS. Subsequent proposals to enhance MSS prototypes can now be based on substantive estimates of costs and benefits and be appropriately evaluated.

Allocation of I/S resources should be done by user department and system type. TPS and MSS are fundamentally different from each other and should not be proposed or evaluated by the same procedures or standards. Realistically differentiated management procedures for proposal preparation and project approval will increase the relevance, appropriateness and timeliness of implemented systems by removing the existing bias against MSS. Managers will thus feel more predisposed to request those system types that will be of value to their department viewed within the context of the company's overall plans. The I/S Steering Committee will also find its task more realistic, its decisions based upon more relevant proposals, and its effectiveness less subverted by informal deals.

As in so many other aspects of the I/S function we have to remove ourselves from the biases created by early experiences with I/S. Project evaluation should not be thought of in terms of cost displacement alone but each system should be assessed with respect to its total contribution to business objectives.

"We are hampered not so much by our ignorance; rather, by the many things we know which are not true". -- unknown.
REFERENCES


