

Chapter 9: Information and Communication Technology



Front cover photo: Students in Choco, Colombia, communicate with a partner school in the United States through a CRS program that links students via the internet. The program helps bridge cultural divides while improving students' computer skills. Photo by Jim Stipe/CRS.

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CHAPTER 9: INFORMATION AND COMMUNICATION TECHNOLOGY



PHOTO: UNICEF FOR CRS

Niramure Joselyne, 19, of Rwanda, sews an item for her client. Joselyne is an orphan who learned this marketable skill through a CRS program.

ICT PROCESS MAP

Implement a Technology Plan Process 9.1

Do you have a methodology
in place for making
technology decisions?
see page 6

Software Selection Process Process 9.2

Do you have predefined criteria
for selecting new software?
see page 13

PURPOSE OF THIS GUIDE

This guide is intended as a reference/working document targeted at organizational managers and practitioners in the field of information and communication technology (ICT). It is intended to aid in the development and enhancement of management processes. Specifically, this guide presents the principles, minimum standards, and best practices for the successful establishment of an ICT implementation process and a software selection process.

Organizations interested in developing or improving their business processes and related policies and procedural manuals will use the information in this manual in different ways. This is because each and every organization has its own unique spin, interpretation, and implementation of ICT business processes.

While it is recommended you read the entire guide to gain a full understanding of the ICT business process, it is not necessary to read all the sections or chapters in chronological order.

WHAT FUNCTION DOES ICT SERVE?

Every organization has information processing and communication requirements. The efficiency of the organization as a business depends on how the organization has optimized its information processing system.

Having ICT processes in place allows an organization to continuously monitor developments and trends in information technology and evaluate the need to change or automate its processes. In the current environment of continuous development in the ICT sector, many agencies may be tempted to opt for technologies that look very fashionable at any given time. The agency needs to balance this urge with a long-term information requirement plan. Investment in ICT technology should be smart and in keeping with agency strategy.

SUMMARY OF THIS GUIDE

An efficient and effective ICT structure reflects professionalism, compliance, fairness, reliability, and transparency to donors. To achieve this, ICT requires considerable attention.

There is no one “right” ICT structure. Factors such as the size of the organization, availability of local ICT infrastructure, and availability of trained staff and service facility define the ICT requirements. The size of



A savings group meets in a local church on El Salvador. The woman in the red and white striped shirt is the field agent. She's working with the group's secretary to teach her how to keep the record book.

the organization is also likely to make a difference in the formation of ICT structure, policy, and procedures.

Managers may directly or indirectly identify the need to change or add automated systems by recognizing one of the following concerns:

- Lack of computing/computer resources
- Use of older technologies (i.e., hardware, software, communication, etc.)
- Limited management information
- Lack of operational information
- Stagnation – a period of little or no economic growth
- Untimely information
- Turnover of data processing personnel
- Lack of software features, functions and capabilities
- High data processing costs

Any of the above problem areas may be a symptom of systems obsolescence or indicate the need for systems replacement.

The guidelines presented herein are a compendium of ICT implementation process, minimum standards, and best practice ICT policies intended to aid an organization's management and staff in the development and/or enhancement of their ICT management policies, procedures, and practices.

KEY PRINCIPLES OF THE ICT FUNCTION

The procurement of goods and services is guided by principles. These principles, when properly applied, provide a guide to best practices in the procurement process. The five core principles are:

1. Competition, Transparency, and Openness

ICT activities will be conducted in an open and impartial manner, using adequately tested transparent systems, avoiding biased specifications, and treating all data requirements consistently and equitably, so that potential vendors and donors can have confidence in the outcomes.

2. Value for Money

Agencies must pursue value-for-money ICT infrastructure, i.e., weighing the benefits of the ICT structure against the cost of the purchase, taking into consideration the following factors:

- a. Meeting standard security specifications
- b. Advantages of buying locally available services
- c. Quality assurance
- d. Capacity of service (e.g., managerial and technical abilities)

3. Compliance With All Legal and Regulatory Requirements

All ICT structure implemented will be in accordance with the legal regulations of the country of function and comply with all donor regulations.

4. Internal Controls and Risk Management Measures

To the extent possible, internal control mechanisms and risk management measures will be put into place to safeguard resources.

