HANDBOOK FOR NEW MEMBERS OF AUTOMATION PROJECT STEERING COMMITTEES

Business people often get involved with automation and information technology projects which involve large sums of money, considerable dedication of time, and long project durations. To control the risk involved, companies set up project steering committees. People from line and staff departments are asked to sit on such groups, with very little support or understanding of what is involved.

The following handbook provides at least an overview of the nature of such committees, their workings, and the nature of information technology projects.

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A. The Role of the Steering Committee on Automation Projects: Ten Questions, and Some Answers

Automation projects often have a group called the "project steering committee" associated with them. The nature and workings of this group are described in the answers to the following ten questions.

(In the background material which follows, some things specific to an automation projects are described. "See background material" in the first part of this handbook indicates places where the material in the second part of the handbook may expand on the point being addressed.)

1. What is it?
2. Who is on it?
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5. What does a steering committee do?
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7. How are meeting agendas set?
8. What benefits, formal and informal, does a steering committee have?
9. What can happen if one does not exist?
10. What can go wrong with a steering committee, making it ineffective?

1. What is it?

On a systems project, a steering committee does exactly what a steering mechanism does for a car. It ensures that the project gets started on the right roads to eventual success, and that it stays there.

Two things determine eventual project success, the technical quality of the computer work done by the project team, and the functional ability of the system to accomplish the operating results envisioned for it. While first is clearly the responsibility of the systems professionals, the second depends upon individuals in the operating areas for which the automation is being developed. Steering committees ensure that the right people from the operating side participate in systems projects.

2. Who is on it?

Actual steering committee membership depends upon specific project scope. The managerial level of the needed individuals must be determined on a project by project basis. The following assumes a project with broad impact. It describes membership in functional terms. This provides general guidelines, which can be appropriately interpreted for in specific projects. Functionally, the following need to be members:

1. The project sponsor:

   The company executive who is sponsoring the project. Generally, this individual is the most senior person on the committee, since all the areas impacted by the project are normally within this individuals arena of responsibility.

2. The operating executive heading each of the groups who will use, or be impacted by, the system being developed:

These individuals are members since they must be committed to the eventual use of the system. They must ensure that their staff participate in its development. Eventually, they will be responsible for getting the operating results from the system which justified investment in it in the first place.

3. The head of the systems group whose staff is doing the systems work on the project:

    Normally, this is an insider. However, when the project is being extensively staffed from an outside consulting firm, the partner with client responsibility would be present.

    When more than one systems group is involved, either the head of each, or the individual with overall responsibility for them all, would be a member.

4. The project manager:

    This person is accountable for project progress and quality. Consequently, the individual sits as a functional peer, even though there may be a reporting relationship to one of the other members. This permits the project manager to establish formal and informal working relationships with each of the other members.

3. How do people get to be on a steering committee?

Individuals are invited to be members by the project sponsor, who normally acts as steering committee "chair". They are selected for the reasons given under each type of member above. Because these reasons are functional, rather than political, there are some natural limits on what can do in response to such invitations.

Members may bring support staff to various meetings, but the initial invitation should make it clear that "membership is limited" to the invited individual. It cannot be transferred to more junior staff without explicit consultation with the project sponsor.

From time to time, members may delegate others to attend a specific meeting in their place because of an unavoidable schedule conflict. That remains a practical necessity. It must not become a way of implicitly substituting some other person for the member. If such substitution becomes the norm, the committee loses its credibility and operating nature. That could severely impact on its internal dynamics, and on project success.

4. What is the relationship between the steering committee and the project manager?

The project manager on an automation project is responsible for getting the system built on time, and within budget. However, the talent and dollar resources required to do so are seldom simply available. The project manager must ask systems department heads and operating executives to assign the staff required. Dollar budgets must generally be taken out of others' annual operating budgets, a step which usually requires a variety of approvals. As the project proceeds, scope changes which expand the project budget much receive specific authorizations. At certain times in the project's life, stop/ continue decisions are made by executives, based on their sense of the project's likelihood of achieving the original justifying return. Consequently, the project manager's job entails having a great deal of responsibility without having a great deal of authority. (See background material - "The Situation in Which Automation Projects are Placed".)

