This paper discusses what should be done in setting up an Information Center as part of an Information Systems group within a business organization. The Information Center is defined, including a user's viewpoint. Three key areas—the mission, organization and position, and staffing—are addressed. A procedure on how to initiate the center is presented. In general, the paper shows what an Information Center environment can be and how it might fit into a business organization.

Management considerations for an Information Center

by L. W. Hammond

An Information Center (I/C) is a portion of the Information Systems (I/S) development resource organized and dedicated to support the users of I/S services in activities such as report generation and modification, data manipulation and analysis, spontaneous inquiries, etc. The fundamental premise underlying an I/C is that if provided proper education, technical support, usable tools, data availability, and convenient access to the system, users may directly and rapidly satisfy a portion of their business area requirements that depend on an I/S environment. With appropriate considerations given during the development of applications by I/S project teams, an even larger portion of the user requirements could be satisfied. By that, I mean to suggest that most of the report generation requirements of a system could be accommodated by having application programs place information in a data base for users to manipulate in order to obtain their own reports. Support for the users would be provided through the I/C. Designers of systems must understand the I/C environment in order to generate good data bases for making reports.

The need for an I/C environment becomes clear when you look at some of the factors that contribute to the frustration of users and developers with today's common I/S project-oriented development environment. The user's environment is seldom static. Business requirements are subject to change at very little notice, although the

I/S project development environment strives for a stability of the requirements very early in the development cycle. An artificial stability is created when users agree to "freeze the specs" so the developers can "get on with the development of the system." In reality, user requirements do not freeze, and the long development cycle often creates a mismatch between what is needed by the user at the time the system is delivered and what is actually delivered.

A high percentage of this mismatch manifests itself in

- The difficulty in modifying the reports provided with the application (in terms of format, totaling rules, level of detail, frequency, data elements included, etc.)
- The inability to accommodate unplanned requests for information
- The lack of a capability to analyze historical data to aid in the decision making and planning processes

Quite often, the alterations required are minor, but the I/S schedule is not able to accommodate them in what the user considers a reasonable time frame (a day or two, not several weeks). This disparity leads to the user's view that I/S

- Is not responsive
- Does not deliver what he/she needs
- Is inflexible

and the I/S view that users

- Always change their minds about what they want and when
- Make unreasonable modification requests
- Do not appreciate the impact they have on other I/S activities

When these views are considered, it is no wonder that frustration and conflict occur.

The proper implementation of an I/C strikes at the heart of this conflict by recognizing this situation as real and relatively unavoidable but able to be solved if both users and I/S will make some basic commitments relative to the report generation and data analysis components of the applications. I/S must make a commitment to implement an I/C with appropriate capabilities, packages, and data availability and to supply the users with education, hands-on support, debugging assistance, etc., and users must commit themselves to use the I/C environment to do most of their spontaneous report generation and inquiry work. I/S (and the I/C staff) must make a commitment to provide the data interface in a usable form, and the users must make a commitment to privacy, security, and auditability requirements for usage of the data. Both sides must provide people who bring with them an appropriate set of skills to apply to the task. The I/C staff

provides the technical support and consulting services; the users provide the application knowledge, task requirements, and people to do the work.

The Information Center, then, is a new I/S-user working relationship, a relationship built on cooperation and a joint dedication to getting the job done. This relationship is satisfying to users because it gives them more control over their jobs, provides timely solutions to their needs, gives them the support they need to develop this capability, and gives them the capability to ask the "next question." The phrase "next question" suggests that a characteristic of the spontaneous workload is that the answer to one question often leads to another question about an aspect of the problem that had not been considered before. This cycling typically continues for several iterations until they have enough information to form their response. The relationship is satisfying to the I/S people because it reduces their frustration level and conflict with users, helps them solve problems the users want to have solved, reduces their application backlog, and eliminates a substantial portion of their maintenance load. It is satisfying to the organization as a whole because it utilizes a scarce and valuable resource in an effective and productive manner, provides access to information when it is valuable in the decision-making and planning processes, and promotes a healthy, cooperative, harmonious relationship between the user and I/S communities.

The information center concept

As stated earlier, an I/C is a portion of the I/S resource that has been organized and dedicated to support users in various I/S activities. We now describe in more detail just what an I/C is and the support it typically provides. Sections that follow will provide even more detailed discussions on these areas of management concern:

- User perspective
- Mission statement
- Justification
- Organization
- Staffing
- Physical facilities
- Data security
- Initial efforts
- Growth and expansion

objective

The objective of an I/C is to provide users access to data on their own terms so that they can solve their own business problems. It is typically accomplished by providing a set of packaged tools and data availability (with appropriate training and consulting support) to the users enabling them to gain the power of the computer in a relatively easy and timely fashion. Examples of such packages are

- A Programming Language/Data Interface (APL/DI)—a data manipulation package
- A Departmental Reporting System (ADRS)—a report generation product
- Query-by-Example (QBE)—a query product
- SCRIPT/VS—a text-handling package
- Statistical Analysis System (SAS)—a statistical analysis package

The training and consultation are required to bring the users quickly to a level of confidence and proficiency with the tools so that they can develop solutions without having to involve I/S personnel and to deliver that service in a time frame consistent with the users' needs and the value of the information to the users.

The type of work the I/C is intended to support is the short job, the one-time query, the simple report, the minor change, etc. and *not* the work that requires the discipline of formal project development procedures. It is *not* a replacement for or a way around the longer schedules usually required to develop a *system.*

An I/C is a formal organization within I/S. It has a manager and staff, a mission statement and charter directing its efforts, and, usually, a set of objectives covering tangible measures (such as return on investment, revenue-to-expense ratios, budget headcount or budget dollars) and/or intangible measures (such as user satisfaction, quality of service, morale). The fact that the I/C is placed within I/S is important because it provides I/S with the ability to monitor and control its usage and growth, include support requirements in personnel and equipment plans, and integrate the I/C with the project-oriented development being done for all users. Placed too low, it will be viewed as belonging to the functional area into which it reports; placed too high, it will be seen as meant to serve only top I/S management. Typical placement has the I/C manager on the same level as an application development manager responsible for a specific functional area. In some cases within IBM, it is placed under a manager who also has managers for Data Administration and Data Management reporting to her/him. The desired effect of the placement of the I/C within the organization is to

- Make the service and support available to users across the entire organization
- Give the I/C equal status with application development
- Provide a management level focal point for the usage of and accountability for this resource

In addition to people (roles will be discussed later), the I/C must have adequate hardware to support its operation. The basic hardware considerations include CPU, direct access storage devices (DASD), and terminals for convenient access. The required quantity of these resources must be based on your initial scope of operations with some

consideration given to the first growth cycle. Generally, I/Cs start with only a few staff members supporting a few software packages for a small set of users; therefore, the initial requirements can be reasonably well determined.