5. Conflict of Interest

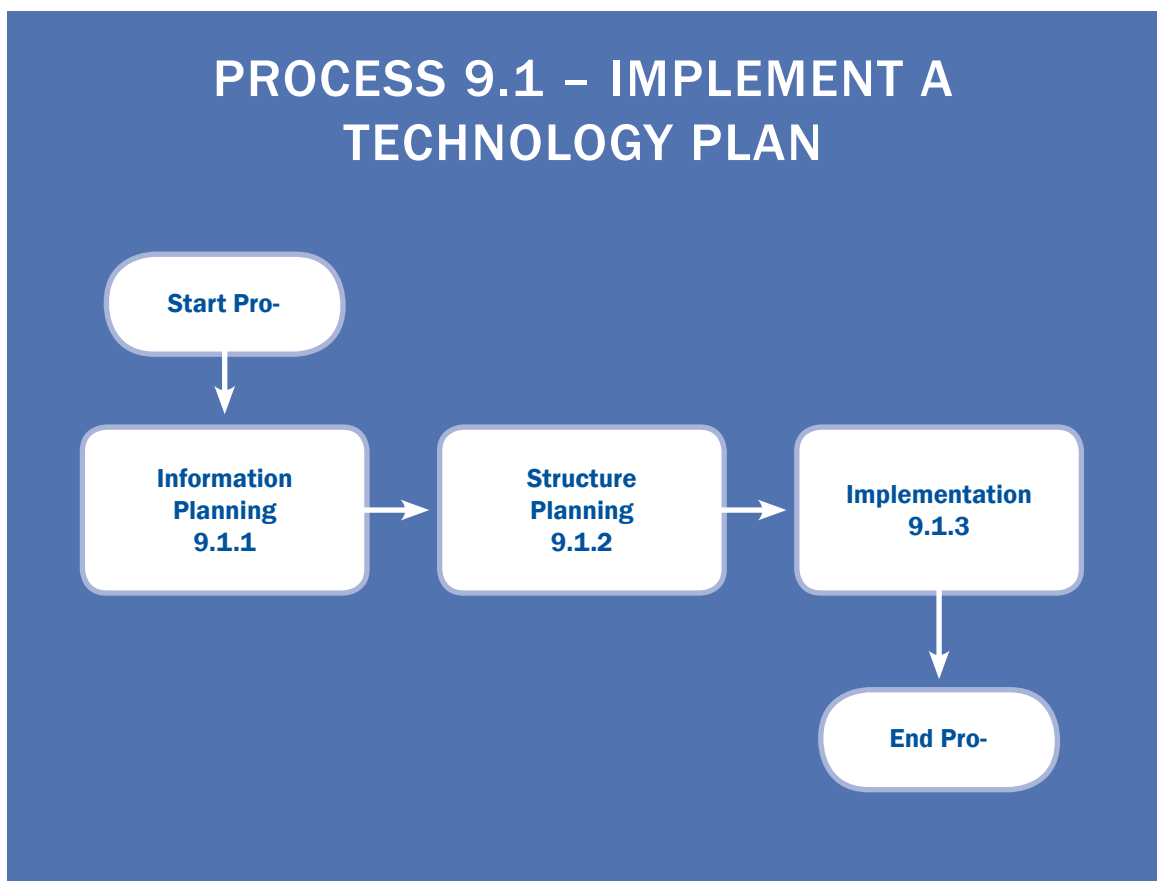
The organization and its staff shall at all times avoid situations in which private interests conflict, might reasonably be thought to conflict, or have potential to conflict with the organization's mandate.