The relationship between the project manager and the steering committee fills this authority-responsibility gap. Individual members from both the systems and operating systems have the necessary authority. They can provide the project with all of the resources it needs for success. Once given over to the project the people and the dollars become under the project manager's responsibility, and fall under this person's authority for the assignment period. This realigns the responsibility with authority, and does so in a way which is functional for the project, without being intrusive in the normal flow of reporting relationships.

The existence of the steering committee warrants that the assignments are coordinated ones. Each member of the steering committee has normal operating concerns and pressures which establish a personally preferred schedule for providing the resources required. If the project manager has to independently negotiate access with each individual, coordinated access becomes very difficult to achieve. Experience shows that the project manager becomes a go-between in indirect negotiations between the individuals. By establishing as a steering committee, these negotiations are direct. The balance between the inconvenience of losing resources, and delaying the project becomes obvious to all the members. Resourcing schedules, and project target dates become aligned. The project manager can then be held accountable for project success within the resource constraints determined by the committee members.

An experienced project manager establishes a personal working relationship with each committee member, and learns what information that person's wants about the project. Project managers have a range of tools available which allows them to satisfy those needs. (See background material: "The Tools and Techniques Necessary for Systems Success".)

5. What does a steering committee do?

A steering committee does 5 main things.

1. It makes "stop/continue" decisions at various stages in a project's life.

2. It reviews, and approves, project financial projections, which consist of:
    i. the initial investment case,
    ii. project operating budgets, updated as the project proceeds.

3. It approves project timetables, and affirms reasonable target dates, given project difficulty and resourcing.

4. It ensures that the design of the product being built by the project team meets business requirements. Its line operating members take steps to have their staffs participate in the design process so that the product as built will be operational by the operating staff who must eventually run it. Its systems members have their review the hardware and computer operating implications, so that the operation of the new systems does not cause any unanticipated drain on existing computer facilities. These reviews are essential, since these people will eventually use the product in a way which earns the return which justifies the automation investment must

both know that it is operable, and what its operating cost range will be.

5. It provides the project manager with the visible support needed to successfully deal with individuals outside the project team, so that project can proceed on schedule.

In addition, steering committees act as a "court of concern", where problematic can be raised by any of the members. The committee format provides a forum where joint dialogue resolves the inevitable conflicts and mis-communications which occur during a project's life. Anything which puts the project off budget, off schedule, narrows or expands its scope, or affects the product's eventual usefulness can generate such "concerns".

6. How often, and how long, does a steering committee meet?

Normally, a steering committee meets at the end of each phase of a project. That makes 6 meetings, if the project follows the conventional project life cycle (see background material: "The Project Life Cycle"). Extraordinary items lead to additional meetings, especially if a re-design loop-back occurs. On large or difficult projects, committees might meet an average once a month over the life of a project.

Meetings should have a clear agenda. Given good agendas, there still tend to be two lengths of meeting: long and short. Short meetings normally are scheduled to last an hour, and can take up to three, depending on the amount of exchange between the members. Meetings should be decision oriented. The members should be briefed prior to meetings, both by members of their own staff, and by project staffers. During design reviews, 3 hours of briefing/reading in preparation for a 1 hour meeting is a reasonable ratio. At other times, each member can expect to spend an hour preparing for an hour meeting. Individual members might expand on this, depending on their degree of concern and involvement with the project. Assume the worst: - if there are 12 meetings of an average of 1.5 hours, of which 4 involve design review, then members might spend 42 hours a year on project work :

- meeting time = 12 x 1.5 +
- regular meeting preparation time = 8 x 1.5 +
- design review preparation time = 4 x 3
- total time = 42.

This for a project which could substantially alter the way their area does its work.

Long meetings tend to happen when members do not the time for pre-briefing and preparation. As a result, the briefing sessions get incorporated into the committee meetings. By the time, all members' questions are answered, such a meeting can easily run half a day to a day. If this becomes a pattern, the effectiveness of the committee can be considerably eroded, since it is difficult to get senior people together to this length of time at frequent intervals.

7. How are meeting agendas set?

Agendas should be set by the committee "chair". For all practical purposes, the first cut usually is prepared by the project manager. This provides an opportunity to include items which are necessary to the progress of the project. If the project manager has developed an on-going working relationship with each of the members, each member can be quickly canvassed for their items of concern. A brief discussion of the result with the "chair" is usually sufficient to structure the agenda.

It should be sent out some time ahead of the actual meeting (5 to 10 working days), so that arrangements can be made for background whatever briefing sessions are required by each of the members. This lead time also gives them with an opportunity for dialogue with one another before the actual meeting.

