Understanding Information Needs for MFIs

MICROFINANCE

GUIDE 1

OF INFORMATION SYSTEMS PLANNING FOR MICROFINANCE

Giving Hope to a World of Need

Information Systems Planning
for Microfinance

Understanding
Information Needs
for MFIs

Shirley A. Lunde

Since 1943, **Catholic Relief Services** (CRS) has held the privilege of serving the poor and disadvantaged overseas. Without regard to race, creed, or nationality, CRS provides emergency relief in the wake of natural and man-made disasters. Through development projects in fields such as education, peace and justice, agriculture, microfinance, health and HIV/AIDS, CRS works to uphold human dignity and promote better standards of living. CRS also works throughout the United States to expand the knowledge and action of Catholics and others interested in issues of international peace and justice. Our programs and resources respond to the U.S. Bishops' call to live in solidarity — as one human family — across borders, over oceans, and through differences in language, culture and economic condition.

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Acknowledgments

Foreword

I
T has been said that the two most engaging powers of an author are to make new things familiar and familiar things new. In creating this guide and its companion, *Determining Information System Requirements*, I hoped to accomplish both.

For most microfinance practitioners, information systems (IS) consist of new and familiar things in equal measure — they combine familiar business practices with new technologies and procedures. In the process, they often open new windows on your operations and significantly enhance your institution's capacity to competitively and profitably serve its clients.

My purpose in producing this guide is *not* to turn every microfinance practitioner into a technology expert — many of you will either work with experienced information technology (IT) consultants or include IT professionals among your staff.

Rather, I introduce you to the broad range of concepts and business issues involved in understanding and evaluating an IS function, and provide tools that assist you in applying them. The concepts are remarkably similar for most microfinance institutions (MFIs), regardless of size or methodology, although the manner in which they are implemented often differs.

Armed with a solid grasp of the concepts — and this guide as a reference — you can effectively catalog your institution's IS requirements; communicate these requirements to colleagues, consultants, and vendors; and then contribute to implementing and managing your new IS. And hopefully, in the process, you will gain a new perspective on the familiar activities of microfinance.

Shirley A. Lunde
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September 2002

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Introduction to Information Systems Planning in Microfinance

T O the uninitiated, the prospect of managing a financial institution's information assets can be daunting. These assets require a sizeable initial investment plus significant, ongoing expenditures, and they provide the majority of an institution's financial and operating data. Given their strategic importance, managing them requires a comprehensive approach to information-asset planning, acquisition, operations and disposal — and an approach that coordinates information-management objectives with the overall goals and objectives of the institution. To further complicate matters, it involves different activities throughout the life of the institution and the information system (IS).

But consider the alternative. You could place a major strategic asset into the hands of a technology consultant, perhaps without fully understanding the business issues involved in effectively managing either the consultant or the strategic asset.

Fortunately, even the most daunting prospects become manageable when the concepts are familiar and the component tasks are clearly defined. The two guides that comprise *Information Systems Planning for Microfinance* — *Understanding Information Needs for MFIs*, and *Determining Information System Requirements* — provide a conceptual framework, as their titles describe, for understanding IS needs for MFIs, as well as the information and tools that you need to effectively determine the IS requirements that match the specific needs of your institution.

Audience

These guides are written from a business, not a technology, perspective, and are intended primarily for senior managers of microfinance institutions — particularly those who lead the business planning process and those involved in accounting, lending/savings and information systems functions. They can also serve as a resource for board members and advisers, software vendors, funding agencies and other stakeholders.

The information in these guides is appropriate for most microfinance institutions that are considering a new computerized IS — regardless of their institutional form, stage of development, methodology or breadth of services. A possible exception is the very small, slow-growth institution best served by a manual IS, although its managers can certainly benefit from the material in these guides.

While these guides and their companion tools are designed to be easy to read and simple to use, they do assume that you have a basic understanding of microfinance, including lending/savings methodologies and financial management practices. They also assume you have a very general familiarity with nontechnical, user-oriented computer concepts and terms. To use the tools, general experience using Windows-based computers and Microsoft Excel and Word software would be helpful.

Structure and Purpose

Preparing your institution for a computerized IS is a challenging task. Breaking the discussion into two smaller, component guides, as outlined below, makes the task more manageable. Taken together, these guides provide an achievable framework for understanding your institution's information management needs, as an aid to selecting a computerized IS.

Implement the elements of this framework as comprehensively or as minimally as you find appropriate for your unique situation, but do give careful consideration to the strategies and tactics in each guide. While there is an understandable tendency to immediately begin reviewing commercially available software systems, or to simply turn the entire project over to a consultant, you are much less likely to achieve your objectives if you take either approach.

You do not have to become an expert in information technology (IT) to implement this framework. But it *is* vital that you understand the concepts to communicate effectively with IT staff, consultants and vendors — and to lay the proper institutional foundation for your new system. It is equally vital that you and your staff participate fully in the process.

This work may add to your implementation schedule at the outset, but it can save both time and financial resources over the life of your IS. It is an important part of your institution's capacity-building agenda.

Understanding Information Needs for MFIs [Guide 1]

Guide 1 defines the crucial elements of manual and computer-based information systems, discusses the advantages and potential disadvantages of each, and provides guidance to help you prepare your institution for a computer-based system. It includes a companion tool, the Cash Flow-NPV Calculator, to help you analyze the financial implications of your current IS and potential alternatives.

Determining Information System Requirements [Guide 2]

Guide 2 introduces the concept of an IS needs analysis, provides a detailed description of the analysis process (including basic project management techniques), and describes the optional companion Needs Analysis tool and related work templates provided to help you conduct and document your institution's analysis.

Navigation

You may choose to begin with the first guide and, over time, read through to the end of the second. On the other hand, if you have a background in IT, you can use the handbook as a reference guide to refresh your memory on specific topics.

If you are reading from a printed version of any guide, use the Contents section and the Index to locate specific material of interest. Throughout the body of each guide, you will also find page references to related materials. For example:

"The advantages and disadvantages of a computerized system are essentially
the inverse of those described for a manual system [page 23]."

IS Planning

Understanding

■ **Guide 1**
This guide helps you prepare your institution for the adoption of a new computerized IS.

Planning

■ **Guide 2**
This guide introduces IS needs analysis, and describes the process and tools that can assist in conducting such an analysis.

Use the Contents and Index sections of each guide to locate specific material of interest.

What is an Information System?

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HINK of all the information that you use on a daily, weekly or monthly basis. Arrears and at-risk amounts. Available cash balance. Delinquency statistics. Dropout rates. Outstanding loan portfolio. Number of active or disbursed loans. Adjusted net income. Financial and operational sustainability indicators…

Now imagine how successful your financial institution would be without access to this information. Or, worse yet, what if the information you had was outdated, inconsistent or simply wrong?

Accurate and timely information is crucial to the operations of any financial institution. Aside from your staff, information is arguably your most valuable asset.[1] It provides a solid foundation for optimal decision-making and for efficient, effective operations.

An information system can be computer-based or, alternatively, developed around manual policies and procedures.

As with any important asset, information must be effectively managed. But managing the many and varied items of data that a microfinance institution needs requires a comprehensive and integrated approach — in short, an information system (IS).[2] Such a system does not have to be computer-based, however. It can be developed around manual practices and procedures, or a combination of manual and computerized practices.

Before you can effectively select, install and manage the appropriate IS for your institution, you should have a grasp of certain basic IS concepts, as discussed in this first guide. Such an understanding demystifies the technology and enables you to communicate effectively with IT staff and/or consultants, and with product vendors or developers. It also provides a necessary foundation for the material in the following guide.

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1 Although it is common to think of assets as having physical substance, that is not a requirement. An asset is simply defined as a "resource controlled by an enterprise as a result of past events and from which future economic benefits are expected to flow to the enterprise." International Accounting Standards Committee, *International Accounting Standards Explained* (Chichester:John Wiley & Sons, Ltd., 2000) Software, for example, is an intangible asset.

2 Information systems (IS) are also referred to as management information systems (MIS), transaction processing systems (TPS), and decision support systems (DSS), among others. To emphasize the comprehensive nature of these systems in microfinance and their general applicability (i.e., not just for use by management), these guides use the more general form, IS.

Elements of an Information System

An IS is nothing more than a group of interrelated elements that work together to capture, process, maintain and disseminate information. At its most basic, any IS consists of an integrated set of data inputs, processes, storage mechanisms, and outputs.

Inputs include all of the raw data that your institution gathers or generates as a part of its operations, such as a loan amount, client name, account number, interest rate or payment amount.

Processes consist of related tasks that are intended to achieve specific goals and objectives — they are the ongoing activities that capture, manipulate, relate and analyze data in the system. For example, one process might compare actual loan payment amounts against scheduled payments in order to flag, or otherwise highlight, those loans that are in arrears. To achieve the system's objectives, these processes translate *data* (i.e., the raw facts) into useful and meaningful *information*.[3]

Storage provides a means for organizing, relating and preserving the system's data. It maintains relationships among items of data — for example, between clients and loans or clients and savings balances — and stores and safeguards it. In a manual system, storage may be as simple as a set of file folders and a filing cabinet. In a computer-based system, storage generally refers to database management software and a computer hard drive or other, similar device.

Outputs are the information that your system generates to describe or summarize your historical activities and to help guide future operations and decision-making. They include financial statements, lists, transaction journals, management reports, online inquiries and various other analyses. In some cases, the format and content of the output is defined by the software (a standard or preformatted report). In others, the user determines the content or format (an ad hoc or a custom report).

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3 Information becomes *knowledge* in the hands of people who can use it creatively to innovate and solve business problems.

Realistic Expectations for an Information System

If you pursue a new IS in the expectation that it will naturally and dramatically transform your operations, you will likely be disappointed. A new IS can provide the catalyst for important institutional development, but this is not an automatic consequence. Ultimately, the IS cannot outperform the business systems that it automates.

Therefore, to avoid unnecessary frustration, it is important that your expectations for the new system be reasonable. Regardless of the system you employ, you can expect the following from your IS:

Reasonable IS expectations:
- *Quality information for decision-making.*
- *Simple, reliable operations.*
- *Justifiable cost.*
- *Reasonable fit with business practices.*
- *Security and disaster recovery support and enhancements.*

■ Sufficient information for decision-making that is accurate, relevant and timely.

■ Operations that are simple, efficient, reliable and user-friendly.

■ Justifiable cost in terms of the initial outlay and ongoing expenditures.

■ A reasonable — but not necessarily perfect — fit with your current and anticipated operations.[4]

■ Security that safeguards your information, restricts availability to authorized personnel, and provides a means to maintain or restore operations in the event of an emergency or natural disaster.

■ Access to fee-based support and enhancements (if the system is computer-based).

Benefits of a New Information System

The benefits that accrue from transitioning to a new IS vary considerably, depending on whether the systems involved are manual or automated, and on the specific features of the new system relative to your requirements. Still, the principal intended benefit of any IS acquisition is optimized decision-making.

An effective system can also:

■ Improve the quality and reliability of your information.

■ Facilitate institutional growth while minimizing operating expenditures, thereby helping you achieve or maintain profitability and sustainability.

■ Enhance communications within your institution, and between the members of your staff and your clients and other stakeholders.

■ Provide enhanced security and strengthen your system of internal controls.

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[4] An oft-cited guideline is to look for a commercially available information system that meets approximately 80% of your institution's needs and wants. Assuming that you have the ability to modify the software, you then can analyze the costs and benefits of modifying the system to address your remaining requirements.

Manual Information Systems

Manual information systems are systems created and maintained on paper, either totally or in conjunction with one or more simple computer spreadsheets. As such, they are highly labor intensive and are most commonly used by relatively small, and often young, microfinance institutions.

Components of a Manual System

A manual IS generally consists of the following elements:

- Staff and consultants.
- Facility and environment.
- Recordkeeping systems.
- Business practices and procedures.

Staff, Consultants

People are the most important element of *any* IS, and often the largest cost component in the IS budget. In a manual system, the personnel include:

- Clerical, accounting and internal auditing personnel.
- Consultants and outside service providers, including accountants, external auditors and IT professionals.