ICT BUSINESS PROCESS 9.1 – IMPLEMENT A TECHNOLOGY PLAN

PROCESS DESCRIPTION

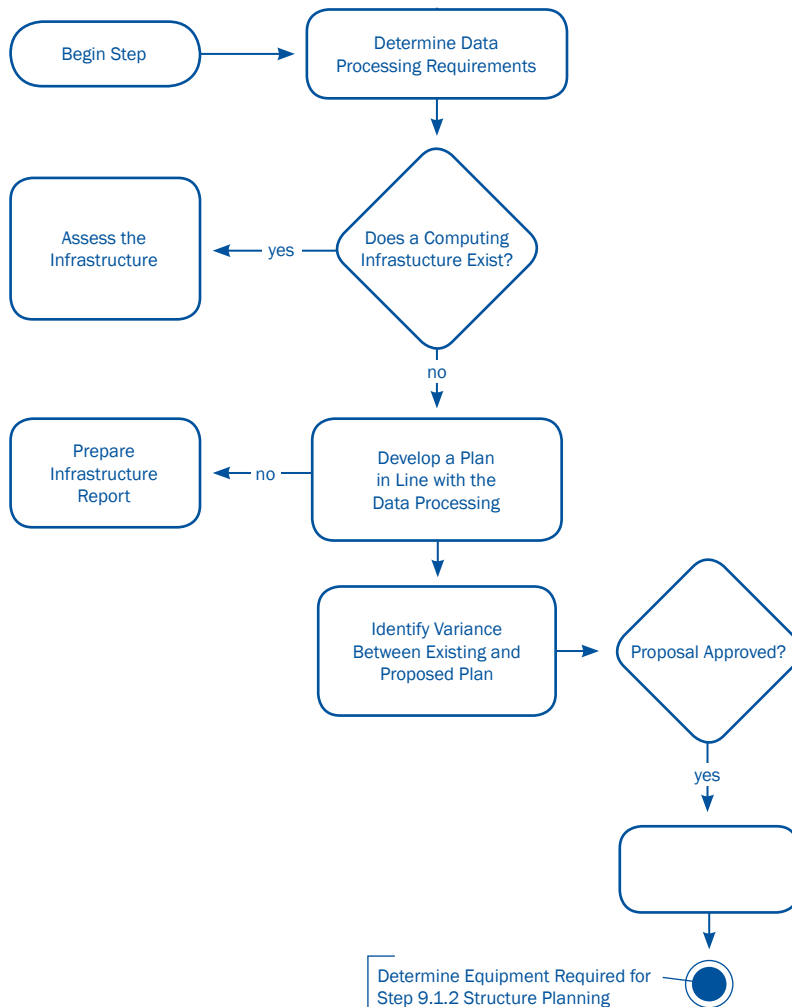
This process has three steps. Step 9.1.1 defines how the organization considers the information requirements as the basis of the entire ICT structure. Step 9.1.2 defines how the organization develops the ICT structure based on those information requirements. Step 9.1.3 defines how the final implementation and continuous upgradation of ICT infrastructure is done.

PROCESS FLOW



STEP 9.1.1 – INFORMATION PLANNING

STEP NAME	INFORMATION PLANNING
Step Number	9.1.1
Inputs	Data requirements of different departments Existing infrastructure details
Outputs	Data requirement plan Final implementation plan
Roles	All departmental heads IT officer IT consultant
Integration Points	All departments
Summary	The organization needs to implement an information system based on data requirements, security requirements, availability of software and hardware, and availability of trained personnel.





Ramiro Rodriguez and his wife fled their farm in rural Colombia when guerrillas came to their house. They made their way to the capital, Bogota, and with the help of CRS and Caritas were able to start a new life by creating a bakery in their home.

The organization should implement an information system based on data requirements, security requirements, availability of software and hardware, and availability of trained personnel. The process cycle starts with an independent assessment of data requirements and ends with implementation of the system plan. It is important for the organization to continuously monitor and assess information requirements and to have an information plan for a longer period of time, preferably for at least five years. The organization should implement a system that shows the right balance between cost, requirement, and availability, rather than acquiring the latest and most sophisticated system that is available on the market.

Business Requirements

1. The organization should conduct a data processing requirement assessment for all departments for a period of at least five years.
2. Data security is an important consideration in the requirement process.
3. The assessor should consider the existing computing network if it exists.
4. An ICT assessment (existing hardware and software in comparison to the desired status) needs to be done of the existing structure with the data requirements.
5. A proposed plan should be made in order to address the business requirements.
6. A cost budget should be prepared based on the plan.
7. The proposed plan and budget should be subject to modification based on final executive decision and resource constraints.
8. The final plan as devised above should be implemented as per the agreed time line.
9. A re-assessment process should be undertaken one year after implementation.

Best Practices

1. ICT has a plan for at least five years.
2. ICT requirements are not designed on a project basis but on an agency basis.