The physical facilities to support an I/C include space for staff offices, including a terminal in each office, a work area with several terminals for general use, and the availability of an education facility. This space is located in the I/S area more often than in a user area even though a few heavy users of the I/C may develop their own physical facilities to support their own efforts. The major consideration is that it be easily accessible to users. Physical security considerations should fit the need of the organization.

personnel requirements

There are several distinct roles which I/C personnel fill. Very few people have the necessary skills to fill all the roles so most I/Cs acquire and develop staff to fill one or two rather specialized roles. The role of I/C manager is perhaps the most intuitively obvious one. In addition to the traditional functions of personnel management, planning, projection and control of resources, development of tactical plans to implement the strategical direction set for the I/C, and interfacing to other portions of the organization, it includes the responsibility to develop, with the users, a statement of the value of the I/C to the organization on some regular basis.

There are several staff roles within the organization. First, there is the role of analyst or consultant. These people are usually the first that a user will work with in an I/C. They are expected to help users assess the validity of using the I/C approach to satisfy their needs and give guidance in the selection of the appropriate packages to use. They may assist users in their efforts to consider alternatives and to develop a business case justification and benefit projection. The next role to be filled is that of a product specialist who receives the user from the consultants. The function of these people is to help the users define a solution for their problem within the constraints of the packages they support. The consultants, of course, pass the user to the product specialist who best fits the user's needs. If a package not in his/her area of expertise is needed, the product specialist will call on other specialists to support the user as appropriate.

There are several other areas of support needed for both users and the I/C staff. Usually some administrative support is provided by a person in a clerical position. This role includes secretarial support as well as control of the education facilities and schedules, keeping manuals up to date, preparation and distribution of a newsletter, etc. Two other roles remain to be mentioned. First, the technical support position includes responsibility for the installation and maintenance of the packages supported. Second, the education/training role consists of developing and presenting materials on the I/C and the packages it supports.

It should be apparent that some people could fill two of the roles such as analyst and product specialist or product specialist and educator, but this should not be done if either job will adversely affect performance of the other with respect to responsiveness to user requirements. In a new I/C, this overlap may be feasible because of the limited scope of the initial offerings. In a mature I/C, the workloads are such that this is not practical. Please note, however, that everyone in the I/C will be an educator or trainer at some time since the objective of the I/C is to be as responsive as possible to user requests.

Finally, since this will represent a substantial commitment of resources on the part of I/S, there must be a responsible attitude developed within the user community toward the use of the I/C. This attitude can be accomplished through a series of actions. The most significant action you can take is to make sure the users realize what benefits they are receiving from their use of the facility and what it would mean to them if it were not available. A significant part of this action is to establish the cost they incur for the services they use. In order to provide this information, some form of measurement and charge-back accounting is necessary. In addition, charge back can provide some of the data necessary to

- Establish that the I/C is not a free resource
- Monitor and control usage
- Establish and demonstrate the value of the I/C
- Do capacity planning projections
- Determine productivity trends

The Information Center — a user's view

This section will discuss the I/C from the viewpoint of the user of I/S services. It will address the typical problems that now exist and how the I/C meets those needs.

In today's environment, most business areas in an organization have computer-supported systems which help them perform their basic functions and produce most of their reports. Users may have been involved during the development of the systems, but typically, they now only supply data to the system, receive reports from the system, and interact with I/S for error corrections, enhancements, and special reports. This activity constitutes only a small portion of their normal work activities so they do not develop a high level of expertise in I/S. They do, however, develop a high level of expectation regarding I/S service. In part, this attitude is fostered by their knowing quite a bit about the data that is contained within the system (since they supply it) and by their having some knowledge of query packages and report generators since those products are common at business meetings, frequently appear in business publications, and are usually taught as

part of college classes. In fact, some of these packages are probably in use in the I/S organization now.

Into this environment, let me now introduce a special request for information. The request could have come from someone within the organization or from outside the business area; perhaps from a source outside the corporation. The typical characteristics of this kind of request are that: the time frame to respond is short (hours or days); the request is not unreasonable; the data does exist to satisfy the request; but no *single* existing report contains all the data.

Therefore, a special report is needed to satisfy the request. The user has two options available: (1) get I/S to write the special report program or (2) use a combination of fairly recent reports and compile the response manually. Both of these have drawbacks from the user's perspective. When I/S writes special reports, it takes too long and costs too much. When it's done manually, out-of-date data or data from various sources may be used. This could introduce some inconsistencies into the response, and it probably means some overtime will be required to produce the response and continue with the daily activities of the organization.

Having set the stage, let me finish by changing from an abstract view of the situation to the user perspective. I will describe the situation just as the user of an I/C would describe how an I/C could be used to satisfy the request. The rest of this section consists of the description.

user perspective

When the request comes into my department, we try to determine if we can handle it or not. Mostly, we look to see if the answer or the data to get the answer is in any of our existing reports or information. If we decide we can answer it, we next assess the resource (including computer services) we need to fill the request. If we need to use the computer and we need a report that does not exist, we go to the I/C for help. Our I/C provides a set of tools (software packages) and people to support us when we use the tools to solve our problems. They also supply us with education if we must train someone to use the tools they support. In addition, they have people we can talk to about our request who will help us determine which tool is most appropriate for our problem and how to structure the solution. We try to have someone in our organization trained on the tools all the time, but if we do not, the I/C can usually teach us to use one in a half day or so.

We go to the I/C with the request and some knowledge about the data we need but not where to find it or what it's called in the system. We expect the I/C to help us get access to the data we need. Sometimes it means writing an extract program to make a data file for us, and sometimes we get sent to some other department that has data we need. Then, we must get their permission to access their data file. If we need help signing on to the terminal or in starting to use the tool

we have selected, the I/C staff is around to help. They are also around to help us figure out what we did wrong if the solutions we write do not work the way we expect. They have been helpful to us by telling us about techniques to help us manipulate the data and use new features of the packages to do our job better.

We usually find out, after we go through a version of the solution, that we didn't ask the right questions or really understand the request. We can go right back and change our "query" to include the new conditions and run it again instead of having to go through the development cycle with I/S again. We sometimes see other questions which may be asked when we get the answer to the first one, so we change the program to get more, supportive data. When we give our response then, we can back it up with the information we used to develop it. Sometimes we even bring the person who asked the question with us when we run the "query" on the terminal so they can play the "what if" game and ask other questions that occur to them.

How much we can do is limited by the capability of the tools and the availability of the data we need. The I/C staff can help us if we need to use other tools in conjunction with the primary one or if we need to include more data in our process.

Since we are using resources for which we will be charged, we develop a business case for our use of the facility. We also develop a statement of the actual benefits we realize from using the environment to solve our problems. The I/C staff will assist us if we need help to do this, but it is our responsibility to do it.

In summary, we, as users of the I/C, understand and accept the following as our responsibilities:

- Understand the problem from its business perspective
- Identify the data we need in a generic sense
- Know how to use the terminal
- Know how to use the packages the I/C supports
- Do the work
- Develop a business case and benefit statement

We look to the I/C to assist us by providing

- Education for the use of the I/C facilities and training in the use of the supported packages
- Consultation, when we have a problem, to help us formulate a good approach to solve it
- Debug assistance if we run into trouble using a supported tool to solve our problem
- Data which is available in a usable format
- Special "user friendly" interfaces to tools or output generation capability when needed

The benefits to us from this facility are that

- We can respond to a wide variety of requests without excessive effort.
- We can do a better job of constructing the response.
- The cost is less and the time shorter than if we used I/S development.
- Many other profitable uses of the center suggest themselves.
- I/S has more time to do the large projects that are important to us for our future support and activities.