The project manager should provide a "minute taker/secretary" from the project staff. This allows full participation by the project manager in meeting interaction. This task is an ideal way to give a senior project individual an opportunity to learn one side of the project manager's job. Minutes tend to be of high quality as a result.

8. What benefits, formal and informal, does a steering committee have?

When a energetic and visible steering committee exists for a project, everyone in the firm connected with, or impacted by the project, knows three things.

1. The executive group thinks that the project is important enough to put quality time into it. That sets a standard for everyone else. As a result, the "quality of work" per "quantity of time" spent on project activity increases.

2. The existence of a committee legitimatizes differences of opinion about task content while stressing the need to work them through productively. The committee models this by its very existence. It recognizes that systems projects involve change and conflict; that this is normal, and part of the process of keeping the firm competitive and productive. As a result, differences are kept functional, and they do not become associated with personality conflict, which tends to disruptive and unresolvable.

3. The formal meetings of the committee, involving both operating and systems heads, become a "acceptable" reason for increasing the informal collaborative contacts among systems professionals and line operating staff. Since effective systems design and implementation depends on such collaboration, this decreases the risk inherent in systems projects (see background material: "Appropriate Project Team Staffing").

In addition, the existence of a steering committee provides the project manager with the needed access to executives. This allows the project manager's job to be a very responsible one, without having to give it an inappropriate degree of authority in operating areas. These areas will have to continue to function long after the project has wound down, and the project manager moved on. (See background material: The Situation in which Automation Projects are Placed.)

9. What can happen if a steering committee does not exist?

Projects without a steering committee run the several risks, of which the most dangerous, and historically prolific, follow.

Of course, the top 5% of the world's systems project managers have the personal skills to handle such situations successfully. However, most of the world's systems projects are managed by competent but not exceptional individuals. A functional steering committee allows them to successful in these situations, because it provides structure and checkpoints which clarify and catch these problems as they begin, not once they have happened.

1. The wrong product gets delivered.

A project manager, under pressure to stay on timetable, while having difficulty getting access to the operating staff needed to ensure an operationally functional design, allows the systems professionals to design and build the system they **think should** be in place. The design is inadequate to the operational needs. Operating staff find it complicates their lives, rather than eases them. They resist using it. Project failure occurs at the implementation stage. (See background material: "Appropriate Project Team Staffing")

2. The product meets the needs of only part of the organization.

A system being built for two or more different parts of the operating organization is specified in contradictory ways by each part. Efforts by the project's systems professionals to resolve the conflicts on the working level fail. One group vigourously pushes to see its needs satisfied. The project manager has no formal means of escalating the differences up the line organization. The problem can be taken up through the systems organization. Efforts to do so are often interpreted as unresponsiveness by the operating group which is pushing its requirements. The systems is build to their specifications. It meets their needs, but is seen as a "flawed" or "failed" system by the other operating groups. They resist use of the system. A one-sided implementation success occurs, and an operating workflow which should be connected becomes fragmented as a result of automation.

3. The project scope keeps expanding.

The project scope keeps expanding. Each round of design work sparks the operating staff to new ideas for improving the eventual system. Without a schedule review by line seniors of financial impact of this scope expansion, the project manager gets caught in a classic "responsibility greater than authority" bind. The project team is mandated to be responsive to operating requirements. Its tendency is to incorporate the additional ideas. The project manager tends to agree, because the additions do improve the quality of the eventual product. No one on the project team has overall line authority, or accountability. Consequently, they are not likely to strongly insist on preparing financial cases for the scope expansion, and taking them up the line organization to see if the added cost and time can really be justified.

However, the project manager is accountable for staying within project schedule and budget. The potential added quality is used to justify design slowdowns within the system organization. At this point, the project is usually still within the overall project budget.

The project manager is now caught in a dilemma. The scope has been expanded beyond what was included in the original feasibility study, and operating clients are happy. This makes relationship management with them easier. The only case which could really have been made for the scope expansion would have to been based on future operating factors, something which is not under the project manager's control. If scope had limited to what could have been achieved within the design portion of the original project budget, then the delivered system would run the risk of being less than required. As well, the project manager might have been asked to explain why the design group was not managed more efficiently. On the other hand, expansion in scope tends to increase the work required in the later stages of an automation project, with an upwards impact on the cost of that work. The product is going to take more time and dollars to deliver. The project budget projections are increased. They have to be explained to systems management. Explanations are on the future systems operating considerations, and client statement of need, both of which are "of rational interest" to the systems organization. It is not accountable for line operations, and tends to accept improvements in this area at face value. As long as the line has "needs", it tends to respond to them If the systems organization should decide within its own authority, to limit scope to what can be achieved within original project budget, then it runs the risk of delivering a system which will be less than client expectations.

