

## COMPUTER APPLICATIONS MUST BE MANAGED

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Very few highway department managers have received any formal or detailed computer education during their academic or working years. Because of their ignorance of the computer field, many managers do not make computer-related decisions; they relinquish this responsibility to computer personnel who frequently make poor decisions. Management must make computer-related decisions if the maximum benefit is to be derived from automation.

The following conditions are typical of a highway manager's department.

1. It is a technical and engineering-oriented agency that historically has been dependent on a separate (usually in-house) organizational unit of computer professionals;
2. Over the years an ever-widening communications gap has developed between top management and assistant top management;
3. The advice and guidance received by assistant top management have often been tailored to meet the needs of automation personnel and hardware resulting in the delay of important (but not easily automated) systems; or
4. There has been a lack of adequate departmental statements of goals and objectives and plans to fit individual systems into an objective-oriented partial total system; and
5. If the data processing capability has been merged into a larger centralized effort, or turned over to an outsider, the department is a captive customer, foregoes much of its former flexibility, accepts the higher costs, and follows rather than directs priorities concerning processing and professional services.

What can top management do about these problems? For one thing, top management must apportion time and resources for some "self-education." It has to be able to evaluate alternative courses of action and to assess their impacts. It must be able to influence potential managing systems by defining their scope, the interrelationships between individual efforts, and the specific results desired. There also must be agreement among management on departmental goals and objectives as they pertain to computer application. Management must be certain that each new effort will be toward a partial total system rather than another "stand-alone" independent system. Follow-up in the implementation and results stages is vital if management is to really control computer applications.

All of the foregoing steps must be taken by management now because future computer applications will be more complex than present ones.

The following are computer-related trends that a typical chief administrator might expect to occur during the decade ahead:

1. "Knowledge explosion" in which the sum total of human knowledge doubles every 5 years;
2. National data center, with attendant debates over security and invasions of privacy;
3. Large-scale time-shared computers with rapid development and use of more advanced terminal hardware (on-line usages);
4. More computer-to-computer direct communication;
5. The beginning of on-line banking (the checkless society);
6. Easier programming due largely to expansion of man-machine interaction through education and language simplifications;

7. Recognition that traditionally independent systems (both automated and manual) must be judged and handled as parts of whole systems;
8. Expanded use of the technique of automated simulation for decision-making;
9. Strong need for expanded computer educational efforts at several levels; and
10. Growing emphasis on payback evaluations through use of cost-benefit techniques with considerably less return on investment from the new data-base type of applications.

Most highway transportation agencies have always maintained a progressive attitude toward utilizing automation in their operations. However, developments of recent years have created the need for a second look at the whole agency operation in relation to current and future needs. The following are a few key checkpoints that could become the basis for a model statement of policy:

1. Develop and maintain adequate departmental goal and objective statements to be used as guidance and direction for evaluating and implementing all systems efforts;
2. Ensure that multiple-user inputs offer alternatives, minimize risk, and foster participative decision-making and internal cooperation;
3. Inventory and analyze all manual and automated computational data-information systems and annotate their contributions to management objectives;
4. Develop all management and information systems to be potential parts of an over-all system and to be compatible with any external change or system as required;
5. Ensure that executive or administrative decisions can override economic analyses reports and cost-benefit ratios;
6. Maintain a business-like operation wherein quality service is provided at acceptable costs;
7. Provide sufficient time and funding for the development of a necessary level of computer and systems knowledge (education) in both managing and operating ranks;
8. Establish a top-level review board to receive new proposals, monitor system applications in progress, audit cost-benefit appraisals, and make priority recommendations; and
9. Give adequate management support to the review board.

For every system or subsystem proposed or in the process of being designed for computer processing, management should establish and use a checklist to assure itself that the new procedure has potential benefit. If the proposal passes this review, it should then be given full support of top management.

For an initial proposal, the review board should apply the following six-step evaluation before a more detailed feasibility study is undertaken.

1. Is there a need for manipulation of data beyond the capability of either manual or key-driven equipment?
2. Is there a need for an increase in the degree of control over groups of items or dollars?
3. Is there a need for a reduction in the number of semi-skilled workers?
4. Is there a need for additional speed?
5. Is there a need for reports containing management control information that would be unavailable or impossible to get except by computer?
6. Is there a need for the large dollar reductions that the proposal offers?

If favorable answers to some of these questions clearly seem to support the prime goals of the department, then the proposal would appear to satisfy a need.

The next step would be to request a feasibility report in greater detail than was contained in the initial proposal that management evaluated. This report is reviewed by management, who decides the merits of the proposal. The feasibility report should clearly state the following:

1. Concept of the proposal;
2. Objectives to be achieved;
3. Areas in the agency that may be affected;
4. Plan of implementation;

5. Analysis of the plan's compatibility with other separate or combined efforts (to make up a partial total system);
6. Time table for accomplishment;
7. Personnel needed to carry out the project;
8. Amount of expected return on investment;
9. Method for incorporating the return, or reductions, into the operating unit's budget;
10. Total cost; and
11. Whether the plan's development will require discontinuing existing projects or programs.

In addition to the formal feasibility report there are certain supportive criteria that management also must consider by seeking answers to questions such as:

1. Will the stored data be reasonably accurate and current?
2. Once stored, will the data be maintained by someone who will feel a responsibility to keep them valid?
3. Will other departmental (or external) units use the data with confidence in their reliability?
4. Are the data likely to be neglected and thus mistrusted?
5. Will the data be compatible with new and modern accounting systems?
6. If the plan significantly exceeds the cost estimate, are you willing to make a positive decision to correct the overrun?

If a sufficient number of these criteria pass the management screening process, there still is one more important role for management before it initiates a project. It must directly share in the formulation of the project's objective statement and approve the form that its output or end results will take.