We also expect to help the I/C maintain its ability to support us in the future by working with them to estimate our requirements for this type of service so they can do the proper job of capacity planning. We believe that it makes a stronger business case to top management if we present the case and support it with the I/C staff.

Mission statement

The mission statement for the I/C is a very significant document in terms of defining the function of the I/C in the I/S environment and the roles and responsibilities of both the staff and the users. The relationship between the I/C and the I/S development staff must also be defined in the document. It is a concise statement of what will be done, how it will be done, and by whom. It should state, in addition, what is *not* appropriate for the environment. There should be more details, perhaps as an appendix or a separate document, that describe the operating plan statement for the I/C and indicate how the mission will be accomplished. The importance of these documents cannot be overemphasized since they will become the primary measurement standard against which performance will be judged and the final, authoritative criteria for providing support to users (or rejecting it if they try to abuse the facility or use it to evade standard justification or development procedures).

The relationship between the I/C and the development group is one that deserves careful attention. These two I/S functions must not be set up as competitive but rather as cooperative portions of the organization. Users should be able to approach either or both of the organizations with a work request and end up with a single, coordinated solution. This tone of cooperation must be woven throughout the mission statement document. Statements relating to the use of the I/C within the scope of large projects and the splitting of the workload responsibilities between the I/C and the project development group must be explicit in the document.

sections of mission statement

The mission statement should be composed of three sections and be no more than three typed, moderately spaced sheets in length. The first section starts with a statement such as "The mission of the ABC

Information Center is:" and then contains statements indicating what it is. Typical statements have included references to

- Creating an environment to assist people to use personal computing products
- Defining the cooperative interface between the I/C and the project teams
- Planning expansion based on usage and user input
- Providing ongoing advice and consultation to personnel using the I/C so they can make financially justified use of the facility
- Developing and maintaining a strategic statement for the usage of the I/C environment
- "Marketing" the I/C within the organization

Specific statements relative to the organization, such as being a product demonstration location in a marketing organization, are added along with statements to monitor and control usage (plan versus actual is most common).

The next section of the statement describes the steps that will be taken to accomplish the mission. Techniques and areas addressed have included

- Installation of hardware and software
- User needs and feedback surveys
- Technical competence of the I/C staff
- Assisting users to do financial justifications
- Development and use of charge-back and measurement systems
- User training modules for packages
- Preparation of articles for publications

The third section must state the criteria for work appropriate to the I/C and, in a generic sense, what is inappropriate. Criteria for acceptance usually include duration of effort, complexity of the task, level of user participation, and frequency of execution. A few more can be added to your own list. The most significant factor in the inappropriate category is that this is *not* a substitute for tasks that deserve/require project discipline. The problem several sites have encountered is that after users build some level of competence, they believe that they can develop *systems* faster and cheaper than the estimates I/S provides, and in some cases, the users could make good on their statement. The problem is that systems developed this way lack many of the things necessary for an ongoing production system and have a heavy impact on operations and the maintenance effort if accepted into production. There are often problems with data compatibility, security, backup, and recovery to the extent that savings realized in development are more than eroded in production operations.

To digress from the topic briefly, the way to handle the above situation is to work with the user, the I/C, and the I/S project team to

develop an approach that incorporates the discipline of the project team, meets the needs of the production environment, and incorporates the user's development skills with those of the project team to reduce the development estimate. Another approach is to let the user do it as a prototype system but have the pieces replaced with components developed by project teams as soon as possible, utilizing the user-I/C portions where appropriate.

operating plan statement

The operating plan statement is a more lengthy document (10–15 pages) and describes in detail the support the I/C will provide to fulfill its mission. Specific portions of some existing documents include

- Background and mission
- Terms and definitions
- Roles and responsibilities
- Strategic direction
- Education
- Data security and availability
- Package selection
- Packages supported
- Potential package support
- Accountability for usage
- Charge-back considerations

Justification of an Information Center

Implementation of an I/C must be a business decision. Executive management must be able to judge the return on investment for an I/C in a manner similar to other I/S and business opportunities. After initial justification, continuing cost/benefit analysis must be performed to ensure that the I/C remains a profitable contributor to the business operation. This section will present several techniques and examples for both components of this activity.

In actual experience, the continuing analysis yields much stronger justification than the initial projections and usually exceeds them. In several centers, the benefits expected by only a small segment of the potential user community have been sufficient for the initial justification. Normal justification techniques work just as well for this project as they do for the more traditional ones. Within IBM, several sites have started by identifying the interactive software products they will initially support, surveying the business potential within the user community resulting from the use of tools, identifying the benefits that would be realized, and comparing them to the expected cost to establish an I/C. One such survey for support of a query package such as ADRS and a presentation graphics offering that were located at a division headquarters identified over four million dollars per year of net benefits. A significant portion of that amount was attributed to redistribution of work among personnel to avoid extra hiring, and a

portion was a reduction in money paid outside the organization for support services, artwork and printing, temporary clerical help, etc. Based on their initial results and the experience of several I/Cs, it is expected that an historical analysis will show that these benefits have been substantially realized.

Another location provided APL training, consulting, and tuning service to a group of heavy users of CPU resources. Over a two-month period, they reduced their usage 50 to 60 percent by improving their techniques and effectiveness, and by structuring their queries in APL/DI and ADRS rather than native APL. Still another site put two people into their personnel department and their facilities management department (one into each), and in about ten weeks identified almost 18 work-months of net savings to the users through the use of ADRS rather than manual report preparation. In both cases, the real savings and the productivity improvement factors (2:1 and 3+:1) were used to convince management that an I/C can have a significant favorable impact on the user community and, more importantly, that those benefits can be projected, tracked, and realized. These savings came about because report preparation was more timely using ADRS than with manual methods. The reports could be produced with fewer man hours and were more complete and accurate than was possible with manual methods.

A final example is that of a development organization that examined the development backlog and identified projects that were suitable for doing in an I/C environment. The I/S cost estimates and user benefits were available. The organization estimated the cost to do them using the I/C and compared that to the I/S estimates. Savings on the order of 3 to 5:1 were identified. A pilot effort covering 15 to 20 of the projects selected was set up as a validation test. When they met, and in some cases exceeded, their projections, full and permanent approval to continue operation of the I/C was given.

Once initial justification has been accomplished and the I/C begins formal operation, the I/C manager, working with the users of the center, must begin to build the continuing business case to demonstrate the I/C's contribution to the business. Occasionally some I/C work yields a very large return. One such project occurred in the purchasing office of a firm that buys and distributes large quantities of materials. Through the use of the I/C to control and manage their purchase orders, they were able to reduce the cost of each unit ordered by a fraction of a cent. The total savings turned out to be in excess of 12 million dollars per year.