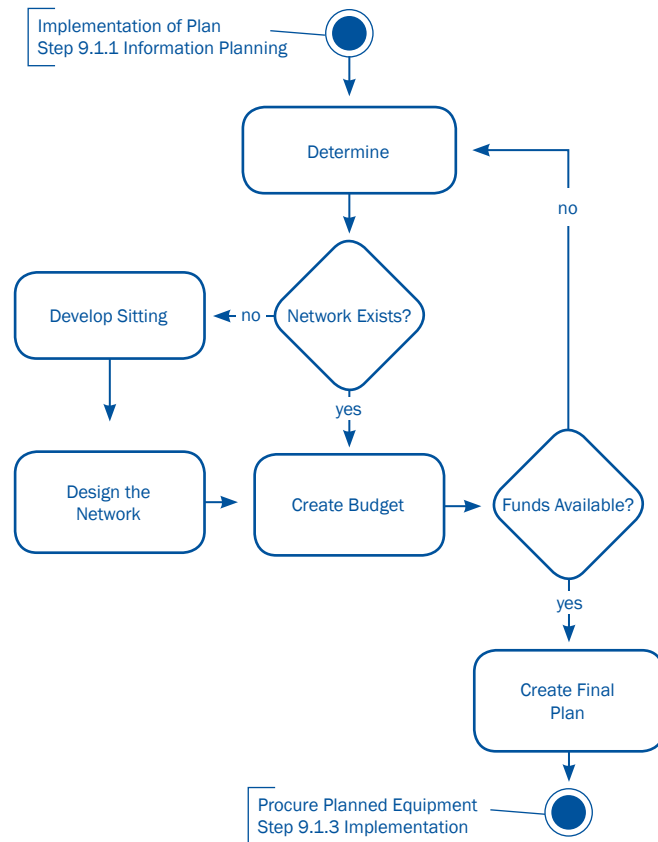
Minimum Requirements

1. A single person does not develop the plan.
2. A team containing the executive body and director reviews the plan.

STEP 9.1.2 – STRUCTURE PLANNING

STEP NAME	STRUCTURE PLANNING
Step Number	9.1.2
Organizational Role	Facility department IT officer Purchasing officer Finance officer Executive
Inputs	Information implementation plan Quotations
Outputs	Approved purchase order Service agreement
Integration Points	All departments
Summary	The structure plan considers the type of equipment to use, for example making the decision to use a laptop or a desktop computer, or to use a pool of computers rather than a more personal set-up.

The organization uses the implementation plan to develop a structure plan. The structure plan considers the type of equipment to use, for example making the decision to use a laptop or a desktop computer, or deciding to use a pool of computers rather than a more personal set-up. Staffing strength and sitting structure are considered in the planning process. Planning culminates with the issue of actual purchase orders and implementation of service agreements.



Business Requirements

1. The opportunity for implementing a network should be assessed. If appropriate, a network plan including the size and nature of the network should be developed.
2. A staff sitting plan needs to be created. The plan will determine cabling requirements.
3. Quotations are received for the networking and the number of computers to be purchased.
4. The purchase of computers and the cable service requirements are approved.

Best Practices

1. Procurement best practices are ensured.
2. All plans are created, verified, and approved by different individuals, i.e., the creator is not the verifier and the approver should if possible be a committee or board that will approve the plans in accordance with the desired results, which will be in line with the overall strategy.

Minimum Requirements

1. Procurement best practices are ensured.
2. Segregation of duties is implemented.

STEP 9.1.3 – PREPARE INFRASTRUCTURE REPORT

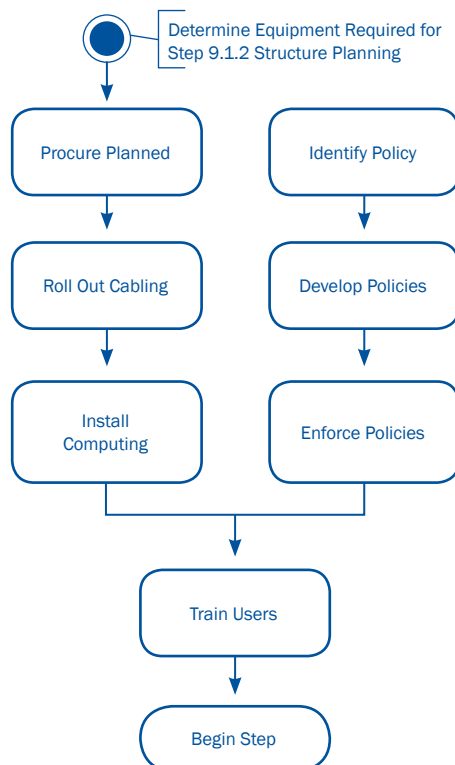
STEP NAME	PREPARE INFRASTRUCTURE REPORT
Step Number	9.1.3
Organizational Role	Facility department IT officer Purchase officer Finance officer Executive
Inputs	Information implementation plan Purchase orders
Outputs	Training plan
Integration Points	N/A
Summary	The policies developed may be scalable taking into consideration future growth



JIM STIPE/CRS

Participants from CRS regions around the world meet in small groups at CRS headquarters during the M & E (Monitoring and Evaluation) Summit.