The dilemma is really one which needs to be faced by senior line executives. They must balance increased cost against increased potential benefit. They need to tell their other own people that the increased quality is often not worth the effort or the delay required to achieve it. The competent project manager, when faced with a need to "upset somebody with bad news", often makes a short term operating decision. That is what project managers are good at. The immediate problem is solved, and the difficulty postponed to the future. Experience shows that when faced with pressure to do so, they expand scope during the design stages, since that can be done without exceeding the overall project budgets. They hope that they can deliver the larger project within budget by saving on construction and implementation costs later on in the project, or that the expanded design will be of such benefit that no one will mind the overrun. The majority of the time, they are disappointed in their hopes. Many of the scope additions are not operationally cost effective, or significantly complicate the task of constructing the system. By the time this becomes obvious, the project is past the design stage, and the overall timetable and budget are well on their way to being exceeded. Simplifying the design once construction has started is almost impossible. It often means starting over. Once people's expectations have been allowed to firm up for some period of time they resist that. Many of the necessary collaborative relationships needed for sound implementation wither under the pressure of the resulting conflicts. Executives starts to ask questions about how the project got out of control, adding a negative tone to the whole project environment.

Once the problem is uncovered, the classic solution is to replace the project manager. Often, the first response of the operating staff to a new project manager is to rethink and expand their requirements. This places the new incumbent in exactly the same situation. Unless the individual is exceptional, the same cycle occurs again.

Projects where the potential of applying automated technology is not clear, and needs to be explored, are better handled by prototyping approaches. The management style on such projects limits the risk, and maximizes the exploration of possibilities. (See background material: "Prototypes or New Ventures Projects".)

10. What can go wrong with a steering committee, making it ineffective?

Steering committees suffer from two classic problems. Firstly, they get bogged down in too much detail. Secondly, they try to take over the day to day management of the project. Both can be avoided.

1. Too Much Detail

The key is to keep steering committee meetings from becoming executive briefing sessions. Of necessity, such briefings go to a deeper level of detail than a decision making and issue resolving meeting does. The temptation to "save members' preparation time by doing it once for all the members at the meeting" is the way to guarantee that this problem will come about. Once detail starts being a part of the meeting, it quickly becomes the norm. It expands too, since each member has different information needs, and tends to ask questions which get them met. The result is an expansion of the question and answer time, and a crowding of dialogue among the members into the "time remaining". Differences and not fully discussed, and the pace of the meetings slow down. Difficult resolutions are easy to avoid by asking more questions about details. A couple of meetings hours instead of an hour and a half. Busy members find it hard to keep their schedules clear for such long meetings. They delegate attendance, or pop in and out of the meeting. Both acts rapidly erode the effectiveness of the committee.

Good "chairs" force briefings off the agendas 99% of the time, even it means the hassle of rescheduling a meeting. Good project managers work hard at setting up effective pre-briefing sessions for each of the members, tailoring them to their personal styles and needs. Good committee members explore their hard differences with other members before the meeting, in informal ways, so that issues at the meetings are dealt with crisply and cleanly.

2. Project Management by Committee

The second problem usually starts with an individual. One of the member's personal management style may be to make all day to day operating decisions, not delegating them to subordinates. It is important not to provide such a member with an implicit invitation to get into the day to day operating management of the project. This is easy to do. Simply don't agenda such items. If the material on the agenda is significant, there will be no time to start in on managing day to day events on the project team. (See background material: "The Project Life Cycle".)

The other individual who can generate this tendency is the project manager. If the individual feels uncomfortable with responsibility - accountability gap normal in automation projects, or if the person is not a strong manager, then project operating items can make their way onto the steering committee agenda. They are often put forward in the guise of information items or requests. The project managers are really seeking to gauge where members stand on a decision they should be making in their own right. The solution here is a frank conversation between some committee member, and the systems executive to whom the individual reports.