Formalizing and solidifying the I/C as a permanent part of the I/S organization will require some careful planning. Before starting the first "opportunity," a sort of score card or evaluation document must be developed to record the actual expenses of the I/C and user effort, an estimate of the cost to do it in a traditional I/S fashion, and the

user's estimate of the value of the task accomplished. This data is collected (along with user testimonials) for each project done during the start-up period and used to solidify the stronger business case. Some examples of the benefits that this process has provided are presented in the following paragraphs.

A service organization used APL/DI and ADRS to manage and track their service contracts and work performed against them. They can do the work in about three hours per week rather than the two days per week it took, and they receive a dollar savings of almost $15 000 per year. It took two days to develop the application initially. Another organization, a manufacturing location, spent ten hours per month manually selecting and manipulating information from several sources to generate a report. Using SAS, they invested three days of effort and implemented that report plus five more they needed. These reports now run with minimal intervention, whereas they would have required 60 hours per month to do without the I/C support. Both sites illustrate a performance ratio of about 6:1, which they attribute to the I/C environment.

In another situation, a department needed 17 reports to track work through a system. The estimate of I/S to develop them in PL/I was one week each. After being taught GIS, the users produced the reports in about three to four hours each using the I/C environment. This is a 10:1 ratio. Another location with GIS installed began to offer consulting and education to users. In a year, the number of jobs increased by 25 percent, but the system resources consumed dropped by 26 percent, which the location attributes directly to I/C support.

Literally hundreds of these projects are being done by users of I/Cs each year, so the total savings mount up to substantial sums. The key is to identify them early, and then have the financial organization track the projects and recover the benefit when appropriate, either through workload increase or budget resource reductions.

Overall, there are several sites that have had an I/C installed for at least two years and have produced a continuing record of two dollars returned for every one dollar invested in an I/C. One of the newer sites, perhaps benefiting from the experience of those that came first, is showing about $3.50 returned for each dollar invested.

As the justification builds, another aspect begins to emerge as a significant factor. Users begin to cite the intangible benefits they receive from the I/C approach. The following are some typical comments that reflect these benefits: the information was timely for the decision or problem solution, the number of factors considered per trial was much higher than ever before, the number of alternatives evaluated was higher than possible prior to the I/C approach, and the "comfort level" with the selected alternative was much greater than under the "traditional" method.

The point they are making is that the quality of the solution has improved significantly as a result of the I/C. In some projects the qualitative benefits could be more significant than the quantitative ones. The difference in investing a few million dollars in opportunities with different rates of return is computable, but measuring the return on the investment of helping to decide the direction of the business or where the product line must be in the future in order to keep the organization in existence is difficult to quantify. After the start-up period, the data on each task should continue to be collected to build stronger and stronger justification, not only for existence of the I/C but for growth and expansion.

Cost allocation is the final component of the justification process. The simplest way to provide cost allocation data is to use a charge-back system for the resources consumed by the I/C in the same way that project development costs are accounted for in the traditional development environment. The people costs for an I/C staff can be fairly and legitimately incorporated into the overall I/S rate for project people since their efforts will help the entire organization and will only be a tiny percentage of the total personnel costs. The charges to users of the I/C can then be based on hardware costs (such as for terminals or direct access storage devices), line and connect charges (for on-line access), and CPU cycles used. Some organizations also include charges for hard-copy output by the page or line and special software costs if the package cannot be shared by other users. Some of the benefits of having such a charge-back system include the following:

- Usage can be monitored and, therefore, controlled.
- Users can gauge the value of the I/C to their own environment.
- The concept that the I/C is not a free resource is established.
- The expenses for both current operation and future growth can be supported with real information.

Staffing is another important aspect of justification. Typically the concern is how much extra headcount will be needed to support an I/C. Although it is assumed that such support is not currently available, often individuals within an I/S organization supply this support on an informal basis. It is possible for this informal support to negatively impact the due dates of major projects along with their associated costs. If this informal support is recognized and taken into account, the simple exercise of measuring its volume for a short period should provide enough data to support the claim that a redistribution of existing workloads will more than cover the initial staff of three to four people.

In summary, normal justification and/or business case procedures can be used to justify an I/C. Several examples of techniques have been provided to suggest approaches to be used. Experience of the centers in operation suggests that a 2:1 return on investment is not

uncommon. Continuing analysis of the I/C is needed to be able to portray its contribution to the business. This contribution will be the aggregate of many efforts. Their assessment of the benefits must be matched with cost data to provide the real net contribution. Specific improvement factors normally run from 2:1 to 10:1 with some exceeding that figure in special situations. Intangible benefits will also be supportive of the I/C. It will take more effort, but some of these can be quantified.

Finally, there is an ongoing responsibility to monitor and control utilization so that the I/C retains its useful characteristic of timely support to users. With the right working relationship between I/S and the users comes a sharing of the justification for growth.

Organization

first structure

There are two structures for I/Cs which are emerging as successful, working organizations. The first, and most popular, is based on a structure set up by IBM Canada. It is an organization that has a manager responsible for the direction and health of the I/C and a staff of people who work with the users to perform such tasks as

- Analyzing user support requests
- Assisting with the development of business cases
- Guiding the users to the appropriate source for the solution to their problem including non-I/C approaches as the situation indicates
- Training and guiding the users as they develop the solution
- Helping users evaluate benefits
- Identifying and introducing new users to the I/C
- Identifying and introducing new packages into the I/C

There are variations on how the above functions are implemented. One variant has individuals working with users from start to finish, meaning that the I/C staff person must be able to analyze the requirements, select the appropriate packages, train the user if needed, and support the user in developing the solution. This variant has the advantages of a single user interface and a better understanding of what the users do within the I/C. Drawbacks are the lack of enough people with all the skills needed to staff the center this way and the loss of exposure to other applications of the packages they support.

Another variation is to have people fill specific roles within the I/C. This structure is the most popular today. These organizations have analysts who perform the initial consultation with the user and assist with requirement analysis and business case preparation. They pass the user to the appropriate product support specialists who help the user develop specific solutions. In the course of this activity, some

other specialist may be involved to do such things as education/training, data base creation, and technical support of other packages.

Both these variations need administration support, which is another role to be filled in the center.

second structure

The other organization is a distributed one which does not have a single manager for the I/C. The commitment to provide users with I/C support is formally recognized within the organization, and individuals are identified to provide it. A part of their work time is scheduled for this type of support. Usually, they reside in a development group that supports a specific user function. Their role is to develop an end user support interface within the users' organization and act as the window into the available I/S resources to support them in I/C activities. There will generally be some organization-wide support for some specific areas that require a high level of expertise, but this support will usually be a staff function to a technical support or operations group. This organization may be good where one or more of the following occur:

- Not enough usage to justify full time support
- Small development staff
- Highly diversified user groups with little overlap between the packages they use
- Highly specialized user functions with good skill levels within their own organizations
- Geographic separation of user functions

The distributed I/C can still be supported on a centrally located machine complex if desired.