The organization starts the equipment implementation and the policy analysis simultaneously. It is important for the organization to develop policy based on the actual structure plan. The policies developed may be scalable taking into consideration future expansion.



Business Requirements

1. Materials are procured and received.
2. Cabling is done as required.
3. Network is set up.
4. Policy requirements on Internet use are identified and developed.
5. Training is done based on hardware and policy requirements.

Best Practices

1. Procurement best practices are ensured.
2. All plans are created, verified, and approved by different individuals, i.e., the creator is not the verifier and the approver should, if possible, be a committee or board that will approve the plans in accordance with the desired results, which will be in line with the overall strategy.

Minimum Requirements

1. Segregation of duties is implemented.

ICT BUSINESS PROCESS 9.2 – SOFTWARE SELECTION PROCESS

PROCESS DESCRIPTION

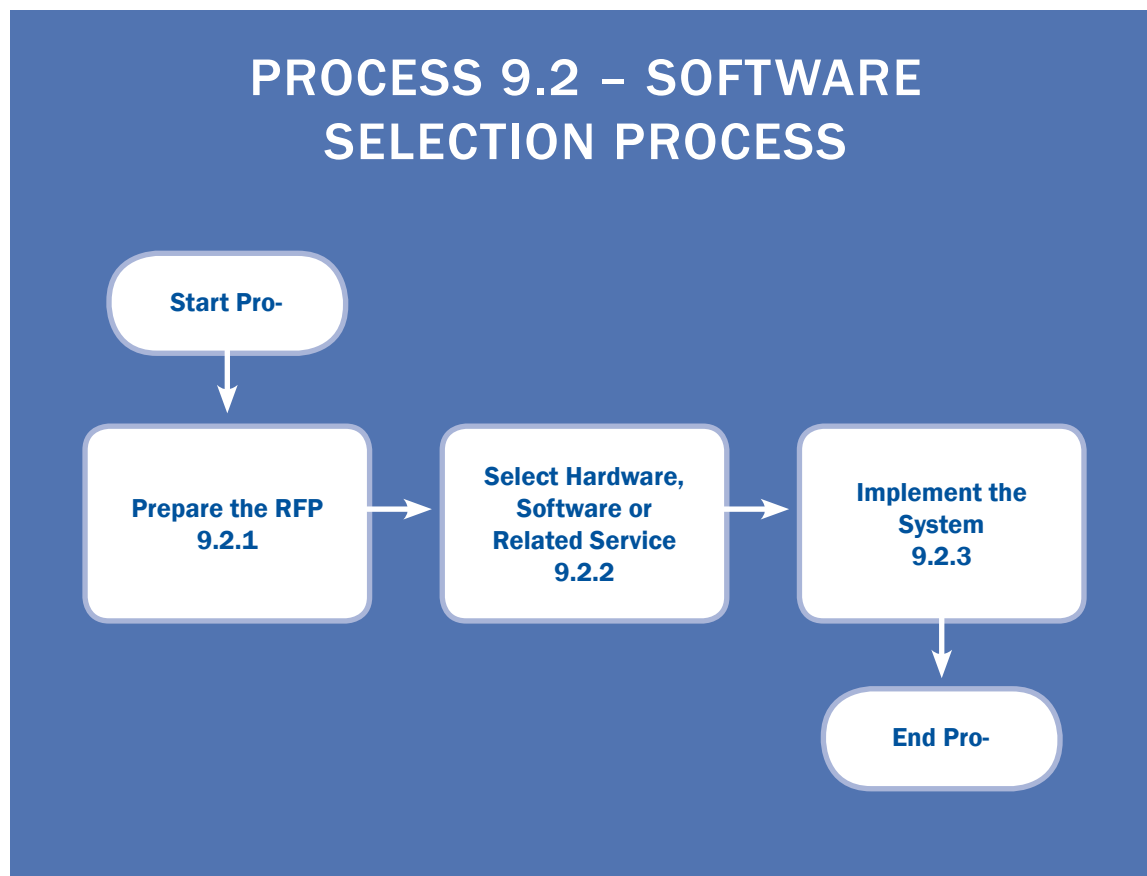
Selecting a management information system is critical to organizational management because cost-effective technology and information systems are needed in all areas and departments of the organization.

Failure to select the right systems may be due to one or more of the following:

- Improper definition of system objectives and requirements
- Failure to involve both management and users at adequate levels
- Underestimating the costs and efforts required for conversion
- Failure to adequately plan for expansion
- Failure to evaluate software properly

The process flow template below will serve to assist in avoiding the pitfalls listed above, thereby reducing the risk of failing to select the correct system.