Manual systems are highly labor intensive. As such, training and cross-training are vital to maintaining the system.

Because manual systems are labor intensive, they typically require more people to maintain than do computerized systems with similar capabilities. However, the staff generally do not require sophisticated computer skills. If portions of the system are maintained in simple spreadsheets, staff members need to be comfortable using a keyboard and mouse, and basic Windows- or DOS-based software programs, such as Excel and Windows Explorer.

Comprehensive training and cross-training is vital for the staff of a manual system, as the system is so dependent upon the people who operate and maintain it. Cross-training allows your IS to continue to function in the absence of one or more people. It also allows your institution to grow somewhat more rapidly as additional, knowledgeable staff are potentially available to accommodate an increased workload.

Facility and Environment

The requirements that a manual IS imposes on an institution's physical facility and operating environment typically include:

- Furniture and equipment for staff, including desks, chairs and locking filing cabinets.
- Buildings, plus offsite record storage if available.
- Environmental controls, such as those for fire protection.
- Electric and communications utilities and other infrastructure.

Recordkeeping System

A manual recordkeeping system typically includes the processes and practices that generate, organize and maintain data — specifically, data related to accounting records, historical reports, and legal and administrative documents.

> Accounting records include such things as source documents (e.g., invoices and bank statements), ledgers, transaction journals and audit records.

> Historical reports analyze and summarize past activities or represent the status of the institution at various points in the past — such as financial statements, performance indicator/ratio reports and a broad range of operating and management reports.

> Legal and administrative documents include loan agreements and payment schedules, business plans, policy manuals, community surveys, loan application forms, training records, bylaws and incorporation documents, visitation reports, and past-due notices.

Activities related to manual recordkeeping include the following:

Manual recordkeeping systems maintain accounting records, various historical and operational reports, and legal and administrative documents.

Activity	Description
Data gathering	The manner in which data is generated and collected for input to the manual system.
Data recording, processing	The procedures for entering data into the system and manipulating it, as necessary, to calculate or otherwise provide needed information.
Data storage, maintenance	Mechanisms for storing and preserving data, such as locking file cabinets; also record retention and destruction policies.
Data security, record protection, disaster recovery	The procedures for safeguarding information and for protecting or restoring it in the event of a disaster, such as a flood or fire, or the loss of key personnel.
Data analysis, reporting, dissemination	The manner in which information is communicated throughout your institution.
Internal controls, information-system audits	Those practices intended to ensure the integrity of the data in the manual system.

Business Policies, Practices and Procedures

Your business policies and practices reflect your institution's mission and culture as well as the overall strategy and tactics in its business plan. These practices provide the foundation for your recordkeeping and information systems, as they are the business activities that the systems are designed to manage. They also include certain internal controls, audits and disaster recovery practices intended to safeguard your information assets.

Your lending methodology — e.g., individual lending, village banking or Grameen replication — is one example of a business policy or practice. Another is whether your institution accepts and manages client savings deposits (i.e., is formalized), or simply monitors client deposits.

You will analyze your institution's policies and practices in detail when you conduct a needs analysis for your IS, the subject of the accompanying guide.

Advantages and Disadvantages of Manual Systems

Although manual systems often are viewed as inherently less desirable than computer-based systems, this is not always the case. Particularly for small, new microfinance institutions, manual systems can provide a number of important advantages.

The most significant advantages of manual systems, relative to computer-based systems, are described below.

Manual systems can be preferable to computer-based systems for certain small, slow-growth MFIs.

Advantage	Description
Less expensive, initially	A manual system is inexpensive, at least in terms of the initial outlay. You can create a manual system with little more than a desk, a chair, accounting paper and pencils, a filing cabinet, and one or more trained staff members. If you have a slightly larger budget, you can add an inexpensive personal computer to run a spreadsheet program, such as Microsoft Excel.
No computer-literacy requirements	If the pool of labor that is available to you is not skilled in using computers, a manual system is a better match for your current resources. It can also provide an important microfinance training ground for staff — particularly if yours is a new institution — while you develop the staff's computer skills.
Adaptable	A manual system is adaptable. To change it, you modify the corresponding policy or procedure and, if necessary, provide additional training for your staff. You do not have to purchase new computer devices or reprogram and test software, for example.
Places fewer demands on infrastructure	For regions with relatively primitive infrastructure — unreliable power sources and limited communications capabilities, for example — a manual system places fewer demands on the physical environment.

Advantages of manual systems.

The disadvantages of manual systems, relative to computer-based systems, are described below.

Disadvantages of manual systems.

Disadvantage	Description
Expensive as MFI grows	A manual system becomes relatively more expensive to operate as your institution grows and its information requirements become more sophisticated. It is nearly impossible to efficiently and cost-effectively operate a large MFI using a manual system.
Quality is less assured	Because it is so dependent on the human element, the quality of information in a manual system is less assured. The calculations are inherently more subject to error than are calculations in a computerized system. The information might be less timely (it can take longer to generate) and is often less comprehensive and less sophisticated.
Requires strong internal controls	A manual information system requires strong internal controls to validate and ensure the quality of the information it generates. You have less assurance that information is managed in the same manner from day to day and from person to person than you do with a computerized system, where the procedures tend to be programmed into the system.
Security can be problematical	Security practices to safeguard and recover data in case of theft, or of flood, fire or other natural disaster can be problematical and time consuming. It is generally necessary to duplicate vital files and documents, and to maintain the copies in a protected facility, generally offsite.
Lower productivity	Productivity in a manual system is generally lower than in a computerized system. The activities involved simply take more time to complete by hand than by computer.
Limited growth potential	The slow ramp-up inherent in a manual system can limit your institution's ability to grow as rapidly as is necessary or desirable.
Lack of institutional memory	A manual system can sometimes impede the development of institutional memory — a historical knowledgebase of policies and practices, and their results — over the life of the institution. Key information tends to reside in the memory of the staff at the time, not in formal documents. As a result, important knowledge can be forgotten or lost over time.

Computer-Based Information Systems

Computer-based information systems are highly automated systems that are created and maintained on either a standalone computer or a networked computer system.

Components of a Computer-Based System

A computer-based IS consists of a number of integrated elements, including:

- Staff, consultants and vendors.
- Computer hardware.
- System software, to manage the various hardware devices and interface with applications software.
- Application software, to automate business processes.
- Information database, to store and manage data.
- Physical facility and environment.
- Business practices and procedures.

Staff, Consultants, Vendors

As with manual systems, people are the most important component of a computerized IS. The personnel involved in establishing and maintaining such a system include:

- Clerical, accounting and internal audit staff, including existing personnel and any additional people deemed appropriate for the new system. For existing staff, a new system may involve new or altered responsibilities and working relationships. Cross-training among the staff is important in a computerized system to ensure that the system continues to function in the absence of one or more people.

- Programmers, system and hardware support/maintenance persons, and user support staff (if you maintain an in-house IT function). If you outsource your IT work, you should assign at least one staff person with the responsibility for maintaining a library of your hardware and software documentation and other computer-related records, such as preventive maintenance schedules and repair history. The same person can act as your liaison with IT consultants to coordinate support requests and other necessary work.

- Consultants and outside service providers, including IT consultants and external auditors. It is essential that you find consultants you are comfortable working with, and that those consultants are willing and able to communicate using language that you can understand. If a consultant is not responsive to your requests, not willing to keep you informed, or implies that any part of the project is too technical for you to understand, it is a cause for concern — the chance of successfully concluding the project is reduced. Consider replacing the consultant as soon as is practical.

Hire consultants that you are comfortable with on a personal level, and that communicate effectively with you and the members of your staff.

Computer Hardware

The hardware element of a computer-based IS typically consists of the following categories of equipment:

- Input devices, such as keyboards, mice, scanners, bar code readers, smart cards and voice recognition equipment.

- Output devices, including printers, monitors (computer screens), scanners and backup drives.

- Processing devices, such as desktop computers (CPUs) and servers.

- Telecommunications devices, such as network hardware (for multi-user and multi-location systems) and modems.

System Software

Applications are user-oriented software programs that automate specific business functions.

System software refers to the basic set of computer programs, usually supplied by the hardware manufacturer, that control and coordinate the workings of all of your computer hardware devices. System software also manages the interaction between your computer hardware and software applications, and creates portions of the user interface.

System software includes an operating system such as Windows, Unix or MS-DOS. The operating system controls your computer hardware and manages memory and file storage, among other tasks. If your institution already has computer hardware, you must know which operating system it is running before you purchase application software to automate your microfinance and accounting operations. Business applications are created for specific operating systems; if you buy software designed to run under Windows, for example, you cannot use it on a Unix-based computer system.

System software also includes communications software, language translators and utility programs to manage such routine tasks as backups and data compression.

Application Software

Applications are user-oriented software programs that automate business processes. The programs are referred to as applications (or, sometimes, modules) because each automates a specific business function. Examples include general ledger (GL)/accounting, lending, savings, accounts payable and inventory. Word processors and spreadsheets also generally are considered to be software applications.

Before you analyze the details or feature set of specific applications, you need to understand the following general attributes of application software:

- *Custom* versus *off-the-shelf*.

- *Standalone* versus *integrated*.

- *Source code* versus no source code *(object code* only).

From an institutional or business perspective, these distinctions can have a critical impact on your system's cost, usability and productivity, maintainability, and useful life.

Custom Versus Off-the-Shelf Applications

Applications can be categorized as custom or off-the-shelf. If an application is developed specifically for use by your institution, based on your standard practices and operations, it is a custom application and, most likely, owned by you.

If, on the other hand, the application was acquired from a software vendor that markets it commercially to other institutions, it is an off-the-shelf application (also referred to as *turnkey* or *commercially available*).

Off-the-shelf applications generally are licensed[5] rather than sold, meaning that they convey the right to use the programs; they do not convey ownership of the underlying program code. While some applications are licensed for unlimited use, many are instead licensed based on the maximum number of concurrent (i.e., simultaneous) users at your institution. Other vendors might charge a monthly fee to use their software. As an alternative, software vendors are beginning to experiment with fee-based Internet access, which allows you to use software without actually installing the programs on your computers.

Because a custom application was developed specifically to meet your needs, it will most closely match your institution's current operations. It also tends to be more expensive as the total development cost is borne by only one customer — you.

An off-the-shelf application, on the other hand, generally provides more operating options because it was designed to accommodate the practices of many institutions. As a result, the application can be more flexible in accommodating changes in your operations over time. For example, assume your institution has always calculated interest income from loans using the flat method. You probably would not design a custom lending application to also include a declining-balance calculation method, because that would mean paying for an option you don't believe you need. However, if you subsequently change to a declining-balance method, you must pay someone to reprogram and retest your custom software to accommodate this new business practice. Off-the-shelf applications generally automate both flat and declining-balance calculation methods, as specific customers might need either, or both.

Off-the-shelf applications tend to be somewhat less expensive — even though they might include certain features you do not need — as the development costs are shared by many customers, not just one.

Finally, off-the-shelf applications can often be *customized* to more closely fit an institution's requirements, when absolutely necessary.[6] The resulting customization of an off-the-shelf application provides many of the advantages of both software types, but will cost more than an off-the-shelf system and might increase the complexity of upgrading the software.

Applications can be custom (developed specifically for you) or off-the-shelf (acquired from a commercial software vendor, and designed for an industry or industry segment rather than a specific customer).

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[5] The exception is custom-developed software, which generally is owned by the institution that contracted for its development.

[6] Under some circumstances, the customization work must be done by the original software author. For additional information, refer to *Source Code* on page 20.

Standalone Versus Integrated Applications

Applications are designed as standalone or integrated. In a standalone system, each application operates as if the other applications do not exist. In an integrated system, applications communicate with each other to share information — in other words, they are aware of each other.

Most often, integrated applications were developed by the same software author. If you purchase applications from different sources, they are likely not integrated.[7] The common exception is the integration between Windows-based applications and Microsoft's Word and Excel software. Many software authors allow you to export data from their applications into Word for publishing and Excel for analysis.

Integrated applications provide the distinct advantage of eliminating redundant data entry and storage, thereby enhancing your users' productivity and the integrity and reliability of your data.