I/C placement

The placement of the I/C within the organization is also important to its success. When placed too high, say as staff to the I/S site manager, it is often viewed (and used) as a tool of I/S and not the users. This placement limits the ability of the I/C to develop a close partnership with the users. When it is placed too low, say reporting to a functional area AD/M manager, it is viewed as belonging to that manager and functional area and not to the organization as a whole, again limiting its effectiveness. The most satisfactory placement is at a level equivalent with the development managers so that it is available to everyone and has equal status with the project-oriented work within I/S. Some organizations have placed the I/C in a position within the organization similar to Data Base Administration and Data Management Departments. As the utilization of the I/C grows and users start to request new packages (or the I/C introduces them), the staff can be enlarged and support incorporated with minimal disruption to the existing structure.

Staffing

Initially, a manager plus two or three I/C consultants are satisfactory as a start-up staff. This size is about right to start and carry through I/C operations for the first eight to twelve months and is sufficient to support one or two packages over a user population of three to five for the pilot period. As competence grows, this staff can support, depending on the packages selected, a user population of 60 to 80. As the staff and users gain more expertise, this staff could support two or three new packages, again depending on the packages selected. Support for more users and/or packages will most likely require an increase in staff size.

After the initial offerings have been available for about six months, additional staff can be added to support the next set of packages. Their first assignments should consist of

- Getting trained on the new package
- Installing the new package
- Creation of good dialogues to make access to the packages really "user friendly"
- Developing their own level of expertise on the package
- Developing user guides for each package
- Developing education materials to support the package
- Running two or three pilot tests with users
- "Going public" with the offering

This process could take two to four months and is repeated each time a new package is introduced. Of course, you may modify the steps as dictated by your situation (i.e., you may already have the package, you may choose to support it without new staff, education may already exist, etc.). Experience has shown that it is better to start slowly and stay under control with a limited set of packages and then add a package at a time to keep growth controlled rather than open the I/C to any and all users at once or try to support a large set of packages right from the start.

The definition of the roles and responsibilities should be well thought out and documented prior to interviewing and hiring staff. You should interview prospective I/C staff with one or two roles in mind that you think they could fill. The roles and responsibilities should be thoroughly reviewed with candidates since they represent a work environment the people are often not familiar with. For some, the unstructured nature of work and/or the education aspects are enough to terminate their interest. Prospects must want to be part of the I/C environment. The main roles I/C staff personnel would perform are those of consulting, teaching, and assisting users at the terminal. Their main responsibilities would most certainly include (1) the direct support of their assigned packages, (2) development of training modules on the packages and presentation of them to users, (3)

evaluation of user requests and suggestions of possible approaches to solve the problems, and (4) the activities necessary to bring new users of the I/C into the environment and get them comfortable enough to begin to do things on their own.

consultant

The role of consultant involves the review of information presented by the users and a synthesis of it into a request for support. The request should identify the best package and approach to solve it. The role of users in this effort is to bring their application knowledge to bear on the problem and understand where the effort might lead from a "next business question" perspective. The role of consultant also involves screening requests to make sure the users understand and abide by the guidelines for use of the I/C and to pass to the project development backlog those requests that belong there.

product specialist

The role of product specialists is to support users of the packages for which they are responsible. They must be "experts" in the uses and functions of the packages. The product specialists should have a general knowledge of the other packages so that they can direct users to them if the need arises. This knowledge is also useful in the development of solutions that may use multiple packages. It is also valuable when interfaces between packages must be structured so that a clean and workable interface can be developed.

A new product specialist can usually support about 20 users and be responsible for two to four packages, depending on experience, relationships between the packages, complexity of the package, and other similar factors. For example, a single person could be expected to support APL/DI and APL/ADRS because these packages have a common base and are so often used together. Some sites have linked another APL-based package called Financial Planning System (FPS) with ADRS and that could be added to the group. If the person had the facility for it, he/she could perhaps support native APL if that was an offering of the I/C. Other areas which lend themselves to grouping are graphics and text processing. If the usage of query products such as QBE, GIS/VS, IQRP is high, you might consider assigning a single person to support each package. If the usage is not very high, the support responsibility could be combined.

The key point is to provide an adequate level of support to the users of the packages. Because of the nature of the area the package supports and the richness of its facilities, support for SAS, used for statistical analysis and output display, is often given as a singular support assignment. In all cases, however, adequate cross training should exist to provide for backup when the primary contact is unavailable and to ensure that staff will be available to be considered for new positions without unduly affecting the level of support of the I/C to its users. Nothing is more frustrating to a user who has entrusted himself to the I/C than not finding help available when it is needed. Cross training also helps when one consultant needs to "talk out" a problem or idea with someone reasonably familiar with the topic.

teacher

The role of teacher is a multi-faceted one. Initially and intuitively, it addresses the basic training needed to teach users how to gain access to the packages and how to use them to solve their problems. In a more subtle vein, the role is to teach users the skill of solving problems and evaluating alternative solutions. It also involves teaching users how to use features of the packages past the basic level and how to do some debugging of their own work. Another key responsibility is to teach users how to articulate their future needs so the I/C can position itself to satisfy their needs when appropriate. Another subtle teacher responsibility is to get users to respect the intent and capability of the I/C and not abuse it. Such respect teaches them to look at the value of the environment and, necessarily, brings them to the position of standing with I/S when justification and support are examined by top management within the organization. Obviously, all I/C personnel are teachers, not just those providing formal education.

terminal assistance

The terminal-assistance role is every bit as important as the other two. All personnel in the I/C should be able to provide some level of terminal assistance. Questions about package usage will most likely be answered by specialists or consultants, but sign-on and general terminal usage should be familiar to everyone. The whole purpose is to make the users' first few contacts with the I/C as painless as possible, thus minimizing the impact of the new environment and concentrating their efforts on solving their problems. This support will typically continue only through the first few sessions until a user has developed enough confidence to take control. The assistance role is usually re-established when the first serious problem is encountered or the user wants to move past the basic stage. It is appropriate to accept the assistance role again at this time to keep the users' confidence level high and impress upon them that the I/C is an environment that is both sensitive and helpful toward aiding them in solving their problems.

other responsiblities

Other responsibilities which I/C staff will be expected to assume include developing personal expertise in the packages supported to the point of

- Initiating creative uses for them
- Doing work for a user area *(but only when absolutely necessary!)*
- Evaluating new areas of support
- Training new I/C staff

The I/C should also work with and support the project teams in the I/S organization. The purpose of this support is twofold: to help project teams work more productively and to educate them about the I/C so that they consider it as an element of their design and development efforts.