Agenda limitation works unless one thing occurs. If the committee "chair" is the kind of executive who personally makes all operating decisions, it is hard to keep operating issues off the agenda. The only solution is to have someone who does not have this tendency set the agenda. That is not always possible, since the chair tends to be the project sponsor and the most senior person on the committee.

B. Background Material:
he Nature of Automation Projects

1. The Situation In which Automation Projects are Placed

1.1 Systems or automation projects have four fundamental characteristics which set out their nature and management:

i. projects have a definite beginning and a definite end, which means that "project" management techniques, skills and styles are more appropriate to them than the "line" management approaches normally found in operating areas;

ii. during a project's life, it invariably impacts upon the staff of more than one working group or department;

ii. in order to get the best eventual economic return from automation, operating people not only have to describe the work they do today to the project's design professionals, but also have to imagine or think through how they might do it better using computer technology;

iv. during the implementation stages of the project, people must change their daily working habits in order to take advantage of the new computer based way of doing work.

Consequently, systems projects force both the people who work on them, and the clients for whom they are being done, to behave somewhat differently from the way in which they currently do during their day to day work.

1.2 Every project manager on a systems or automation project faces four contradictory and irreconcilable tasks:

i. the project must be kept moving forward, so that the results are delivered on time and within budget;

ii. relationships among the various groups affected by the project must be kept smooth and harmonious;

iii. better ways of doing the work currently being done by these groups must be designed, evaluated for weakness through testing, so that the methods built into the computer technology which will be used in the future is sound and efficient;

iv. the individuals in the various groups who will use this technology to do this work must be retrained in their basic work habits, as well as in the patterns of work flow which defines the relationships between them, so that the return expected from the automation is achieved in operating practice.

1.3 Twenty years of experience has shown that very specific steps must be taken, if systems projects are not to fail. Each of these reduces the risk inherent in applying new technology to new ways of doing things within a firm. They also recognize the contradictions inherent in the project manager's job, and provide ways of allowing these contradictions to be worked out explicitly. They assume that the staff on the project, especially the project manager, is capable and experienced. Great personal ability, without the structures provided by these steps, has simply not proven to be enough. Normal competency is adequate when these techniques are well used.

Accepting the contradictory dynamics in the four tasks given above as normal, these structuring techniques provide skilled project managers with the communication forums and management tools which are necessary for success on all the levels inherent in their jobs. These structures are not substitutes for personal responsibility and accountability. They do ensure that the conditions necessary for responsibly holding individual project managers to account exist.

2.0 The Tools and Techniques Necessary For Systems Success

2.1 Basically, these project structuring techniques are:

i. the project life cycle,

ii. prototyping and new ventures projects,

iii. formal project planning and monitoring,

iv. explicit technology and implementation risk analysis,

v. appropriate project team staffing,

vi. the project steering committee.

2.2 A brief note on the first five follows. They serve as background to a description of the role of a project steering. Individuals who are members of automation project steering committees for the first time may find them helpful in understanding their role and participation in committee meetings.

2.3 The project steering committee is a vehicle by which the project manager can communicate with the operating managers impacted by a project. This committee's existence is often crucial to allowing a project manager to succeed in achieving a project's goals. The committee can discuss material which comes out of the activities undertaken under any of the techniques.

3.0 The Structured Project Life Cycle

3.1 By breaking the project into a set of stages, project work is set up into clearly distinguishable stages. Called the "project life cycle", these phases are:

a. feasibility,

b. initial or conceptual design,

c. detailed or operational design,

d. programming and testing (construction),

e. implementation and training,

f. post implementation review.

3.2 Each of these phases is terminated by an explicit review of progress. "Go/no go" decisions, which must involve the senior operationing line managers responsible for the area in which the automation is being implemented, are possible after the first four.

3.3 These phases has obvious analogues on other types of projects outside of automation, (such as engineering design, or construction). Thus, they thus allow line and operating management to have a sense of what must be going on, without having to understand all of the specialized processes normal to an automation project.