PROCESS FLOW



STEP 9.2.1 – PREPARE THE RFP

STEP NAME	PREPARE THE RFP
Step Number	9.2.1
Organizational Role	Facility department
Inputs	N/A
Outputs	RFP Vendor proposals
Integration Points	Key department personnel
Summary	Preparing an RFP requires numerous preparatory activities such as creating a selection committee, performing a needs assessment, and listing the needed product specifications. After receiving proposals, evaluation will be needed.

1. Create a Selection Committee

A selection committee should be appointed to oversee the systems selection project. This committee should be responsible for the outcome of the project and should generally direct, monitor, and report on project activities.

Management's involvement in the systems selection process is critical to the successful completion of the project. The assigned individuals within the organization should have a clear understanding of the objectives and scope of their assignment and ensure that a proper reporting relationship with management exists before undertaking this responsibility.

2. Perform a Needs Assessment

Selection committee members should gain an understanding of the present manual and/or automated systems and use this as a basis for defining requirements for each application area to be automated. This can be accomplished by meeting with key departmental personnel to define the features, capabilities, and reports that are desired and required to satisfy their needs. This list of requirements is necessary to compare the capabilities of various software products and services and will become a major component of the request for proposals (RFP). This also may include identifying current data processing costs, including estimated costs for processing each major application. This information can provide management with a basis for cost comparison with proposed systems changes.

Because of the uniqueness of the organization's particular requirements, general software packages may not be readily available. These instances need to be identified, as they may have a substantial impact on the initial cost of implementing automated systems. In some instances, the organization may subsequently decide to eliminate certain requirements from the systems' objectives rather than incur the cost of developing unique application programs.

3. Determine Processing Volumes

The selection committee members should also document key processing volumes for each application area, since this information will subsequently be used to determine specific hardware requirements. Current and future volumes (e.g., five-year) should be used to ensure that the proposed system has adequate capacity for processing today's activity volumes with a margin for reasonable growth.

4. Develop Hardware and Software Specifications

The hardware specifications should include technical information related to requirements for equipment speeds, capacities, and capabilities. It is important to consider future expansion requirements for each component, such as the central processing unit (CPU), disk and tape drives, data communications devices, printers, and other hardware components. The software specifications should include specific software features, functions, and capabilities required from a user perspective. The specifications should also identify interface requirements to existing hardware and software systems, benchmarks related to processing speeds and volume of the system, and conversion issues. In addition, it is important to specify the requirements for technical and user documentation and the type and amount of training to be provided.

5. Prepare the RFP

The vendors should be provided with the basic information required to prepare a specific proposal. The RFP should include the following considerations:

- Proposal instructions for responding to the RFP
- Organization background information (e.g., description of present processing methods)
- Estimated processing volumes developed previously
- Hardware and software bid specifications developed previously
- Electronic data processing control considerations (e.g., access and security capabilities)



KARL GROBL FOR CRSA

On Calcutta, India, Shishu Bhawan Orphanage cares for an estimated 300-350 children, about 50 of whom are physically and/or mentally challenged.

- Reference information for existing users
- Cost information, including the initial acquisition costs and annual recurring costs to facilitate life-cycle costing analysis
- Proposal evaluation criteria that will be used to compare vendor responses

6. Analyze and Evaluate the Proposals

The selection committee should review the vendor proposals and prepare comparisons of the proposed hardware and application software. The committee should develop summaries of each system's expansion capabilities, along with cost summaries. Vendor references should be checked to ensure that the vendor's technical, installation, and service support is adequate. Finalists should perform software demonstrations and user site visits.

STEP 9.2.2 – SELECT HARDWARE, SOFTWARE, OR RELATED SERVICE

STEP NAME	SELECT HARDWARE, SOFTWARE, OR RELATED SERVICE
Step Number	9.2.2
Organizational Role	Facility department
Inputs	Vendor proposals
Outputs	N/A
Integration Points	Key department personnel
Summary	Choosing a vendor from a list of proposals requires taking a diverse array of selection criteria into account.

The selection committee should develop a list of criteria to be used in evaluating automation alternatives. These criteria should assist the selection committee in prioritizing and quantifying the automation solutions that best fit the needs of the organization. The criteria will then be used to evaluate the vendors' proposals and assist in making the systems selection decision.