When the I/C is understood and appreciated by the project teams, there is the potential for a lot of cooperative effort. A way in which

this potential can be tapped is to design systems without hard-coded reports whenever possible. In lieu of these reports, the project team will deliver a data base (or set of data bases) with the report information in them. This data will be made available through the I/C. The users will work through the I/C to develop their own reports from the data. The advantage for users is that they can define the format and frequency of the reports at will and add and delete reports as required; all they have to do is make sure the data will be in the report data base. The advantage for the project team is a cleaner interface between processing and reporting and a reduction in the maintenance and enhancement workload for the system. They will usually get a cleaner systems design since they can concentrate more on the processing logic with only a little consideration given to the reports. All they have to consider with respect to reports is whether to put an element into the report data base.

personnel characteristics

As you may well have guessed by now, there are some special characteristics I/C personnel must possess to be effective and develop the proper attitudes about the I/C among the user community. When you interview and select I/C staff, consider such factors as

- Interpersonal communications skills
- Ability as a self-starter
- Teaching ability
- Problem-solving skills
- Patience and persistence
- Relationship to potential users
- Application expertise
- Package knowledge
- Salesmanship talents

While no universally agreed upon priority for these characteristics exists, general agreement is that the application and package skills can be taught and belong lower on the list than the "personality" type skills.

In conclusion, since this will be the first point of contact with I/S for many users and in some cases the only contact they will ever have, you must staff the I/C with quality personnel. They will project the image of I/S to the user community, so be sure they create the image you want.

Physical facilities

There are only a few, but nonetheless important, considerations concerning physical facilities for an I/C. First, the manager and staff should be located together where they are easily accessible to the users. Individual work cubicles or offices are recommended for each person to facilitate an undisturbed environment when working with

users. There should be one or two unassigned areas where users can work when they come to the center, and a group of terminals should be available for their use. Three or four terminals should be in this group, and each staff person and work area should have one. Proximity to an instructional facility is also important, since there should be considerable activity in this area. The instructional area could be shared with another group which also needs education facilities, or it could be dedicated space used by the I/C for demonstrations and formal presentations in addition to its use as a classroom. This area should have a terminal or the ability to install one when required. A nice addition for groups in excess of five or six is a large-screen display or two TV-type screen extenders. One I/C has set up a training facility that can accommodate about a half dozen students, each one having an individual terminal. This setup is very helpful in giving a real feeling of "hands-on" experience to the training exercise. It is not recommended that the common terminal area be used as the instruction area because of the conflict of purpose and impact each activity has on the ability to do the other.

Lack of these facilities is not a reason to delay starting an I/C. As long as terminals and workspace are available somewhere, you should begin to offer the service. The support you generate will help justify the proper physical facilities.

Some final observations on physical facilities concern terminals in user areas and physical security. Data security is discussed in the next section. As users build their competence, they will want terminals in their own areas and can point to productivity gains by not having to go somewhere else to work but rather having terminals immediately available when "the inspiration" hits. It is proper to support them so that they justify and acquire the terminal equipment; the I/C must make sure they will be usable when installed. The I/C maintains control over hook-ups and thereby controls access to the system which helps contain usage of the system. With regard to security, consider appropriate levels depending on the potential for abuse. You can put terminals in user areas out of general view, have the key lock feature installed, and/or put them in a locked area. It is possible to provide limited, controlled access to the power supply for the terminals, giving the ability to completely sever the connection between the terminals and CPU when the terminals are left unattended. In any event, let the level of security fit the requirement.

Data security

The considerations surrounding data security are certainly among the most important relative to starting and operating an I/C. If your corporation has a data security function, involve those people in the planning, implementation, and monitoring activities. If such a function exists at your site, solicit its involvement in the I/C data security

plans. Make sure that guidance and requirements set down in your site standards and procedures manual are included also.

Based on a composite of data security procedures available, two facts emerge: (1) all data security procedures depend for their success on the integrity of the people using the system and (2) it is possible to provide adequate data security in an I/C environment.

There are several ways to provide data security. Packages and techniques used include the Resource Access Control Facility (RACF), data set password protection, encryption, sign-on profiles and passwords, and use of security provisions built into most of the packages you would offer through the I/C.

The standards manual should address the security considerations for data, sign-ons, and passwords. Aspects typically addressed include

- Responsibility for confidentiality of passwords and sign-ons
- Frequency of password changes and by whom
- Classification criteria for data security levels
- How long a sign-on can exist without rejustification
- Access to production data bases
- Sharing of data between functions

Some organizations make it a standard practice to require users to change their own passwords every month. If this is not done (a 10-day grace period is usually allowed), the user is locked out of the system and must be reinstated by someone authorized to do so. Your organization may choose to implement a semi-annual or annual process in which user management must approve continuation of the sign-on. You may even consider sign-ons that are revoked at completion of the project. This type of sign-on means that if a project developed in an I/C is going to be run as a production job, it must be validated and controlled under the security guidelines for production systems. The advantage of this mode of operation is that you can gain a better understanding of how and for what the I/C is used since each project must be justified in order to get a sign-on.

Some auxiliary data security support is gained by restricting the access to live data bases to read-only and then only when it is the only reasonable way to provide access to the data. More support comes through identifying an owner for each group of data and requiring people to gain permission to use the data from its owner. The I/C could accept the role of providing all data needed through extract programs which only take the elements requested, thereby not making extraneous, yet associated, data elements available just because they are in the same segment or record with the needed data. Still more support comes from having someone review a log (created by the security system) of all accesses to confidential and critical data and assessing any unusual situations identified.

When users ask to have the results of their I/C efforts replace their current production files (and sooner or later they will), make sure there is a distinct procedure to be followed with multiple verifications and approvals of responsible personnel at each critical step to protect both the users and operations from "a simple *misteak*." The request is not uncommon in the areas of planning (financial and product), and people working with models or simulations. Special care must be exercised in taking backup copies of existing files to be used in recovery procedures. It is desirable to have a program you can run before and after the change which in some way would validate the success of the operation. The validation criteria would have to be determined based on the situation.

To make security work, personal involvement includes the protection of critical information such as passwords and generated reports, the observance of all security procedures, and the nonmisuse of data provided for legitimate purposes. Periodic changes of passwords with distribution based on a current need to know and periodic reviews of approvals to access data granted by owners of the data help enforce the security procedures.

Again, the key points in this area are (1) adequate security can be established; (2) it takes study, planning, and work to implement the appropriate controls for your I/C; and (3) your corporate and/or local site guidelines for security are the ultimate authority for resolving questions concerning security.

Initial efforts

Now that the "preliminary" work is out of the way, the focus turns to what, specifically, the I/C will make as its initial offerings. The considerations cover the following areas:

- Package selection
- Pilot effort selection
- Training
- Execution
- Measurement/tracking/evaluation
- Reporting

Most I/Cs begin by selecting a package that is already installed and being used and then selecting two or three users who need that package to satisfy a current business need. The I/C works with the users in a pilot project environment to accomplish the training and use of the package to resolve the requirement. The results are evaluated and a preliminary justification developed for the service the I/C wants to offer. The user experiences are abstracted and published to indicate to others what potential uses of the packages might include. This pilot stage may last two months.

pilot group characteristics

Some of the characteristics you should look for in your pilot user groups include

- Existing or imminent need for I/S to help solve a business problem
- Willingness to develop skills to use packages within their own area
- Ability to quantify results of their efforts
- High level of "special report" type work in the development backlog
- Need for quick responses to their business issues
- Willingness to share their experiences with others
- Willingness to stand with I/S to justify the I/C concept

In general, users who speak negatively about the service they get from I/S on small job requests are candidates to whom you could present the I/C opportunity. Users with a history of good participation with I/S are another obvious target population for the I/C. After these groups, you must do some creative searching for candidates. Look for groups who would be strong supporters of the concept. A survey of top management levels may uncover some tasks they feel are not being adequately addressed. You may also uncover activities no one ever considered doing with I/S participation that are now feasible to attempt. Small, low-visibility functions usually have I/C-type work being done manually because of perceived high overhead cost to get I/S service. Still another way to identify candidates is to hold an "open house" and show off your support. This method may attract people with problems you could solve right there. That would get a lot of publicity throughout the organization.

application criteria

Applications for the pilot efforts should be selected to fulfill a few basic criteria:

- They should be valuable to the users.
- The type of request should be typical of many organizations (e.g., extract, sort, and list; query existing data; build and analyze small function-oriented data bases).
- The application must be able to be satisfied within the constraints of the selected packages.