In a standalone system, each application operates as if the other does not exist.

A Fable: The Blind Men and the Elephant

One man, approaching the tusk, likened the elephant to a spear.

A second, touching the tail, found the elephant to be a rope.

A third found the elephant very like a tree.

The Moral of the Story:

You can't draw accurate conclusions based on limited information. Each man's conclusion was correct based on the data available. Yet his understanding of the whole was very wrong.

An integrated information system helps to ensure the consistency and accuracy of your view of your financial data, regardless of the source application.

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7 Another potential disadvantage of purchasing software from two or more software authors is that the applications generally have different user interfaces. In other words, they may look different and require different procedures and security to operate. These differences reduce user productivity and extend the learning curve.

Data entered into one application automatically flows into other applications in the system. As a result, redundancy in data entry is reduced or eliminated. For example, if your integrated system includes a lending and a GL/accounting application, you can enter loan payments in the lending application and the accounting balances are automatically updated to reflect those payments. If your applications are not integrated, you must enter loan payment data in the lending application and, separately, in the GL/accounting application.[8]

Integrated applications generally share access to information in the database, such as a client file or chart of accounts. This eliminates redundant data storage. For example, savings and lending applications require basic client information to identify the specific client that is depositing or withdrawing savings, and the client borrowing or repaying loaned funds. If these applications are integrated, they can share the same client file. If they are not integrated, each will maintain its own client information.

By sharing information, integrated applications help to ensure the integrity of your data. Barring a programming error, the data in one part of your system should be identical to the data in another part of the system. If the information is not shared, significant differences can result from data entry errors and from timing differences. For example, the amount of your outstanding loan portfolio as reported in your lending application might not be the same as the outstanding portfolio on the financial statements produced by your GL/accounting application.

In an integrated system, applications communicate with each other to share information. This enhances productivity as well as the accuracy and reliability of your data.

If the applications in your system are integrated, you can automatically generate reports and analyses that are difficult or impossible to generate in a system of standalone applications. For example, many important indicators are calculated using data from both the GL/accounting application and the lending application. If your GL/accounting and lending applications are standalone, you likely have to calculate these indicators manually, or export data from the applications into a spreadsheet or report writer to perform the calculations.

If you purchase two or more standalone applications, it is theoretically possible to develop software programs to link them, thereby approximating the operation of an integrated system. However, this approach might not be practical if the underlying data and processing structures of the applications differ significantly. These links also can be expensive to create and maintain.

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8 If the software applications in your system are not integrated with GL/accounting, make sure that these other applications are at least capable of processing and reporting on the accounting entries for their transactions (i.e., account numbers and debit/credit amounts). For example, the lending application should manage and report on the accounting entries involved in disbursing loans and in processing payments. Such reports provide the basis for posting manual entries — weekly or monthly summary totals, for example — in the accounting application. While many standalone applications do process and report these accounting entries, some do not. If your applications do not manage the accounting for you, your system will be much more time-consuming to operate, and will be less productive and reliable overall.

Common Application Software Configurations for an MFI

At a minimum, a computer-based system likely will include a standalone lending application or a standalone GL/accounting application. The diagram below illustrates one possible configuration for the computerized IS of a small or medium-sized MFI.

A possible information-system configuration for a small-to-medium MFI.
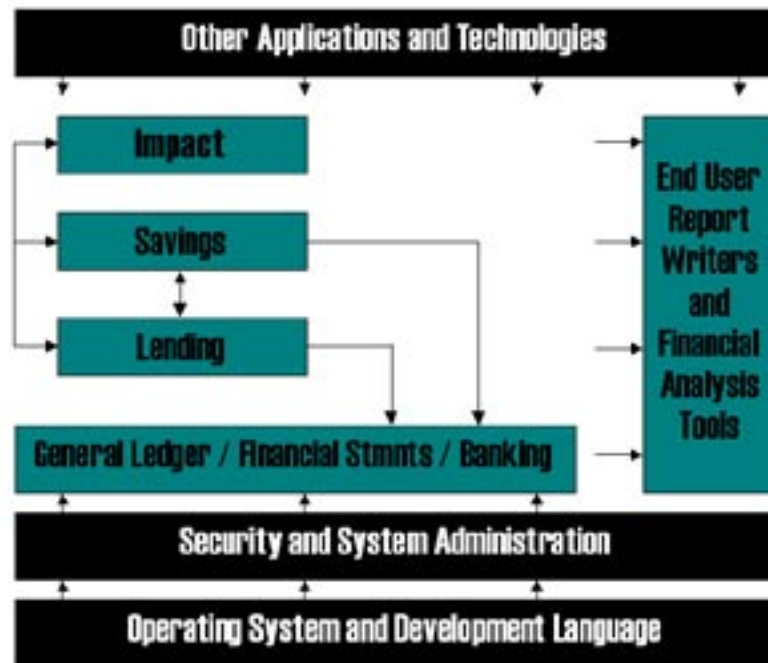
A basic system for MFIs might include any combination of the following applications:

Application	Description
GL Accounting/ Financial Statements	Maintains your chart of accounts, accounting transactions and historical balances, and generates financial reports and indicators. Most such applications also manage budgeting tasks; some include a banking facility.
Banking	Stores information on the various bank accounts you maintain, and assists you in reconciling your bank statement with your accounting records. Some systems place this facility in general ledger or accounts payable, rather than in a separate banking application.
Lending	Manages data for your loan products and loan clients, processes portfolio-related transactions, and produces reports. Some lending applications also monitor savings for non-formalized institutions. (In some systems, client data is maintained in a separate client information application.)
Savings/Teller Operations	Maintains data for your savings products and savings clients, processes savings-related transactions, tracks deposits, and produces reports. Such an application is generally only appropriate for formalized institutions that actually capture and manage client savings. (In some systems, client data is maintained in a separate client information application.)
System Administration	Establishes your security scheme (including user logins) and manages other basic tasks required to administer your information system.
Other Generic Software	Provides word processor and spreadsheet/financial analysis tools.

A small computerized system for an MFI might include GL/ accounting, lending, savings, system administration and security, plus various word processing and financial analysis tools.

Many information systems, particularly those used by larger MFIs, will include additional applications such as:

Application	Description
Accounts Payable	Manages data for your suppliers and vendors, processes transactions to record purchases and payments, and produces reports. Most also include a check writing facility.
Client Impact/ Outcomes	Maintains a database of socioeconomic information on clients, which might also track and report on outcomes. This application often is custom-developed, as a lack of standardized requirements makes it less economically attractive to off-the-shelf developers. It tends to be an expensive application as a result.
Report Writer/ Analysis	Allows non-technical staff to generate custom reports and analyses using the data in the information system's database.
Contact/Schedule Manager	Tracks and manages interactions with clients and important outside contacts, such as donors, staff, consultants, volunteers, community organizations and business service providers.
Human Resources/Payroll	Maintains background information on your staff and produces your payroll.
Integrated Technologies	Provides interfaces to such technologies as bar code readers, smart cards, palm computers and document imaging devices.

Larger computerized systems also might include applications for accounts payable, client impact, report writer, contact/ schedule manager and human resources, as well as a variety of integrated technologies.

If your institution also operates in sectors other than microfinance, your software system might include additional applications, such as inventory or sales/accounts receivable.

Source Code

Applications are developed, or written, in high-level programming languages such as C, COBOL or Visual Basic. An application's programming language is the coding scheme that instructs the system to perform desired actions. Taken together, these instructions are referred to as *source code*

A language translator program turns this human-understandable source code into machine-language instructions that your computer can understand, referred to as *object code*. The distinction is critical, because not all applications are licensed with source code — and if you have source code for an application, you can change it. If you only have object code, which is always provided, you can run the application but cannot modify or enhance it.

Many software vendors do not provide customers with source code for their products. Some software vendors provide access to limited portions of the source code, while others provide source code for an additional fee. As an alternative, some vendors maintain a copy of their software's source code in a form of escrow account to ensure that clients can gain access to the code in the event the vendor organization ceases to exist.

The primary advantage of having access to source code for your applications is that you control your institution's destiny — even if you never actually use the source code to modify your software. If your vendor goes out of business, fails to maintain and enhance the software, or chooses not to include features that become essential to your operations, you have the ability to implement changes yourself or contract with another firm to do so.

The most commonly cited argument against providing access to source code is version control. In other words, if you make changes to your version of the software and the software author releases an upgraded version, you might have to reapply your changes. In a worst case scenario, your changes might be incompatible with the author's version, thereby requiring a redesign or conversion of your data.

If you do not have source code, you cannot make changes or implement your own enhancements.

In reality, the version control issue might be more appropriate as an argument against making indiscriminate modifications to software than against providing access to the software's source code. If you find at some later date that your institution absolutely needs a feature in the software that the author cannot or will not provide, your ability to change the source code protects the value of your investment; you do not need to replace the software.

If you ever do find it necessary to change the software's source code without the involvement of the software author, be sure to:

■ Schedule a reasonable amount of time for your programmer(s) to review available technical documentation and to become very familiar with the software's design before you begin implementing changes.

■ Thoroughly document each change you make, however minor.

■ Isolate your changes from the rest of the programming, if possible.

■ Be prepared to re-implement your changes in a new version, should it become necessary.

Information Database

Your system's database is comprised of the fields, records and files that contain your institution's current and historical data.

Field — the numbers and characters that, together, represent one business fact; for example, a client name, a loan number or a loan disbursement date.

Record — a collection of related fields; for example, a client record includes all of the data related to one client (e.g., name, client number, gender, age, address).

File — a collection or related records; for example, a client file includes all of the records for all of your clients.[9]

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9 Depending on the type of database (e.g., hierarchical or relational), different terms may be used. However, the general field-record-file concepts are still relevant. A technical discussion of database concepts is beyond the scope of this guide.

The database also establishes and maintains the relationships between all of the items of data. Additional software programs, collectively referred to as the DBMS (or database management system), manage the interface between the database and the software applications.

Ideally, your system employs a single, common database that pools all of the data from all of your applications. This allows you to eliminate redundancy and, therefore, the opportunity for error. For example, in an integrated system you can maintain lending and savings clients in a single client file. When the client moves, you update the address in only one file location. If, however, your system includes standalone applications from multiple software authors, you likely will have multiple databases and client data that must be maintained in two or more locations.

Facility and Environment

Your physical facility and your business policies and practices are a vital part of — and provide the foundation for — your information system.

The demands on your institution's physical facility and environment are more complex for a computer-based system than for a manual system. They include:

- ■ Furniture and equipment, such as chairs, desks, filing cabinets, keyboard trays and wrist rests.

- ■ Buildings, plus an offsite data storage facility, if possible.

- ■ IT library or other central location for system and software manuals and other reference materials.

- ■ Environmental controls, such as those for temperature, humidity and fire protection. Temperature and humidity requirements for your computer hardware are detailed in the documentation supplied by the manufacturer.

- ■ Electric and communications utilities and other infrastructure. Computer systems generally also require some form of generator or uninterruptible power supply (UPS).

Business Policies, Practices and Procedures

Your business policies and practices are an important part of your computerized IS. They reflect your institution's mission and culture, as well as the overall strategy and tactics in its business plan.

These practices provide the foundation for your IS, as they are the business activities that the system is designed to manage. If you change your system, the related policies and procedures are likely to change somewhat, as well. A more sophisticated system accommodates more sophisticated practices.

Your business practices also include certain internal controls, audits and disaster recovery practices intended to safeguard your information assets.

You will analyze your policies and practices in detail when you conduct a needs analysis for your IS, the subject of the accompanying guide.

Advantages and Disadvantages of Computer-Based Systems

The advantages and disadvantages of a computerized system are essentially the inverse of those described for a manual system. If a manual system is less productive than a computerized system, for example, then a computerized system is more productive than a manual system.

As your institution grows and its information-management requirements become more sophisticated, the advantages of a computer-based system become paramount, and the disadvantages less significant.

The most significant advantages and disadvantages of computer-based systems are described below.