Based on the above evaluation, each vendor should be ranked according to management's criteria for selection. A list of advantages and disadvantages for each alternative also should be developed. The selection committee should then recommend the best overall solution, given these findings and conclusions.

A written report containing a summary of the above information should be presented to management. The report should be supplemented by descriptions of each alternative and recommendations for contract negotiations and implementation activities.

Selection Criteria:

It is important to note that each organization has a unique set of requirements for any given software application and that it is not possible to provide a single list of requirements appropriate for every organization. Organizations differ in size, IT infrastructure, communication style, required level of security, cash position, IT literacy, and in-house capabilities.

The following 14 suggestions are guidelines for the selection process, but each organization should weigh each of the criteria to reflect its unique requirements.



MIKE SPINGLER/ORS

A women's microcredit group meets in Cambodia.



In Bangladesh, some of the youngest students of the CRS-supported Sangoil UCPEP School head home after morning classes. Once children complete four years at Sangoil they join the regular government primary school system, already four years ahead of their peers who have not had access to pre-school education.

1.)	First, it is a good idea to check the vendor’s background as well as basic product information. Key at this stage is pricing, since prices vary significantly as do pricing models. Here it is important to check not just license fees but also maintenance fees. Software pricing is a very difficult issue and different pricing models might be more applicable to one organization than others, e.g., pricing per user rather than pricing per package. Software companies are often flexible in their pricing and pricing models are subject to negotiation. It is also important to consider training and implementation costs as they can drastically increase the overall price of solutions, but often remain initially hidden.
2.)	It may be useful to understand the background of the vendor’s company and the product. The size and global presence of a software vendor might be important if organizations plan to implement the system across the region or country of operation. One might want to check the economic viability of the software vendor as well.
3.)	In order to assess the scalability needs it is important to consider the final scope of implementation. An organization might initially implement a system in one department or business unit, but later expand it to the entire organization. There are three aspects of scalability:
3a.)	The application should be scalable in terms of programming. It should be easy to add new users and departments at any time.
3b.)	The underlying database should be scalable to allow for data accumulation.
3c.)	The communication approach should be scalable so that it is easy to disseminate the information to users.
4.)	Language can also be an issue for international organizations. It is advisable to check whether the application comes in various languages.
5.)	Flexibility and customization are important aspects. Today, organizations are less willing to invest in applications that are not, for example, able to integrate with other applications. Many tools provide interfaces with reporting packages, spreadsheets, activity-based costing solutions, or planning features. Flexibility should also be provided in terms of methodology support.
6.)	<p>The organization should consider features and functions. Organizations can discuss needs in terms of administrative tasks and access control, exception alerting, collaboration, and reporting. It should be possible to assign owners (and persons responsible for data entry) in order to contact them or send automated reminders. Some organizations like automated e-mails and workflows, other organizations do not feel that such an approach fits with their work culture. Organizations might want the software to support action and include activity or project fields that allow tracking progress against strategic objectives.</p> <p>Organizations need to decide what level of security is needed in the system; some organizations are very open and share any aspect of the system information among all employees whereas others require very tight security. An organization might require a system that can handle multiple currency reporting or multiple entity reporting. Such functions and features should be considered in the selection process.</p>
7.)	The communication aspect of any system implementation is important to the users. Organizations have to address issues such as deciding if the software should be web-enabled or perhaps even WAP-enabled. Some software solutions are able to trigger automatic alerts, e-mails, or SMS messages, which can be sent to individuals or groups.