Unless you cannot avoid it, do not make a new package the pilot offering. Look at the usage the packages are getting and at their users with respect to the level of expertise they possess relative to the packages. You want a package set your staff can support and with which the users are somewhat familiar but not one the users are already expert at using (save those for the second cycle of adding packages to your supported set); you must be able to provide something to the users that they cannot do for themselves and that they consider valuable to their function. You also want to select

software packages that have a potentially broad user population to assist you in building a solid user community. Pick a package that someone can use to solve an existing or imminent problem.

The pilot efforts you select may come from any business area or function within your organization. First and foremost, pick a pilot that can be done within the limits of the package. Other key points to look for are a high chance of success, the good visibility that a success will provide, the need of the user, and the level of user participation you may expect. As you make the survey of packages and users, have the staff look for potential pilot projects. Try to select a pilot project you could do yourself (in case the user support is not adequate) to prevent a negative exposure. Another key factor is data availability. Try to pick a project that will utilize existing data which is stable and accurate. Since these are to be your springboards into continuing I/C operation, pick a project that has quantifiable results and a user who will quantify and support them. Last, in order to remove some of the bias, select users who would not give I/S a very high rating as well as users who would react favorably towards I/S. Hearing a positive story from a traditionally negative user is worth every second of effort to the success of the I/C.

prior activities

Prior to starting the pilot I/C project, a number of activities must take place. A user's guide must be developed for the use of the I/C itself. It should include how to make the initial contact, the forms which may be required, a step-by-step procedure for filling them out, how to acquire a sign-on, and how to sign onto the system. It must include how to gain access to the education and support materials available and how to report problems with the system. In short, it must try to anticipate every user's need and provide the necessary guidance to walk him/her through it. In a similar fashion, guides for each of the packages must be prepared. Finally, education materials must be developed to train the initial set of users.

Also, user training must be done prior to starting the pilot to make users familiar with the packages' capabilities and limitations. In addition to the training modules you will develop for each package, consider the self-study courses now available for them. You should probably start with them as a base from which or around which you develop your courses. The quality of the recent course materials is really quite high. This training will also tend to shape the nature of their requests into things that are realistic to attempt. Be sure to spend extra time during training gathering comments on the training module and exercises. Plan to have another critique after the pilot offering to see what else users would say about the adequacy of the training. As part of the training, work through the general I/C user's guide and the specific user guide for the package they will be using. Modify the guides to reflect the comments and experiences of those using them to do the pilot project.

During execution of the pilot efforts, keep careful, detailed notes on everything that happens. These notes can prove useful in preparing the success stories, business cases, and follow-on activities. Prior to starting to do the work, get agreement on what the completion criteria are for the project, and measure and evaluate results against them. The users will probably identify more things they want to include as they get into the pilot project, so use change control procedures to amend the criteria or identify them as new tasks outside the original scope. Measure and evaluate them apart from the original project. If at all possible, do the things that arise this way to impress upon the users the power and sensitivity of the I/C as it aids them in meeting business needs. Try to limit the time to three to five days to actually learn the tool, state the problem, and solve it. Data availability could impact this significantly, and that is why you should work with data that is already well known, stable, and accurate.

It is very important to perform accurate and complete measurement on the projects. Because these are pilots, you may not wish to charge for any I/C service and usage, but you should still gather the data and calculate the charges as a portion of your evaluation effort. The form you ask the user to fill out should be simple and capture relevant business case information. It should include space for qualitative comments and the users' appraisal of the value of those benefits. Perform the cost/benefit analysis with the users and get their concurrence with the results; if possible, get them ready to present it to top management as you do the last step in the initial cycle, which is to report the results to top management.

Finally, tell your success stories (better yet, have the users tell them for you) in order to gain the support needed to make the I/C a permanent part of the I/S organization. A side benefit of the success stories is that as management hears them, they picture ways to use the I/C to help solve problems they face. When you give them the ability to solve those problems, they become a stronger set of supportive users. A very fundamental principle in the entire endeavor is that if someone once has successful experiences and appreciates the value, it is a major effort to get him/her to give it up. They will dare you to make it work, then dare someone to try to take it away from them.

Growth and expansion

With the initial success comes the opportunity for growth of the center and expansion of the offerings. There is a risk of failure if you attempt either or both of these on too large a scale. The best advice is to start slowly, gain control, then go fast. Success is an opportunity to gain control and to strengthen your base of user support, not to go fast. This stage occurs about two months after the startup of the

center. The pilot projects have been done and the results presented; the experience and user comments have been incorporated into the training modules and package user guides; there has most likely been another round of projects done to validate the changes; and the users are asking for more access to the environment. It is really too soon to consider expanding the staff and offering more packages. You should use the next few months to work with the original set of users to do more projects and solidify their competence, to introduce new users to the I/C and provide their initial training, and to start to identify the next area of support the I/C will provide. Once this has been done, you can add staff and the packages selected to be offered next and open the initial packages to any users who want to use them. At this time you will probably be involved with justifying terminals in users' areas if you have not already encountered that question. With more users and more projects, the data security and data availability issues should be reviewed and revised as appropriate, for what was working on a small scale may now be insufficient on a large scale. As you can see, this is really a time to get control and not advance too fast.

It has been suggested by some existing I/Cs that each user get a "free" encounter with each new package he/she uses. It has also been suggested that each new package be introduced into the environment as if it were the first one, thus repeating the ideas expressed in the previous section. Both of these ideas have merit and should be considered at this time. Another problem you will be facing at this time is that of cost accounting/charge back and capacity projections. It is time to thoroughly review procedures in these areas.

restaffing

Shortly, you will begin to face the problem of staff attrition and where to find replacements. In the case of attrition, planned cross-training is the key to having backup personnel available when the right opportunity to promote someone arises. A solution for replacements can be harder to obtain because, in addition to the logical sources of I/S development people, personnel in user areas who have used the I/C may want to compete for those positions. There are several good reasons to consider them: (1) they probably have excellent product knowledge; (2) they understand how user areas function; (3) they know the I/C environment; and (4) they are probably among the user's top people. Several negative factors are also to be considered: (1) they are probably among the user area's top people; (2) they may tend to support only their former business area; (3) they may lack the I/S background to enable them to make the proper trade-offs between the I/C and project-oriented development; and (4) they may forget they are no longer "users."