Advantage	Description
Ensures the quality of information	The information maintained in a computerized system is generally considered to be of better quality. Given appropriate controls over data entry, the calculations and information generated by the system are not subject to random human error. Additional controls can be built into processes to ensure accuracy, such as not permitting (or generating) out-of-balance accounting entries. The reports and analyses are produced on a more timely basis, and are often more sophisticated and comprehensive.
Less expensive to operate	Although a computer-based system is more expensive than a manual system to establish, it is generally less expensive to operate for medium-to-large MFIs with sophisticated operations.
Enhances productivity	Computer-based systems are more productive. They operate faster than their human counterparts and are not subject to downtime due to illness or other absence — although they are not totally immune to their own brand of downtime. A computerized system can more readily use the same data for many different processes, calculations and outputs.
Provides more sophisticated capabilities	It is easier to implement and maintain highly sophisticated processes, calculations and outputs in a computer-based system.

As your institution grows, the advantages of a computer-based system become paramount, and the disadvantages less significant.

Advantage	Description
Facilitates growth	Given adequate capacity — a large enough hard drive to store the data, for example — a computerized system can more readily accommodate rapid growth, enhancing your institution's potential to accommodate changing circumstances.
Develops institutional memory	Because historical policies, procedures and data reside in the memory of the system rather than simply in the minds of the staff at the time, computer-based systems can facilitate the development of institutional memory.
Utilizes staff more efficiently	Computerized systems can more effectively utilize the skills and capabilities of many of your staff. They are freed from certain basic and repetitive tasks to concentrate on improving the operations of your institution and servicing your clients.
Enhances data security	It is much faster and easier to create backup copies of important data in a computer-based system, and the duplicated information is more readable. Assuming these backups are appropriately maintained, safeguarding and recovering data in the event of a natural disaster is more straightforward.
Automates important security controls	Computerized systems can automate a number of important security controls, such as password protected logins, limited access to programs and data based on user IDs, and detailed audit trails.

An integrated system provides additional advantages, including increased productivity and a reduced potential for error and timing issues.

An integrated computerized system provides additional advantages over a computerized, nonintegrated system. In an integrated system, the workload that is otherwise involved in entering and validating the same data in multiple applications is eliminated. This dramatically increases productivity and enhances quality at the interfaces by reducing the potential for error and eliminating the need for certain controls and validations. Integrated systems also tend to be more maintainable over time.

One theory suggests that a nonintegrated system provides an advantage in terms of internal control. The act of manually reconciling transactions and balances among applications, according to proponents of this view, is a proof of accuracy. However, this belief greatly underestimates the effort required to reconcile the applications, and ignores alternative methods of auditing the computer-based records.

Disadvantage	Description
More expensive to establish	Computer-based systems require higher expenditures to establish than do manual systems, and generally take more time to implement.
Requires computer-literate staff	The staff of a computerized MFI require some degree of technical sophistication, even if much of the IS function is outsourced to consultants.
Places greater demands on the infrastructure	Computer-based systems place more demands on an institution's infrastructure. They require a reliable source of power, for example, and controls over extremes in temperature and humidity.
Can generate voluminous data	Because it is relatively easy to generate reports and other output in a computerized system, staff members potentially could be flooded with information that is neither necessary nor appropriate given their specific positions within the institution. It is important to ensure that information is distributed appropriately.
Potentially inflexible in core processes	Computer-based systems can be somewhat inflexible regarding changes to certain core processes — particularly if the software was custom-developed for the institution. The changes must be specified, implemented in the software and tested. Because commercially available systems are intended to be used by many different institutions, they are generally designed to be somewhat more flexible and accommodating of change.

Potential disadvantages of a computer-based system.

Combination Manual/ Computer-Based Systems

Information systems — particularly older systems that have had components added or replaced over time — commonly include manual and computer-based elements. Typically, the software applications in the system were developed by two or more different vendors.

Systems that include manual and computerized elements have much in common with computer-based systems that are not integrated — they generally require at least some redundant data entry in parts of the system. As a result, they require additional controls at the interfaces to ensure consistency in amounts and timing.

Systems with manual and computerized elements provide many of the same advantages and disadvantages as the manual and computer-based systems described previously.

Information systems can include a mix of manual and computer-based elements.

Are You Ready for a New Information System?

Your institution's business plan — not its age or the size of its client base — is the basis for determining when to computerize, as well as the computer system you need.

BEFORE you seriously consider computerizing any portion of your operations — or changing an existing computer system — make sure that your institution is ready for the transition. Not every institution is in a position to install or operate a new system successfully, as information systems cannot outperform the business processes that they model.

A new IS is not a panacea for a troubled institution. The system comes with its own, new set of concerns and requirements. If your current IS, whether manual or computer-based, is in crisis, it is probably *not* the time to transition to a new system. Adding a computer to the mix will not resolve the situation, particularly if your problems are rooted in your methodology, work flows, staff, or policies and procedures. It might only allow you to continue to do the wrong things — albeit faster and more consistently — and waste significant resources in the process.

The question then arises: At what point in its lifecycle should an institution consider computerizing its information management?

Guidelines for Computerization

The microfinance industry commonly uses 2,000 to 3,000 clients as a computerization threshold.[10] However, MFIs vary significantly in strategy, methodology, growth, regulation and applicable standards. Thus, it is difficult to apply any general guideline — such as the number of clients, growth rate or age of an institution — to determine exactly when a specific MFI is ready to advance to a computer-based system.

WHEN TO COMPUTERIZE?

In the *Microfinance Handbook: An Institutional and Financial Perspective*, Joanna Ledgerwood and Tony Sheldon presented their own set of guidelines for assessing the sophistication of an institution's information system requirements based on size. They suggested that small MFIs (3,000 or fewer clients) that are not formalized and not growing rapidly have relatively simple requirements that can be met by manual systems or basic computerized information systems.

Medium-sized MFIs (between 3,000 and 20,000 clients) that are growing and that offer various credit and savings products have somewhat more rigorous requirements. However, they generally cannot afford custom development or highly customized software systems. Large MFIs (20,000 or more clients) also have relatively sophisticated needs, but they can justify more readily the cost of customization.

Source: Ledgerwood, Joanna, *Microfinance Handbook: An Institutional and Financial Perspective*. (Washington, D.C.: The World Bank, 1998)

The decision to pursue a new IS is best made on the basis of a comprehensive, well-thought-out business plan, as described later in this guide. The following factors, when revealed as a result of the business planning process, often initiate a major change in an institution's IS:

■ Perceived limitations in the capacity, quality or feature set of the current IS, relative to anticipated needs.

■ Anticipated rapid growth, with an accompanying need to scale up operations faster than the current system can accommodate.

■ Planned changes in policies or procedures that cannot be cost-effectively implemented in the current system.

■ Institutional need or desire to achieve a significant increase in operational efficiency.

■ Requirements imposed by government authorities or donor organizations, such as those resulting from formalization.

Preparation[11]

As a preliminary step in acquiring your new IS, establish clear goals and objectives for the system. Then, ensure that your institution is adequately prepared to install and operate the system effectively. You should have the following elements in place (or concrete plans to establish them) before you select and install a new computerized system:

Before you proceed with your acquisition, make sure that your institution is ready to install and operate it effectively.

■ Current business plan.

■ Annual budget, including expenditures for IS.

■ Formalized policies and practices.

■ Comprehensive system of internal controls.

■ Complete and accurate historical records.

■ Adequate infrastructure.

■ Sufficient computer-literate personnel.

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10 The Consultative Group to Assist the Poorest (CGAP) presents the following guidelines in an FAQ on the Microfinance Gateway website: "The common threshold in the industry for moving to a more specialized microfinance MIS software application seems to be approximately 2,000 clients. However, some institutions maintain a manual MIS and grow to more than 30,000 clients. If a microfinance program has less than 2,000 clients and limited or no plans for growth, then a system that relies on spreadsheets for managing the loan portfolio is sufficient, affordable and possibly recommended, given the costs to implement an MIS software package."

11 Also refer to Annex 1: *IT Preparation Checklist for MFIs*.

The manner and extent to which you implement each element depends, in part, on the size of your institution and the resources that are available to you — but do not totally ignore any of them.

The work you do to enhance these aspects of your operations lays the groundwork for your IS needs analysis.[12] This analysis, in turn, provides an important foundation for your review of possible new systems. It also contributes greatly to the successful installation and operation of your system.

If, ultimately, you decide not to change your IS, your efforts in this regard were not wasted. They contribute to the efficiency and effectiveness of your ongoing operations.

Business Plan

It is often said that if you fail to plan, you plan to fail. Your institution's business plan defines and communicates its overall mission, strategy and objectives. It provides you and your colleagues with a detailed operating plan and with financial projections that are specifically designed to achieve those objectives.[13]

Your business plan is the end result of your institution's business planning process — a vital management function that includes strategic and operational planning.[14]

Strategic planning analyzes your institution's current situation, establishes its mission and goals, and develops a strategy for the future. The process generally includes research into your business environment, markets and clients, as well as an assessment of your institution's strengths and weaknesses.

Operational planning creates a comprehensive, detailed implementation plan based on the goals and strategy from the strategic plan. Typically, the operational plan includes a combination of monthly and quarterly *financial projections* for a five-year period.

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12 For detailed information on preparing a needs analysis, refer to the companion guide, *Determining Information System Requirements.*

13 For a sample business plan, refer to Annex 2: *Sample MFI Business Plan.*

14 For additional information on business planning and financial modeling, refer to Sutia Kim Alter, *Managing the Double Bottom Line: A Business Planning Guide for Social Enterprise*s (Washington, D.C.: Save the Children Federation, 2000). Also refer to Shirley A. Lunde, *Using Microfin: A Handbook for Operational Planning and Financial Modeling* (New York: PACT Publications, 2001).

In the context of information systems planning, your business plan contains information that is vital to determining your IT needs. For example, the plan's five-year projections help to determine the size of the database you need by projecting your growth rate and number of clients, loans and savings accounts. The projections also indicate the volume of transactions that the system must process on a daily, weekly or monthly basis. The operating plan provides insight into your business processes, methodologies, financial products, and institutional structure (number of branch locations, for example) — all of which impact the design of the IS.

This means that the quality of your IS is dependent, at least in part, on the quality of your business plan. And the quality of your business plan is determined, in large part, by the manner in which you conduct your strategic and operational planning processes. In developing your business plan, you should do the following:

■ Adopt a comprehensive planning framework based on a best-practices approach, such as the one implemented in the Microfin model.[15] Be sure that you include detailed financial projections to support your business plan. Such projections demonstrate the workability of the overall plan as well as the consequences of making various choices. They also provide information to revise or refine the plan, as necessary.

■ Allocate adequate time and resources, both financial and non-financial, to complete the planning process. Typically, the strategic and operational planning processes require six to eight weeks, perhaps longer if you and/or your colleagues are new to business planning, or you have to conduct significant market research at the outset.[16]

■ Involve key stakeholders in your planning process, including staff at all levels of the institution, board members and representative clients. Do not simply assign the responsibility for creating the plan to a consultant or a few staff members. A more participatory approach ensures that your plan draws upon a broad range of experiences and perspectives. It also encourages consensus building, and develops a sense of ownership and broad endorsement among those responsible for implementing the plan.

Your business plan helps to establish your IS requirements, including database size, transaction volumes and vital business processes.

Your business plan and anticipated IS acquisition are linked in other important ways, as well. Any significant expenditure on your part — including the acquisition of a new IS — should advance your institution's strategic objectives and be reflected in its financial projections. When you build your IS acquisition into your business plan in this manner, you establish the system's priority among all of the projects that compete for your limited resources. You also help to ensure that the resources necessary for the system's success — financial and non-financial — are made available.[17]

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15 For additional information on Microfin, as well as software and handbook download options, refer to the Microfin website at www.microfin.com.

16 Alter, *Managing the Double Bottom Line: A Business Planning Guide for Social Enterprises*.

17 For guidance in establishing financial projections for a new information system, refer to the section on *Projecting Cash Flows* in this guide.