8.)	Technical requirements depend on the existing infrastructure in each organization. Any new piece of software should support the existing desktop or network operating system. Any discussion about technical requirements should involve the IT department.
9.)	In considering user interface and data presentation, organizations have to decide how they want data to be presented in the form of reports being generated by the system; applications vary from very graphical representations to more text- and tables-based reports.
10.)	Tools offer different levels of analysis capabilities stretching from simple drill-down capabilities to multidimensional analysis, complex statistical functionality, forecasting, and even scenario planning. Organizations that require more complex analysis functionality often have tools for this in place and have to decide whether to integrate or replace those. Analysis functionality also includes the number of graphical displays (from bar charts to advanced 3D charts) and tolerance settings. Requirements in terms of charts and graphs depend on the measures the organization tracks and their visualization requirements. It is especially important to include business analysts in discussions of these requirements.
11.)	The system should be able to provide back-up mechanisms that include both internal and external back-ups. It should also be able to maintain an audit trail, which is important for future references.
12.)	Vendors offer different levels of service. Some offer no implementation support and instead partner with consulting companies. Other vendors offer comprehensive service including implementation service and a service hotline. Organizations need to be clear about how much support they want and whether the vendor or its partners can deliver the desired level of support.
13.)	Organizations should consider future developments and release frequency of the product, which might indicate the vendor's attention and commitment to the product. It is also important to understand the future vision of the software vendor, which will influence future product development direction. Organizations should share their future vision with the software vendor in order to ensure future compatibility.
14.)	<p>It is important to know whether the software is at the beginning or end of its product lifecycle in order to fully assess risks associated with adopting the product. Products at the end of their lifecycle often have very robust functionality and a large customer base. The danger with these products is that they are written in older technology, so compared with new software they are often difficult to modify. They also may be less intuitive for users, may have poor reporting capabilities, and have a high risk of being discontinued in the future. In addition, the vendor may not be providing much support for the product, may not be developing and enhancing the product, or may be focusing its resources and efforts on new products. If the vendor discontinues the product, customers will have to invest in licensing and implementing a new software system.</p> <p>Products at the beginning of their lifecycle take advantage of the latest technology. The problem with these products is that, because writing software is such a complex undertaking, the new software usually has functional gaps and may be unstable with a number of software "bugs" or anomalies. Even if the software is relatively bug-free, new versions usually do not have adequately trained implementation experts, training resources, or full technical support.</p>

STEP 9.2.3 – IMPLEMENT THE SYSTEM

STEP NAME	IMPLEMENT THE SYSTEM
Step Number	9.2.3
Organizational Role	Facility department
Inputs	N/A
Outputs	N/A
Integration Points	Key department personnel
Summary	After choosing a vendor, a contract will need to be negotiated before implementing the system. After implementation, it is important to schedule a post-implementation review.

1. Negotiate Hardware, Software, and Service Contracts

Once finalists have been identified through the evaluation process, contracts for hardware, software, and services should be negotiated. During the initial phases of contract negotiations, the organization may choose to work with more than one vendor in an effort to improve its negotiating position with the best vendor. Contracts should include provisions that protect both parties and should be reviewed by legal counsel with experience in the technical aspects of hardware, software, and related services.

2. Implement the System

The implementation process should be a combined effort potentially involving organization personnel, vendor personnel, and outside consulting personnel as needed. The implementation plan should provide specific details regarding the activities, responsibilities, and target dates for the implementation process.

3. Perform a Post-Implementation Review

When the implementation process has been completed, a post-implementation review should be performed. This typically entails a review of the new system to verify for management that requirements are being satisfied and that the system is functioning satisfactorily. Specific strengths and shortcomings should be identified and a plan should be developed to address any serious weaknesses.

COMPLIANCE CHECKLIST FOR ICT FUNCTIONALITY

REVIEW CHECKLIST	COMPLETE
Are there policies and procedures guiding and regulating the use of ICT equipment?	
Are those policies circulated to staff?	
Are there monitoring procedures (carried out by IT staff) to assess effective implementation of the policies and procedures?	
Are there policies and procedures in place to guide and regulate employees in the following areas?	
Creating and use of email accounts	
Misuse and personal use of emails	
Information confidentiality	
Are there policies and procedures guiding and governing the following?	
Hardware and software standards	
Software configuration, setup, and installation	
Software license and copyrights	
Computer antivirus protection	
Are there policies and procedures guiding and governing power supply management in the following areas?	
UPS equipment standards and specification	
UPS systems (to prevent data losses)	
Power saving (power switchoff at night and on weekends and public holidays)	
Are there policies and procedures guiding and regulating procurement of IT equipment and software?	
Request and approval	
Delivery	
Inspection by IT staff	
Allocation (to staff), configuration, setup, and installation	



Rwandan solidarity camp youth participating in activities.

Are there policies and procedures guiding and governing IT equipment disposal?	
Are there policies and procedures guiding and regulating LAN setup, configuration, and administration?	
Are there policies and procedures for the following areas of information and computer security?	
Use of personal computers and software	
Downloading and uploading of data from and on non-business related sites	
Sharing and exchanging data	
Access to confidential data and information	
Handling a security breach	
Are there standard procedures and processes for the following considerations of data backup?	
Assigned responsibility	
Backup media	
Off-site backup	
Is there a disaster preparedness/recovery plan?	
Are there policies and procedures governing the following considerations of a service level agreement?	
Standard contract detailing	
Level of support service	
Length of services and hours of support	
Response time	
Access to information and confidentiality	

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