3.4 When projects use the project life cycle as a structure,and there is a project steering committee, this group should make a clear continue/stop decision at the end of each phase. By stage, this decision has the following implications.

a. At the end of **the feasibility stage,**

it says that committee members agree that:

i. the financial and schedule projections are reasonable and realistic;

ii. the return which is projected can be in fact be operationally achieved, given what is known to date;

iii. the broad choice of technology to be used is the correct one.

b. At the end of the **initial or conceptual design stage,**

it says that committee members agree that:

i. the updated financial and schedule budgets are reasonable and realistic;

ii. the return which is projected can still be achieved, given what is known to date;

iii. the general design for hardware and software is reasonable, and cost/effective;

iv. the system as conceived can be implemented, and will be operable by the staff who will eventually be using the system;

v. the system as conceived is a useful product, which at the currently projected development cost, and eventual operating price, reasonably meets the needs of the operating groups which will use this system.

c. At the end of the **detailed or operational design stage,**

each of the members affirms that:

i. the updated cost and schedule considerations are still reasonable and realistic;

ii. they are satisfied that their staffs are correct in their assessment of
- the detail design,
  - its suitability to their operating requirements,
  - its implementability,
  - its eventual operation, and
- its potential for getting the justifying return.

d. At the end of the **programming and testing (construction)** stage,

each of the members affirms that:

i. the cost to date, and projected remaining costs are acceptable;

ii. the system as built and tested meets their operating requirements;

iii. that the training and implementation plans are realistic and reasonable.

e. At the end of the **training and implementable** stage,

each of the members confirms that:

i. the turn-over of the product to the operating staff meets expectations;

ii. the current operation of the product is adequate;

iii. reasonable provisions have been made for the ongoing maintenance and repair of the new system;

iv. adequate performance criteria and monitoring mechanisms have been established, so that initial performance data on the new system will be collected and evaluated.

f. At the end of **post-implementation** stage,

the operating executives confirm that:

i. the system is meeting its financial return objectives;

ii. the system is meeting its operational objectives;

iii. the system is meeting its performance objectives,
or upgrade plans have been based on the initial performance evaluation of the system, and steps will be taken to upgrade the system to that it will meets its performance objectives;

iv. the repair/maintenance facility for the system is adequate;

v. documentation for the operation of the system is adequate;

vi. documentation and training procedures for new staff is adequate;

vii. provision has been made for the collection of required changes, and a version/release upgrade request facility is in place.

4.0 Prototype or New Ventures Projects

4.1 For certain kinds of automation projects, which have a decidedly experimental or questing nature, the structure inherent in project life cycle approach must be explicitly avoided. It is too limiting to allow the give and take necessary for creative investigation. Instead, such projects are best managed using prototype or new ventures approaches. They need to be staffed by creative individuals who often do not fit well into structured situations, whether of the project or operating type.

4.2 Prototype projects are undertaken when the technology to be applied is fairly well understood, but the possibilities for its implementation and use are not. Consequently, it is difficult to prepare the kind of specifications that are needed by for the "construction" phase of regular systems projects. By carefully building a team of innovative systems and operating people, and by using the right systems development tools, it is possible to build an experimental prototype which allows operating staff to clarify its ideas about how the technology can be applied to their environments. Once they have gained this experience, they can determine if a larger, more thorough going, systems project can be economically justified.

4.3 New venture projects are undertaken when both the technology and its application are not clearly understood. They are an exploration into a possibility. They often fail. On the other, ones which succeed often develop ideas and ways of using automation which have great payoff when rolled out using more conventional techniques.

4.4 Such projects are controlled by limiting the amount of time and money available to the team, and by restricting the initial impact to a pilot. They often do not have an explicit end point, since the team can generally come up with further products or new approaches, given more time and money. Often the team fails, in that an approach which looked promising in conceptual design fails for good reason during the construction of an operating prototype. The ability to spot this type of failure early, and move to more successful approaches, characterizes the exceptional project manager on this type of projects.

4.5 These investigate projects must be sponsored and regularly reviewed by senior management. It is management's responsibility to select ones with the best promise for eventual operating return, and turn them over to an implementation team for rollout to line areas. It is also management's task to kill projects which are not going anywhere. This must be done in a way which does not kill the enthusiasm of the project staffers for other innovative work.

5.0 Formal Project Planning and Monitoring

5.1 Computerized project planning and progress monitoring tools are essential on large systems projects since they:

i. break the work into pieces which can be explicitly assigned to individuals;

ii. show the logical relationships and dependencies among such pieces of work through the use of workflow diagrams;

iii. generate calendarized work schedules which reflect the logic of the workflow;

iv. identify work bottle necks or crucial skill dependencies;

v. track actual progress against plan during the project life, so that work slippage and project delay can be corrected.