Building your IS acquisition into your business plan has the added benefit of imposing a beneficial discipline on the acquisition process. Because the business plan generally extends for five years into the future, it forces you to analyze the longer-term requirements for your IS. To develop the plan, you consider your existing operations and any necessary future changes. If, for example, your business plan includes the objective of transitioning to a rural bank within three years, you know that your IS needs analysis should include savings/deposit tracking software that is capable of supporting a rural bank.

Budget

Your annual operating budget is an important corollary to the five-year financial projections from your business plan. The budget serves to guide your actions — and those of your accounting staff who monitor expenditures — throughout the fiscal year. As a result, it is likely to be somewhat more detailed than your five-year projections and to be formatted in a manner that closely ties to your accounting system.

Your annual budgeting process should include an analysis of your anticipated IS-related expenditures — an IT budget — whether or not you maintain your own in-house IT function.[18] You need to know what you spend on your information assets, as they can constitute a sizable cost center and impact your institution's overall profitability.

Unfortunately, many institutions have no idea what they really spend on their information systems; their budgets do not segregate IS expenditures from those incurred for other operations. Even if your hardware and software components are paid for and fully depreciated, you still incur costs to operate and maintain the system. However, some of these costs might be buried in other departmental budgets rather than allocated to the IS.

Regardless of how you ultimately aggregate and present financial data in your annual operating budget and on formal financial statements, an information system's budget brings together all of the costs related to acquiring, operating and maintaining the system.

It is important that you prepare your IT budget in the context of planning for your entire institution, as the expenditures should be tied to a projected level of business activity. For example, if you anticipate that your lending program will grow significantly over the next year, you might need to budget for additional data entry operators and computer equipment (more personal computers and printers, for example). If you project slower growth, you likely will not need additional personnel and equipment.

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18 For additional guidance in projecting the elements of your IS budget, refer to the section on *Projecting Cash Flows* in this guide and to the NPV Calculator tool that accompanies this guide.

Schedule

The implementation schedule for your IS acquisition is also an outgrowth of your business planning process.

As you begin to plan for your new IS, establish a preliminary target date for the transition — i.e., the date you intend to begin processing live data in the system.[19] (If you do not intend to install all of the applications in your new system at once, you might have more than one target date.)

Although the initial target date commonly slips, simply having one in mind is useful. For one thing, it helps you to project system-related expenditures in the correct period. For another, it establishes an end date for the historical data you must gather[20] as you proceed to analyze your IT needs and select the new system.

Working backwards from your anticipated transition date, consider the time you will need to enter historical data, to train staff, to perform any pre-installation testing and physically install the system, to optionally customize the software you select, and to select the most appropriate system. The result indicates when you must begin the acquisition process.

If, on the other hand, you do not have a preferred transition date in mind, you can instead work forward to calculate the earliest possible date for the start of live operations.

For simplicity and to facilitate preparation of comparative financial statements, reports and trend analyses, scheduling your transition for the beginning of a fiscal year can be useful, although this is not a requirement in most systems. You should avoid planning the transition for those times when other major business activities or initiatives will compete for institutional resources and the focus of the staff.

This acquisition timeline can vary considerably from institution to institution, although it generally takes an MFI between one and two years to prepare for, select and fully implement a new computerized system.[21] This schedule assumes that you purchase a commercially available product and install it without major modification. If you ultimately decide to develop custom software, or significantly customize an off-the-shelf system, you likely will extend the timeline considerably.

The physical installation of your system's hardware and software is actually the smallest part of the implementation schedule — a few days to a few weeks, at most. Assuming that you already have a current business plan in place, the work you do before installation (such as conducting a needs analysis and evaluating available software products) generally consumes anywhere from one-quarter to one-third of the schedule. Post-installation tasks, such as training, data conversion and initial setup, and validating the operations of the new system, consume the remainder.

A preliminary target date for installing the system helps you to schedule preliminary activities, budget expenditures in the correct period and gather the appropriate historical data for your installation.

»THE GUIDES

- **Understanding**

  Business Plan/
    Budget
  - Plan
  - Budget
  - Schedule

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19 This date does not necessarily mean that you will be using the new system exclusively at this point. It is common, when validating the operations of a new system, to run the system parallel with the old system and to compare the results.

20 For additional information on preparing and entering historical data, refer to the section on *Historical Records* in this guide.

21 In an FAQ on the Microfinance Gateway website (www.microfinancegateway.org), CGAP suggests a similar timeline. The Microfinance Gateway is also available via a link from the CGAP website (www.cgap.org).

Formalized Business Policies and Practices

Your institution's business policies and practices are an outgrowth of the strategy and tactics in its business plan. They represent the manner in which the strategy is actually implemented on a day-to-day basis. A thorough understanding of all of these policies and practices is essential before you select or implement a new system. If you don't know — or cannot effectively communicate — the details of how your institution operates at all levels, you are not likely to achieve your information-management objectives with a new system.

In some instances, you might discover that actual practices differ from those specified by management. These differences must be discovered and reconciled *before* selecting and installing your new system.

Documenting Work Flows and Business Practices

As a general practice, many MFIs document — and thereby formalize — their existing information/work flows and business practices, and maintain this documentation on an ongoing basis. It provides an essential foundation for the institution's IS needs analysis, among other things.

This type of documentation typically includes such high-level documents as organization charts and the various flowcharts, graphical illustrations and other visual portrayals of information flows throughout the institution.

At a more detailed level, the documentation includes operating, accounting, and credit collections manuals, as well as a variety of other policy documents. For each significant procedure, this documentation might include any or all of the following elements:

■ The reason for, and objectives of, each procedure.

■ The personnel, or job titles, involved in any aspect of the procedure.

■ A detailed description of the procedure, from beginning to end, including the steps undertaken by the staff members involved.

■ Flowcharts, or other graphical illustrations, of the procedure and related information flow.

■ Timing or frequency (e.g., whether the procedure is performed daily, weekly, monthly or annually).

■ Description of related internal controls, including authorizations and decision-making authority.

■ Data requirements for inputs, processes, decision points and outputs, with sample formats (e.g., reports or input forms) as appropriate.

■ A description of how, and for how long, the related information is maintained, and whether historical data is maintained in detail or summary form.

■ For complex and interrelated procedures, the relationship of the procedure to other business processes, such as any required preliminary and/or subsequent activities.

■ Optionally, a description of the strengths, weaknesses and limitations of the current practice.

If you do not have this type of comprehensive documentation available, you should, at a minimum, ensure that your basic policies and practices are written down and that your staff have a solid understanding of all of your procedures, including any anticipated changes. Significantly, these policies and practices are not limited to your microfinance and/or accounting functions; they include all operations that your IS might impact. [22]

Fact-Gathering Methods

If you find that you need to enhance your documentation before you conduct the needs analysis for your new IS, you can typically use any or all of the following fact-gathering methods:

Interviews with management and staff.

Observation and site visits.

Questionnaires.

Reviews of existing forms, input and output documents, financial and management reports, internal audits, policy and procedural manuals, and software documentation.

Reviews of existing flowcharts and other graphical portrayals of information flows.

Flowcharts and Process Maps

A flowchart is a simple, graphical representation of the elements and the flows or relationships in a business process — e.g., loan approval, loan disbursement, savings withdrawal. (This type of flowcharting is also sometimes referred to as process mapping.) If you connect all the individual flowcharts you develop for your business processes, you create a graphical depiction of the overall work flows and operations of your institution.

In addition to defining business processes, flowcharts provide a simple, visual mechanism to analyze and improve processes. For example, they can help you to eliminate duplication and other unnecessary steps in the process, consolidate tasks, remove bottlenecks, and streamline activities to enhance the flow of your process.

Flowcharts are comprised of standard symbols for such things as documents, decision points, and data input or output — all connected by arrows representing the flow of the business process.[23] They readily can convey a great deal of relevant information, while minimizing ambiguity. As such, they play a vital role in documenting business processes and information flows.

Formal documentation for current business practices helps to ensure that the practices are followed consistently and can be easily and accurately communicated.

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22 In the context of effective internal controls, all of your important business operations should be formalized and documented. For additional information on internal controls, refer to the section on *Internal Controls* in this guide.

23 Several of the software products in Microsoft's Office suite — including Word, Excel and PowerPoint — provide basic flowcharting symbols for your use. These symbols are generally available on the Drawing toolbar under the AutoShapes option.

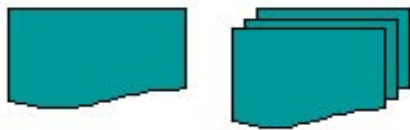*Legend of common flowcharting symbols.*
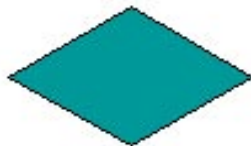
Data (Input or Output)

Process

Document

Decision
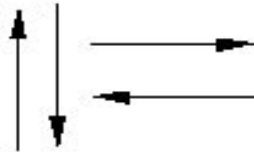
Flow Direction

Off-page Connector
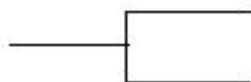
Annotation

Each business process generally is linked to other processes that precede or follow it. To reflect these relationships, each flowchart is numbered, and each off-page connector symbol on the flowchart includes the number of the flowchart to which it links.

Often, flowcharts are developed from a group exercise. Before you begin to draw your flowchart, agree on the beginning and end of the process to be flowcharted. Then, identify the elements (e.g., tasks or steps) in the process, all inputs and outputs (including forms and reports), the person (or title) responsible for each element, and the overall sequence of events. After you have identified all of the elements and the related flow, you can assign symbols to create the flowchart.

A flowchart for an MFI's loan approval process might look something like the one that follows:

Loan Approval Process [No. 19]

as of February 2002
prepared by S. Lunde, Internal Auditor

Responsibility	Flow of Business Process	Comments
Client and Loan Officer	[18] → Prepare Loan Application → Loan Application	Client prepares application for loan officer at end of a loan cycle.
Credit Manager	Eligibility Criteria → Determine Eligibility	Credit Manager validates application against product-eligibility criteria. [1 day]
Credit Manager	Credit History → Determine Credit Status	Credit Manager verifies client's creditworthiness. [1 day]
Credit Manager	End ← No — Recommend Approval? → Loan File / Yes	Credit Manager creates an initial (paper) loan file with application, eligibility/credit report, and other relevant documents. [3 days]
Loan Approval Committee	End ← No — Recommend Approval? / Yes → [20]	Loan Approval Committee reviews loan file and makes recommendation. [5 days] — Data entry flowchart, number 20.

Sample flowchart of a business process.

Requirements Documents

A requirements form — sometimes referred to as a requirements use case — is a generic form or document used to describe a business process, similar to the sample below.

Sample Requirements Use Case form for a business process.

Requirements Use Case

Element	Description
Name of Practice/ Process/Procedure	
Personnel Involved	
Description	
Preconditions	
Post Conditions	
Typical Course of Events	
Assumptions	
Related forms, reports, documents	
Priority	

Like the flowcharts, these forms generally are prepared through interviews, observations, and/ or group exercise.

Critically Analyzing Business Processes

For many institutions, certain policies and procedures stem from the limitations of a previous IS, or from long-standing conventions that are no longer relevant or applicable in the current business environment. Computerizing these practices has been likened to paving over winding cow paths — the route might become a bit faster, but it is not fundamentally better. In other words, while a computerized system can help to ensure that you do things right — eliminating computational errors, for example — it cannot ensure that you do the right things for your institution.

The transition to a new IS, however, does provide an opportunity to make fundamental improvements in your institution's business processes. If your institution is new, it provides a context for creating those processes.

By critically — and strategically — analyzing your business processes, you can make your practices more efficient and effective, and more responsive to your needs.[26] A number of techniques can help you in this analysis. For example, you can use *business process reengineering (BPR),* which allows you to challenge your assumptions and fundamentally redefine important aspects of the way you do business. Other techniques include *six sigma quality, continuous improvement (CI)* and *total quality management (TQM).* At their heart, however, each is nothing more than a critical analysis and redesign of business processes.[24]

Certain policies and procedures are particularly critical for MFIs seeking to automate their information systems. Therefore, these are some of the most important targets for reengineering in the context of a new computerized system. These critical policies and procedures — discussed in more detail in Annex 3: *Reengineering Topics* — are the following:[25]

- Chart of accounts.
- Accounting standards.
- Reporting.
- Methodologies and product/service offerings.
- Localization issues.