Most of the negative aspects can be remedied with education and management control, but the item that appears on both lists cannot. When it comes to top performers moving between functions, there is usually a lot of emotion and finger waving and charges of raiding. The only way to handle this situation is head-on and above board with

all appropriate levels of management (I/S and user area) involved in an assessment of the impact of such a move and the alternatives available to provide proper coverage, should it occur. It is true that user managers should be providing the same type of cross-training and backup for their people to provide the mobility to make moves, but this situation is not usually met with logic and reason; it is an emotional and political one and must be dealt with as such. If logic prevails, fortune has smiled on you.

service evaluation

Some sites have implemented a user report card to gather service evaluation information. Some have printed forms they send to users at the conclusion of a project, and some have cards with every terminal so the user can send in any reactions after a session. A few sites have reported that they have, or are installing, a report card, presented as part of the log-off procedure, to capture user satisfaction opinions and comments while they are fresh in their minds. Regardless of how the data is collected, it is an important task. It supports your business case, monitors your service level performance, and provides guidance in determining future needs. The user report card should be easy to use and provide information you really need and will use. To keep usage of the data collection system at a high level and ensure the accuracy of the data, make certain there is a feedback loop that shows users that the data is important and is used as the basis for decisions affecting them. I/C management has a responsibility to pay attention to the information and use it, and to modify the data requested as the environment changes. This information, used in conjunction with charge-back and benefit follow-up analysis, provides a strong base for justification of growth and expansion.

New equipment justification is actually a divided responsibility. Terminal justification is largely the responsiblity of the users with assistance from the I/C; CPU and DASD justification is largely the responsibility of the I/C with support from the users. The final justification process and presentations should be made as a joint effort between users and the I/C. Make every effort possible to have users provide the quantified benefit value based on their experience, and match that with the I/C cost data. Make sure, however, that the data will stand up to some level of testing and that the users will defend the nonquantified part of the justification presentation which, by the way, may be more significant than the hard dollar figures. Prior to presenting the justification for equipment, spend time educating the people to whom you will make the presentation about the importance of the qualitative aspects of justification and how to appraise it. This effort will prepare them to accept this portion of the justification and treat it with some significance.

Finally, considerations for maintaining an adequate hardware configuration must be addressed. It is very important to maintain an adequate level of service and responsiveness to encourage users of the system to continue to use it. It has a companion responsibility, which

is to support the dependency that develops so that increased utilization is not at the expense of performance. The information you capture from user "report cards," charge-back system, and project justifications must be used to plan and justify hardware to meet the projected needs of the user organization. Lead times for equipment may dictate an oversupply for a short time in order to ensure that the I/C can meet its responsiveness commitments during periods of growth or transition. If service levels become too unpredictable or nonresponsive, users will not support the I/C and the I/C's value to the organization will be lost.

Summary

The Information Center establishes a new user-I/S partnership which will benefit the entire organization. Users benefit because their short-term, often one-shot, I/S-related business needs can be addressed immediately. I/S benefits because it can satisfy the short-term, one-shot user needs in a more efficient manner, thus being able to devote more of its resources to new project-oriented development necessary for the long-range success of the business. The total organization benefits because a scarce and valuable resource is used in a more effective and cost-efficient manner.

The possibilities for implementing an I/C exist in almost every type of data processing situation. The need for an I/C is accentuated by today's business dynamics. The decreasing cost of data processing systems makes it easier to justify the resources to implement an I/C. The rise in the level of expectations of users of I/S services creates a larger backlog of work for I/S organizations. The difficulty of most I/S organizations in acquiring and maintaining an adequate staff contributes to the inability of I/S organizations to allocate sufficient resources to solve the problem within the traditional environment.

The realization that both users and I/S have a role to play in resolving this situation is the key to its success. The basic concept of an I/C environment is that users, provided with the tools, data, training, and consultation, are capable of and willing to generate their own queries to solve spontaneous business needs. This environment is usually established by allocating a few people from the I/S organization to provide the proper support. The I/C staff must possess a high degree of interpersonal skill as well as technical expertise in support of the set of tools the environment offers. The users' view of such an environment is that it is very valuable to them in helping to structure the business requirement into something that can be solved using the I/C approach and assisting them as they actually develop the solution. It is perceived as a responsive organization interested in meeting the needs of the business in a timely and cost-effective manner. The development of the business case (cost/benefit analysis) is usually a shared responsibility between users and I/S and helps to build the

justification for an I/C. The I/C should not be considered a "free resource" since that can lead to misuse and decay of the I/C.

The three key areas which must be addressed when initiating an I/C are (1) the mission statement, (2) organization and position, and (3) staffing.

The mission statement must be a clear statement of the function of the I/C and the roles and responsibilities of both users and I/C staff. In addition, the relationship between the I/C and project-oriented development activities must be a part of the document. A more detailed attachment to the mission statement should contain information on how the I/C will meet its mission, the criteria for work appropriate to the environment, and specific sections covering such topics as roles and responsibilities, tools and data available, consultation and education, and accountability and charge-back considerations.

The organization of a typical I/C is oriented around package support and functional roles rather than application areas. In cases where the application data is so complex that this is not practical, a few I/Cs have allowed someone to specialize in that area with the understanding that the user will develop data expertise as quickly as possible. Placement of an I/C relative to other I/S functions is also a key to its success. The best placement seems to be as an equal with both project-oriented development and operations, giving the I/C the proper level of support and exposure to all potential users.

Staffing is the third key issue to be addressed. Staff personnel must be able to support their functional assignment (consultant, product specialist, educator, etc.) technically, but this is not the most important consideration in selecting staff. The ability to establish good harmonious relationships with prospective users and good problem-solving capability is more important. The impressions that this "first contact" of a user with I/S (of which the I/C is a part) will generate are a significant part of how successful that specific effort and the total I/C effort will be and how it will be perceived by the organization.

The question of adequate physical facilities can be addressed at any time in the life of an I/C. Initially, all that should be necessary is to make the I/C staff accessible to the potential users and to make the packages and data available to the users through a terminal system. Data availability raises the question of *data security*. Most I/Cs have found that adequate data security (i.e., consistent with current data security practices) can be implemented using existing methods and packages. In addition, an owner of the data is identified and must give formal permission for someone else to use his/her data.

Getting started covers selection of initial packages and pilot users, training, and measurement/tracking/evaluating/reporting.

Most I/Cs will start with a query package that is already installed and supported by existing educational materials. A few users who have requests that might be satisfied by the package are selected and trained to be the initial users. Detailed records of the effort expended and benefits obtained are kept for each use of the package. At the end of the pilot phase, the results are evaluated and a recommendation for the future of the I/C is made to top-level management by both users and the I/C manager. Growth and expansion can be accomplished by adding new users to those already using the initial set of supported packages and by adding new packages to meet new business needs.

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