5.2 Prototype and new ventures projects do not generally use these techniques, since their teams are small, their focus is limited, and their initial application resticted to pilots.

5.3 The project plan forms the "grounding base" to which everyone involved in the project refers in their communications with one another. It is the one thing that they all have in common. This implict use for communication about how work should be done is often greatest benefit of a formal project plan. It allows people to clarify how they will relate to one another as they apply their skills and knowledge to getting the project's work done.

6.0. Explicit Technology and Implementation Risk Analysis

6.1 Explicitly identifying the risks inherent in undertaking a project using a formal risk assessment methodology is simply a way of anticipating potential trouble areas. Doing it without taking steps to direct action at the areas of greatest risk accomplishes nothing. Doing as the means of producing a coordinated response to such potential problems helps build a sense of project collaboration and teamwork. It also helps develop a sense of realism about how much can be accomplished in the timeframes available to the project team.

6.2 This exercise combines formal analysis, practical experience, and proven judgements to make thoughtful predictions. The interaction of the predictions combine to locate areas with great risk of failure. It is best done by a small team incorporating the following kinds of individuals:

i. an analyst or consultant skilled in technology risk analysis;

ii. the project manager;

iii. a system designer with extensive experience in the hardware and software technologies to be employed on this project;

iv. an operating manager who fully knows the area in which the new automation is to be deployed, and who is enthusiastic about its potential, while realistic about the change it will require;

v. an operating manager who has extensive experience in implementing automation in comparable operating areas.

6.3 Useful results often come out of a 2 to 3 day workshop lead by the analyst or consultant. It is usually most appropriately done sometime after the initial or conceptual design.

7.0 Appropriate Project Team Staffing

7.1 Care must be taken to ensure that the project team is composed of the right mix of systems professionals and line staff experienced in the operating areas to which automation is to be applied. The required team mix varies at the different points in the project life cycle. This results from several reasons.

7.2 The underlying work structure built into in the new automation must be operable in its own right. It must make sense from a operating point of view. Automation is a tool. Simply deciding to automate something does not guarantee that the an adequate understanding of the nature of the work to be done will be present. Systems professionals do not have the kind of operating experience which allows them to determine correct work design. They can only succeed if they work with individuals who do.

7.3 The work design must not simply be a computerized version of the way things are done now. Taking that approach often institutionalizes ineffectiveness or inefficiency. Computerized systems are usually more expensive to replace, or rework, than non-computerized ones. Inefficient computer systems generally last longer than inefficient manual systems, and are harder to get rid of.

Automated systems also tend to be larger and faster than manual ones. Thus, computers are much more efficient at carrying out ineffective ways of doing things than humans. (Known to systems professionals as the "GIGOF" rule: "garbage in, garbage out, **FAST**".) So the workflow design built into the automated systems must be an effective one. It must do the right thing. Once this is clear, it must do that thing in the right way. Only through constant concern with these two, first effectiveness, then efficiency, will the new automated system be a way of doing the work which is a substantial improvement over the old one.

This requires an approach to conceptual and detailed systems design which balances professional automation design skills and operating design experience. The team must be innovative, while remaining operationally realistic. Correctly balancing the team is itself an exercise calling for experienced judgement. Some of the members must know what will work in the application areas, while others must be realistic about what can be done with computers are various levels of cost. Neither group can be rigid, simply repeating what they have done in the past. As a team, they must be innovative, applying their knowledge in new ways so that the new systems places the firm at the leading edge of productivity.

7.4 The work done during the programming and testing phase of a systems project is specialized, and requires different skills from the work accomplished during the design and implementation stages. Consequently, the team mix from the systems side will change over the life of the project.

7.5 Eventually, line staff will have to change they way they do work in order to take advantage of the new automation. People are taught, or develop, habitual ways of doing things which make sense to them, Changing such habits takes considerably more energy than retaining them. Consequently, most people resist change.

People accept change when they, or people they perceive as knowledgeable, or as their peers, have participated in the formulation of the required change. They resent change which they perceive to as having originated with "experts" who have "no operating knowledge" or "experience in common" with themselves. Functionally balancing the project team during the conceptual design and the testing phases with individuals drawn from both systems and line areas facilitates acceptance of the required change. Using operating staff as part of the training and implementation team ensures realistic timetables, as will as increased acceptance of change.