This type of critical analysis can require a fairly extensive and time-consuming review of your business processes. It can also take additional time to implement any changes that result. If you implement those changes before you proceed with a new system, you avoid adding complexity — and possibly confusion — to your IS installation.

Considering business process changes before you complete your IS needs analysis (the subject of the companion guide) is helpful, although in practice the two analyses might overlap.

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24 The perspective of an outside consultant can often prove valuable to this critical analysis process.

25 A number of excellent books have been written on business process reengineering, including *Reengineering the Corporation: A Manifesto for Business Revolution* by Michael Hammer and James Champy. For information on six sigma quality, you can refer to *Six Sigma Pocket Guide* by Rath and Strong, or *The Power of Six Sigma: An Inspiring Tale of How Six Sigma Is Transforming the Way We Work* by Subir Chowdhury.

The transition to a new system provides an opportunity to critically analyze your business practices.

Internal controls are a vital element of risk management as they are designed to prevent problems before they occur, and to detect them if they do.

Internal Controls

Internal controls are policies and practices designed to provide reasonable — although not absolute — assurance as to:

■ The reliability of your institution's financial reporting.

■ The effectiveness and efficiency of your operations.

■ Your compliance with applicable laws and regulations.[26]

Examples include formalizing your policies and procedures in written documents, segregating duties so that the same person does not control assets and account for them, requiring two or more signatures to authorize or approve a transaction, using serially numbered documents, and password protecting the access to computerized elements of your IS.

Internal controls consist of practices designed to *prevent* problems (i.e., deterrence controls), as well as practices intended to detect problems after the fact. The manner and degree to which internal controls are implemented can vary based on the institution's size, ownership, industry, and legal or regulatory environment. However, they will always address the following components:[27]

■ Control environment.
■ Risk assessment.
■ Control activities.
■ Information and communications.
■ Monitoring.

As your institution grows and you replace existing systems with larger and more complex (often computerized) systems, internal controls become increasingly important. They are an essential element of your overall risk management program. In fact, the scope of your institution's external audit depends, in part, on an evaluation of the strength of your internal controls.

If you haven't already implemented a comprehensive internal control system — or you are considering a new IS that can significantly impact the design of existing controls — it is vital that you allocate sufficient time to analyze your internal-control requirements. Because designing, documenting and implementing new internal controls can take time, you must begin the process well before implementing a new IS.[28]

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26 These critical issues are addressed here, rather than in the context of the needs analysis in the companion guide, because reengineering can involve fundamental changes to your institution's business processes. In comparison, the needs analysis focuses on assembling and reporting your requirements based on existing business processes, or relatively minor refinements to existing processes. Many of these reengineering issues — accounting standards and internal controls, for example — deserve entire guides in their own right. You might wish to supplement the information in this guide with additional readings on specific topics.

27 Statement on Auditing Standards (SAS) No. 78, *Consideration of Internal Control in a Financial Statement Audit: An Amendment to SAS No. 55* (AU Section 319).

28 For a basic discussion of internal control systems for MFIs, refer to Campion, Anita, *Improving Internal Control: A Practical Guide for Microfinance Institutions* (Microfinance Network, 2000). For a more general discussion of the subject of internal control, refer to a comprehensive auditing textbook such as those listed in the bibliography to this guide.

Responsibility

Your institution's board of directors and top management are responsible for creating an environment that fosters internal control. Together, they build a culture that emphasizes integrity and ethical values. They also:

■ Assess risks, such as those related to exceptionally rapid growth, significant changes in the operating or regulatory environment, staff turnover in critical positions, institutional restructuring, and changes to important accounting practices.

■ Establish appropriate controls in response to those perceived risks.

■ Develop a process to assess the effectiveness of instituted controls on an ongoing basis.

Many medium-to-large MFIs maintain one or more internal auditors on staff to assist them in implementing and monitoring controls, or they outsource some of these activities to an external audit firm. Internal auditors generally have professional accounting and auditing expertise, plus a thorough knowledge of the industry and the institution's operations. To maintain critical operational independence, internal auditors should report directly to the board of directors or the board's audit committee.

Internal financial and accounting controls ensure that the data in your information system is authorized, complete, accurate and protected from unauthorized access.

An internal auditor helps to ensure that the institution's policies and practices are followed; that its internal controls are comprehensive and effective; and that the board of directors is aware of all significant risks. Specific internal-audit activities include:

■ Analyzing and reporting on the institution's accounting, financial and operating controls.

■ Promoting cost-effective controls.

■ Determining compliance with policies, procedures and applicable laws.

■ Monitoring procedures that account for, and safeguard, assets.

■ Establishing the reliability and timeliness of management reporting.

■ Evaluating staff performance relative to assigned responsibilities.

■ Recommending changes to address perceived deficiencies.

Accounting and Financial Controls

Specific internal controls vary somewhat, influenced by the unique aspects of the institution (including its size and organizational structure), the IS, and each business function. However, whether your IS is manual or computer-based, internal accounting and financial controls ensure that:

■ The transactions you process for each aspect of your operations are appropriately authorized and the data is complete and accurate.

■ Your policies and procedures are followed.

■ The reports and other outputs are accurate and complete, and made available only to authorized personnel.

■ The data you maintain in your IS (i.e., standing,[29] or master file, data) is complete and accurate, and the overall integrity of the data is maintained.

■ Your assets are protected against loss resulting from improper use of the system and from error, fraud or theft.

Internal Controls for Computer-Based Systems

A well-designed IS automatically incorporates many internal controls that are common to all institutions. For example, when operating live, a computerized system will not allow you to process an accounting transaction using an invalid account number or to delete an account number that is being used. The system will also prevent you from posting an out-of-balance entry.

In addition to these generic controls, computerized information systems often automate, or build in, some of your institution's unique controls. For example, when you install the system, you might be asked to establish control parameters for approving and disbursing your loans — such as the number of signature approvals required or other loan-validation criteria. It is helpful if these types of controls are designed and in place before you install the system; changing them at a later date might be difficult.

If you switch from a manual to a computerized system, you might need to implement changes in your internal controls to reflect the differing natures of the two systems.[30] For example, because manual systems rely heavily on the human element, they are inherently subject to random errors. Therefore, the internal controls must guard against this risk.

Computer-based systems, on the other hand, always process transactions in the same manner based on their programming. They are not subject to random processing errors, but they are subject to repeated errors — in other words, any processing error will be duplicated for every like transaction until the cause of the error is eliminated. Also, one error can generate additional errors elsewhere in the computer system if the erroneous data is the basis for subsequent processing, resulting in a cascade of errors.

Computer-based systems also require new controls based on their unique components. These controls are often categorized according to asset controls, personnel controls, input controls, processing controls, telecommunications controls, output controls and database controls. They ensure that:

■ New and enhanced software applications are appropriately designed, accurately and reliably programmed, and effectively implemented — including data conversion and staff training procedures.

■ Assets are secured and properly accounted for.

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29 Standing data (also referred to as master file data) is semi-permanent or permanent data that is referenced or used repeatedly during processing — a chart of accounts or a client list, for example.

30 For additional information, you can refer to any number of books that address audit-related topics for computerized systems. Many general auditing texts also provide information on establishing internal controls for computerized systems.

- Access to systems and data is restricted. Computer-based systems can increase security risks because the data is concentrated in one location (e.g., the computer database) — or a relatively small number of locations in the case of non-networked, multi-site systems. Manual, paper-based systems maintain data in many different locations, effectively dispersing the security risk.

- Authorized and accurate data is entered, processed and reported according to established procedures (including the conversion of historical data) and using the appropriate software version.

- Data can be recovered if the hardware or other part of the system fails.

- For applications that are not integrated, the integrity of the data is maintained between and among applications.

- Illogical and unrealistic values are identified by the system — for example, a weekly payroll amount that exceeds the employee's annual salary. In a manual system, the staff would normally catch such nonsensical errors.

While some of these controls can be designed into the software, others require staff involvement via administrative or procedural controls.

Historical Records

Unless your institution is new, with absolutely no previous operations, you will need to gather and organize at least a minimal amount of historical information for entry into your new IS. This data provides a foundation for the system when you begin processing new data (i.e., live operations), and also provides comparative data for financial reporting and for trend analyses and performance indicator calculations.

If any significant portion of your historical records is disordered, misplaced or missing, you might not be in a position to convert to a new system without first reconstructing this data.

In evaluating your historical records, consider the amount of history that you need to enter for initial setup and any preparation required to format the information correctly for the new system.

Although you can make final decisions on historical data as you select and begin to install your new system, any tentative decisions you make now can help define your schedule and budget, and the resources you will require. They also might influence your analysis of possible new systems.

Type and Amount of History

Relevant historical records include past accounting and operating data — manual or computerized — for all activities that will be managed by the new IS.

The specific types of information and the amount of history that you must prepare (in months or years) depend on certain policy decisions you make, as well as the specific software that you select. In some cases, you can enter summary data; in others, you must enter detailed information.

When you select a system, your software vendor or developer should be able to provide guidance on the data that will be required during the installation of your new system.
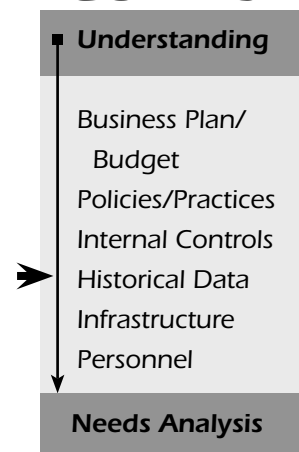
At a minimum, you will likely need to prepare the following:

General Ledger/Financial Statements Application

- Chart of accounts, including data for all segments.

- Opening balances for each account as of the first day you plan to go live with the new system.

- Month-end balances for at least 12 months before the first month of live operations, if you intend to create comparative financial statements using the system or to calculate indicators that require such historical data.

Lending Application

- List of clients (borrowers), along with any relevant background information.

- Loan product definitions and validation criteria.

- Outstanding loan portfolio as of the date you begin live processing. It is generally preferable to enter the original loan amount and any payments to date — rather than just the current outstanding balance — to avoid corrupting the historical data for comparative reporting and for indicator calculations. Some MFIs prefer to enter only new loans into the new system, while continuing to process existing loans in the previous system, to minimize data entry for initial setup. However, this approach can complicate your work to validate the new system (i.e., running parallel systems) and make producing comparative financial statements or calculating indicators more difficult.

The minimum amount of historical data required to install a new system varies from application to application.

Savings/Teller Operations Application

- List of clients (savers), along with any relevant background information.

- Savings product definitions.

- Outstanding savings balances as of the date you begin live processing. If you would like data for trend analysis, you can enter savings balances for the prior 12 months, or more.

Client Impact and Outcomes

- Social and economic history for loan and savings clients. The specific information required is unique to each software product.

Accounts Payable

- List of suppliers, with any relevant background information.

- List of recurring payments, if any.

- Outstanding invoices or other liabilities as of the date you begin live processing, along with any partial payments made against these obligations. If you would like data for trend analysis, you can enter invoices and payments for the previous 12 months, or more.

Human Resources/Payroll

■ List of all staff members, with any relevant background information.

■ Salary information for each employee.

■ Background information on government requirements (such as payroll taxes or unemployment insurance), if any.

■ Outstanding obligations as of the date you begin live processing, if any. If you would like data for trend analysis, you can enter payments for earlier periods.

Fixed Assets

■ List of all institutional assets, along with current locations and assigned responsibility.

■ Accounting information for each asset, including original cost, useful life, accumulated depreciation as of the date you begin live operations, and depreciation method.

■ Maintenance and repairs history, if available.

■ Any legal documents applicable to the assets, such as warranty or service agreements.

Banking

■ Bank statements or similar documents for at least the previous two or three months.

■ Cash balances for each bank account as of the first day you plan to go live with the new system.

■ List of transactions from your accounting records for each bank account, beginning on or before the date of the last bank statement and extending to the date you plan to go live with the new system.

■ Bank reconciliation reports for the previous one or two months.

Unless you can import data directly from your old system into your new system, you must allocate sufficient time and people for data entry.

Data Preparation

Data preparation, or conversion, refers to the process of organizing historical data and then transferring it into the new system. Some applications require that you enter the data using the same programs you will use after the new system goes live. Others provide optional spreadsheets or other unique procedures to import historical information into the new system's database. Rarely can you import directly from an old computerized system into your new system.

Your software vendor or developer should be able to guide you on the options for entering data into the new system. Unless you can import the necessary data directly from your old system into your new system, you must allocate sufficient time and people — staff and/or consultants, and temporary data-entry operators — for this task.

To streamline the process, ensure that your historical records are:

■ Legible.

■ Complete and error free.

■ Organized in a manner that makes it easy to locate information.

■ Secure from accidental damage, fraud and theft when not in use.

Infrastructure

A new or upgraded IS — particularly a switch from manual to computerized system — can impact many elements of your institution's infrastructure, including:

■ Facility and the amount of floor space dedicated to the system (headquarters and branch offices, if any).

■ Office space for additional personnel, including consultants and any temporary staff you hire for data conversion.

■ Space for a technical library (in a secure location) to maintain information on your business practices and on the hardware and software elements of your system, including manuals and other formal and informal documentation.

■ Offsite storage for data backups and other critical documents.

■ Furniture and fixtures.

■ Utilities, UPS, temperature controls, humidity controls and other environmental concerns.

■ Networking and communications upgrades.

■ Security, including theft and fire protection devices.

■ Insurance coverage for your new assets.

Changes to these and other elements of your infrastructure can require significant planning to implement. Although you might not have sufficient information to make final decisions until you have selected a system, researching your options as soon as possible is helpful.

Personnel

To be effective, your IS implementation requires the involvement and support of your institution's board and top management. It must also have the whole-hearted cooperation of managers and operations staff.

People naturally have concerns about potential job losses due to computerization, and about changes to the nature and scope of existing jobs when the IS changes. You must openly address these concerns from the beginning, and perhaps provide important incentives to the staff. If you maintain an in-house human resources function, its participation is vital in managing this staff-relations aspect of the implementation.

Although you will analyze your staffing requirements in more detail in the next guide, *Determining Information System Requirements*, you should give initial consideration to the following questions:

■ Do you have sufficient operations staff — and access to consultants and temporary help — to manage the extra workload required to select, install and validate the new system before it goes live? It is extremely stressful if your people are required to continue with all of their traditional responsibilities and, simultaneously, find the time to learn and perform new tasks.

- Do your staff have the appropriate skill set to operate and manage the system after it goes live? For example, your data entry operators might lack basic computer skills that necessitate pre-training in hardware (i.e., using a mouse), operating system basics (for example, locating, opening or copying files), or other required software (such as using Windows Explorer, Microsoft Word or Microsoft Excel). Your managers might need similar training.

- Do you have an in-house IT function to support the hardware and software components of the system?

- If *yes*, do they need new or refresher training in operating systems, networks or programming languages? Do they have the necessary knowledge to install and maintain the hardware elements of the system? Also, are they sufficiently informed about your institution's business policies and practices? Because the IS reflects your institution's operations, the IT staff needs at least a basic understanding of your policies and practices.

- If *no*, and you plan to use outside consultants for this activity? Do you have a person on staff to coordinate and manage this working relationship? And do you have the financial resources available to support the consultant's involvement? Have you identified consultants with the necessary technical knowledge, and important project management and interpersonal skills? Have you and your staff spent time with the consultants to ensure that they develop a basic understanding of your institution's business practices and organizational structure?

Involve your human resources function from the beginning in order to allay staff concerns and to develop useful incentives.

Start this analysis as soon as possible, particularly if you are transitioning from a manual to a computerized system and your staff has limited computer experience. While you can generally rely on the vendor of your new system to offer courses in the company's own products, it might not offer courses in other products or in basic computer skills. As a result, sourcing the appropriate training classes and scheduling attendance for your staff can take considerable time.

Identifying potential staffing voids, qualifying consultants, or hiring and training new personnel also can be time-consuming.

Can You Afford a New Information System?

N OT every institution requires a computer-based IS. And not every institution that requires a computerized system needs the most comprehensive, costly system available.

Information systems are long-term investments that require an ongoing commitment of financial and non-financial resources. As such, they impact your institution's cash flow and profitability for years to come, and must be economically justifiable. Your goal in selecting an appropriate IS, then, should be to find the best return on the costs involved — not simply the lowest- or highest-cost alternative.

Projecting IS Cash Flows

Acquisition costs include hardware, software, furniture and fixtures, facility upgrades, personnel, and up-front support.

As a first step in analyzing the feasibility and financial implications of your anticipated new IS, project the related cash flows. A cash flow projection is a forecast of the funds that flow in and out of your institution over the life of the system, considering such things as:[31]

- Acquisition costs.
- Development costs.
- Installation costs.
- Operating costs.
- Increased revenues.
- Cost savings and other operational efficiencies.

The cash flow highlights the impact of a new system on your institution's profitability and cash position. It is an important source of information for use in preparing the financial projections for your business plan and your annual operating budget. It also provides the basic data that you need to prepare a cost-benefit analysis for your IS investment.

Unless you are a new institution that has not begun operations, your cash flow analysis is ultimately a relative one. You compare your current system with one or more alternatives to establish the financial impact of the change. Therefore, as a starting point, you need to know the current and projected expenditures for operating and maintaining your existing system. You will also need similar projections for one or more alternative systems.

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31 To assist you in organizing your cash flow data, you can use the *Cash Flow-NPV Calculator tool* that is a companion to this guide. For additional information on using this tool, refer to Annex 5 in this guide, *Using the Cash Flow-NPV Calculator Tool.*

Because the costs can vary considerably among the various alternatives — and because you begin planning for your acquisition well in advance of selecting a specific IS — your initial projections are necessarily very rough estimates. Nevertheless, they help you begin to answer the questions "What can my institution afford?" and "How will the acquisition affect profitability?" Over time, as you analyze your requirements more fully and review available systems, you can develop more precise projections.

Even if you take your financial analysis no further than a cash flow, the exercise of preparing one is extremely important — it requires you to carefully consider the impact of the IS on your institution's financial position. And while the projections are generally prepared on a cash basis, you might decide you need to restate them on an accounting basis, as well.

The primary difference between the two bases (cash and accounting) is timing. For example, if you purchase a significant computer hardware asset for cash, a traditional cash flow analysis reflects the entire cost of the asset as an outflow when the payment is made to the seller. This accurately represents the actual funds expended, and helps to predict your institution's cash requirements.

However, an optional, accounting-based analysis might recognize the cost of the hardware asset over its useful life as depreciation instead. This approach mirrors the accounting methods you use in preparing your accounting records and formal financial statements.

To start your cost analysis, itemize all items that need to be priced in each category using as much detail as possible.

Estimating the Useful Life of an Information System

Useful life is an educated guess, based on such factors as your institution's growth rate, the magnitude of anticipated changes in your business operations (for example, transitioning to a formalized institution), and the flexibility and capacity of the IS you choose.

At a minimum, your IS should serve your needs for three to five years.

Realistically, if you anticipated your future requirements, and if your system is well maintained and enhanced to incorporate new features and technologies, you might extend its useful life to 10 years or more.

Cash Outflows and Other Costs

Any IS has an associated cost — whether you ultimately choose commercial software or your own custom development program. Acquiring your new system, customizing or developing portions of its software, and installing and operating the system are processes that carry associated costs. And, while an existing system does not have any major up-front acquisition costs, you do replace or upgrade components and also incur operating costs throughout its useful life.

For purposes of your cash flow analysis, you can categorize outflows according to acquisition costs, development costs, installation costs and operating costs. Examples of costs in each category are described below.

Start your cost analysis by itemizing the to-be-priced elements in each category using as much specificity and detail as possible. For example, you might initially estimate your future cost for personal computers (PCs) to be US$10,000. However, if you add detail to your cost analysis that indicates you need PCs for your headquarters and two branch locations — including four data entry operators and two managers, plus a shared-use PC at headquarters — it becomes clear that US$10,000 is inadequate.

As a general rule, the more detail in your analysis, the more accurate the final amounts will be. This detail is also useful later in variance analysis. For example, if you find that you spent more on your computer hardware than planned, the detail can pinpoint the reason. Maybe you purchased two shared-use PCs for headquarters when only one was budgeted (a quantity variance). Alternately, you might find that you accurately predicted the number of PCs that would be required, but each PC actually cost more than you had anticipated (a price variance).

If you have an in-house IT function, your colleagues likely have a good idea of the costs involved in acquiring and maintaining a system, as well as how to perform any additional pricing research that is necessary.

If you do not have in-house IT expertise, you can turn to any number of sources for cost information. Websites, such as the Microfinance Gateway (microfinancegateway.org), include resource centers and discussion groups on the subject of information systems and technology.

In addition, a number of email-based discussion groups, such as the DEVFINANCE list maintained by Ohio State University,[32] also are available. Hardware and software vendors will provide general pricing information for their products, and often maintain their own websites with price lists and product details. MFIs that have recently purchased new systems often are willing to share experiences.

Your acquisition budget should include funds to replace or upgrade components that will likely become damaged or obsolete over time.

Acquisition Costs

Acquisition costs include all of the expenditures you incur to obtain the components of your IS. As certain components will likely become damaged or obsolete over time, you should plan for their replacement or upgrade in your acquisition budget. In addition, to minimize downtime for the system, you should purchase and maintain a spare-unit inventory of certain vital components that are not replaceable immediately in your local area.

Acquisition costs can vary substantially from one MFI to another, depending on the institution's size, number of branch operations, regulatory environment, lending/savings methodologies and products, and its business practices, among other variables.

One small-scale study of mature MFIs[33] found that a "typical" large institution spent between US$100,000 and US$150,000 for the initial software — excluding customization, support and maintenance costs. A total hardware upgrade (if necessary) cost the MFI approximately US$100,000 plus an additional US$5,000 for each branch operation. The study concluded by stating that, while a computerized system can represent a substantial cost for an MFI, the more significant cost can be the cost of "not having information."

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32 For information on joining the DEVFINANCE discussion group, refer to the Microfinance Gateway at microfinancegateway.org.

33 Waterfield, Chuck and Calmeadow, *Budgeting for New Information Systems for Mature Microfinance Organizations,* November 1997. (Prepared for the International Finance Corporation.)

When budgeting for your IS acquisition, consider the following elements:

Cost Element	Description
Hardware	The computers plus any peripheral devices such as printers, scanners, backup systems, generators or UPS, storage devices, and modems. The acquisition cost of new computer hardware includes all expenditures necessary to acquire and set up each item — including the selling price, any delivery charges and applicable taxes.
Software	Purchased/licensed software, as opposed to software that was developed specifically for your institution. As part of the acquisition cost, add any minor customization done before installation. These software products may include: The operating system, such as Windows or Unix (generally bundled with the hardware). Business applications such as GL, lending and savings. Include any additional charges for source code or documentation. Telecommunications software for networking, email and Internet access, and remote login. Utility programs for such activities as backups and virus checking.
Furniture and fixtures	All costs for additional desks, tables, chairs, bookshelves, keyboard trays, wrist rests and similar assets required for the new system, either at your headquarters or branch offices. Include the selling price, any delivery charges and applicable taxes.
Facility and infrastructure upgrades	All costs to acquire new or supplemental office space (other than rent or lease costs, which are operating expenses). If you must upgrade your existing or new space in any way to prepare it for the system (e.g., electric wiring, phone cables, lighting, security system, temperature or humidity controls) include those costs here.
Personnel and consultant fees	Contract payments to outside experts as well as increased payments to staff for overtime or expanded duties that are related to the evaluation or acquisition of the system. Do not include ongoing personnel costs; they are considered operating expenses.
Maintenance and support	Up-front maintenance and support fees, and any other one-time fees you incur to acquire the system.

Development Costs

Development costs are those expenditures required to create custom software for your institution, or to customize and enhance existing or off-the-shelf software products. They include:

Cost Element	Description
Specifications	Contract payments to outside experts, or increased payments to staff for overtime and/or expanded duties for the development of functional and technical specifications.
Database design and software coding	Payments to consultants and/or staff to implement the specifications in the software.
Pre-installation testing	Payments to consultants and/or staff to test the software during and immediately after programming.
Documentation	Payments to consultants and/or staff for development of user and technical documentation.
Rentals	Expenditures to rent any equipment, furniture or fixtures necessary only to support the development effort.

Installation Costs

Installation costs represent the expenditures required to get your new system, or new components, up and running. They include:

Cost Element	Description
Data conversion	Funds expended to gather and prepare data for entry into the new system, plus the cost of data entry. Whether you are using a manual system or a computer-based system, you will incur a cost to transfer the data to your new system.
Technical assistance	Payments to vendors or IT consultants who assist your staff with the technical aspects of the installation.
Initial training	Training costs for your in-house training staff and/or managers, data entry operators, and other personnel.
Validation	Testing and parallel operations necessary to validate the new system, including funds for consultants and overtime payments to staff.
Internal controls	Costs associated with developing or modifying, documenting, and implementing internal control policies and procedures for the information system.

Operating Costs

Operating costs are IS-related expenditures incurred over the useful life of the system, including those in the following categories:

Cost Element	Description
Personnel	Ongoing payments to in-house personnel and outside consultants.
Ongoing training	Post-installation training costs for staff and consultants, as necessary.
Audits and internal controls	Periodic audits and other internal control and risk management practices.
Facility and fixtures	Post-installation costs for desks, tables, chairs, bookshelves, keyboard trays, wrist rests and similar assets, either at your headquarters or branch offices. Include the selling price, any delivery charges and applicable taxes.
Utilities	Expenditures for such things as electricity, heat and humidity controls, telephone, and Internet.
Insurance	Costs required to ensure IS assets against loss from such things as fire or theft.
Rentals	Expenditures to rent equipment, generally on a temporary basis, when equipment is being replaced or repaired.
Hardware and software	Upgrades or enhancements to extend the life of the system or expand its utility.
Repairs and maintenance	Payments necessary to fix or maintain hardware or software components of the system.
Ongoing support fees	Post-installation maintenance and support fees to operate the system.
Supplies	Consumables such as printer cartridges and paper.
Overhead	Proportional allocation of other costs to the IS function.

You incur operating expenses on an ongoing basis throughout the life of the information system.

Cash Inflows and Other Benefits

For purposes of your cash flow analysis, you can categorize inflows according to increased revenues, cost savings and operating efficiencies.

Increased Revenues

Over time, your institution will likely increase its revenue-generating potential as a result of the new system's ability to accommodate such elements as:

Revenue	Description
Customers	Growth in the number of clients you serve within your institution's existing markets.
Markets	The addition of new markets — such as extended geographical areas or different types of clients.
Products	An expanded menu of products and services — for example, a new individual loan product, formalized savings products, or a microinsurance offering.
Fees	More complex interest, commissions and other fee structures for your products and services.
Branches	Additional operating locations for your institution.

Over time, a new information system should accommodate your institution's growth, thereby increasing your revenues and generating cost savings and other operational efficiencies.

Cost Savings and Operational Efficiencies

The direct cost savings that accrue from a new IS vary considerably from institution to institution and system to system, but can include such things as:

Cost Savings	Description
Personnel	Lower personnel costs in accounting, information systems, lending and savings functions — or smaller increases in these costs over time.
Operating costs	Separate from personnel costs, reduced operating costs for the IT function, as well as other functions within the institution.
Consulting	Reduced expenditures for consulting services.
Write-offs	Fewer loan write-offs, based on timely access to comprehensive, accurate information for decision-making.
Restructuring	Reduced costs for loan restructuring and refinancing to the extent they result from inadequate information and poor decision-making.

As your operations become more efficient with the aid of your new system, you will likely experience additional benefits, such as more efficient use of management and staff time as well as more effective allocation of other institutional resources.

As you project these amounts, be sure that you do not duplicate any elements that are already factored into your analysis as a result of the cash outflows section discussed previously.

Projecting Qualitative Costs and Benefits

In addition to the quantitative measures identified above, you also can estimate the value of *qualitative* costs and benefits that result from the new system.

Qualitative values provide useful information when justifying the cost of the acquisition, and when comparing a potential new system with your current system or another potential system. However, you should not include qualitative values in your operating budgets or financial projections; they do not reflect actual accounting inflows or outflows.

Unfortunately, no concrete measurements or scales apply when estimating qualitative costs and benefits — they are inherently subjective. This does not mean, however, that you should be reluctant to include them in your analysis.

The implications of a qualitative cost or benefit can be useful to consider when estimating its value. For example, assume that the new system provides more comprehensive and timely information for managing your loan portfolio. But how do you quantify this type of benefit? One way of estimating the value is to consider the possible impact of better information. You might predict that the system will allow you to analyze your customers' creditworthiness better and prevent the issuance of a number of high-risk loans. The cost of administering and, ultimately, writing off such defaulted loans is a quantifiable benefit of any system that allows you to prevent issuing such loans in the first place.

Qualitative costs and benefits are based on subjective estimates, but they can be extremely useful in comparing one information system with another.

Qualitative Costs

Certain costs of an IS are non-financial, and therefore difficult to quantify. To help in identifying them, ask yourself, "What are the risks involved in changing to a new IS?"

Qualitative costs can include the following:

Qualitative Cost	Description
Time value	The implicit cost of delays in availability of the new system resulting from, for example, an extended customization or development schedule, or extensive employee training.
Morale	The temporary decrease in confidence or mood that can result from the additional pressures involved in installing and learning a new system.
Disruption value	The implicit cost of any interference with your normal operations, or to your clients, caused by installing the new system.

Qualitative Benefits

Many of the benefits of a new IS are equally difficult to determine and to quantify. To help in identifying these benefits, ask yourself, "Why do we want a new IS?" and "What do we hope to achieve with a new system?"

The answers might lead to the following qualitative benefits:

Qualitative Benefit	Description
Timeliness	Faster and more ready access to important information.
Accuracy	More reliable and accurate information on which to base decisions.
Flexibility and sophistication	The ability to accurately model different, changing and more complex financial products and business practices.
Rapid scale-up potential	The capacity to grow as quickly as necessary to accommodate customer and market needs, while maintaining quality.
Morale	Employee satisfaction based on such things as access to more and better tools to perform work-related responsibilities, and an opportunity to develop new professional skills.
Personnel	The competitive ability to attract and retain skilled managers and staff.
Customer service	Customer satisfaction based on an enhanced ability to provide quality products and services.
Marketing value	Competitive advantages over other financial service providers in serving the needs of current and prospective customers, employees, and other important stakeholders.
Fundraising	Enhanced ability to attract necessary investment and loan funds.

Cost-Benefit Analysis

To further analyze the financial impact of your planned investment and to justify the cost, you can build upon the cash flow by preparing a cost-benefit analysis. As the name implies, a cost-benefit analysis weighs the costs of a possible investment against its associated benefits.

Possible Approaches

One possible approach to cost-benefit analysis is a *discounted*[34] *cash flow,* which estimates the present value of future cash inflows and outflows using a *net present value* (NPV) or an *internal rate of return* (IRR) calculation. Either calculation provides a standardized means of comparing investment alternatives.

The NPV represents the present value of the future cash inflows and outflows for an anticipated investment.

The IRR represents the yield or interest rate for a contemplated investment that generates an NPV of zero. In other words, it is the interest rate for which expected cash inflows exactly equal the cost of the investment.[35]

As information systems are often cost centers, not profit centers, the NPV might be a more appropriate tool for your analysis than the IRR.

Limitations

A cost-benefit analysis is inherently financial and quantitative in nature. Although you can factor in certain qualitative costs and benefits, as previously noted, the analysis cannot totally account for all of these qualitative elements.

As a result, your cost-benefit analysis is only one input into your institution's IS decision-making process. By itself, the analysis cannot provide a final and definitive answer as to the best system for your institution.

Initially — before you have detailed data on specific systems — you can use rough estimates to compare the cost of your current system with an anticipated, but unspecified, new IS. Later, if you decide to pursue a new system, you can perform a similar analysis using actual amounts based on vendor bids and/or your own budgetary research. [36]

A cost-benefit analysis helps to justify the cost of an IS expenditure, and provides a basis for comparing the financial impact of alternative systems.

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34 Discounting is the process of estimating the present value of future cash flows based on the time value of money (i.e., the concept that, because of its earning potential, an amount of money that is available today is worth more than the same amount of money available in the future.)

35 Microsoft Excel provides financial functions that perform NPV and IRR calculations — including the NPV, XNPV IRR and XIRR functions. If these financial functions are not available on your system, you might need to install Excel's Analysis ToolPak. After you have installed the ToolPak, make sure to enable it by clicking Tools on Excel's menu bar, and then Add Ins. Although a detailed discussion of each of these methods is outside the scope of this guide, you can refer to virtually any finance textbook for additional information.

36 Cost-benefit analysis for software customization or enhancement projects involves separate calculations.

Calculating Net Present Value

As an information system's cash inflows and outflows generally occur at different times over several years — and the timing of the inflows and outflows vary for each potential system — you discount them to provide a common basis for comparison.

Consider, for example, two different information systems with identical selling prices. The first system must be paid for before the installation. The vendor of the second system will finance it at a below-market interest rate over five years. Even though the quoted price for both systems is the same, the second system is actually less costly when you factor in the time value of money. You control your funds for a longer period and, theoretically, can invest those funds to earn a higher return than the below-market financing cost of the system.

To recognize this time value of money, the NPV calculation includes a discount rate. Typically, this rate factors in the anticipated effect of inflation plus a risk-adjusted return for the funds to be invested.

To calculate the NPV of your anticipated investment, complete the following steps:

Net present value provides a common basis for comparing systems with cash flows that occur at different times over several years.

Step	Description
1	Determine the useful life of the information system.
2	Establish a discount rate for the calculation. At a minimum, use the prevailing market interest rate for the period.
3	Project the future cash inflows and outflows over the useful life of the system. If you choose, include estimates for qualitative elements.
4	Perform the NPV calculation to establish the discounted net cost of the investment.

Although you can calculate the NPV manually using formulas from any finance textbook, the simplest approach is to use Microsoft Excel or other, similar tools with built-in financial functions.

Excel provides an NPV and an XNPV worksheet function.[37]

Use NPV for your calculation if you reasonably can assume that your cash flow amounts are spaced equally in time (e.g., monthly, quarterly or annually) and occur at the end of each period.

Use XNPV if your cash flows are not periodic, as you can establish the exact date of each inflow or outflow.

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[37] To access either of these functions, choose Insert on Excel's menu bar, then Function.

Conclusion
and Next Steps

I N this guide you have learned what to consider when deciding whether a computer-based IS is the right choice for your institution at the current stage of its development. Further, you have learned how to weigh critical factors when looking at a computerized IS — whether to buy off the shelf or custom designed, stand-alone or integrated, with or without the source code.

To prepare for the transition to a computerized IS, you have been provided with guidelines on the key elements that must be in place before proceeding with computerization (e.g., current business plan, annual budget, formalized policies and practices, internal controls, historical records, infrastructure, and personnel).

Finally, you have been given tools and information to help you analyze whether you can afford a new IS. With this new knowledge of IS terms and concepts — and an improved understanding of the IS process — you now are in a stronger position to make IS decisions and discuss options with IS consultants or vendors.

To gain more insight into the process of computerizing your IS, and to help you decide if this is appropriate for your organization at this time, the essential next steps are set out in the companion guide, *Determining Information System Requirements*. This guide demonstrates how to systematically analyze your operational processes and IS requirements, and provides templates and tools to assist you in the management of this project.

A thorough analysis of your operational processes is critical to the selection of an appropriate IS. Equally significant, a comprehensive operational analysis can help you define, evaluate and improve your operational systems. So even if you have decided to maintain your current IS, it would be valuable to read the companion guide and learn how to build a better understanding of the systems within your own organization.