Making the Most of Current Systems

Even if the long-term plan is to replace existing systems and databases, it is very likely that they will continue to be used for some time as they contain much of the necessary information and processing functionality. It is therefore important to consider how to obtain the maximum contribution from the information in current systems and those still under development. This must be achieved by managing the existing information contained within existing systems, which is frequently 'imprisoned' in multiple corporate files and databases, with considerable duplication, obsolescence, inconsistencies, inefficient linkages and poor exploitation. They may have been poorly designed in the first place. In addition, employees are not very well trained generally to use information. These factors can all lead to competitive disadvantage and must be rectified, if the business case warrants this. If progress is to be made toward implementing effective information management, it is essential to provide efficient access to information in these existing databases. However, if multiple versions of key subject databases such as 'customer', 'product' or 'order' exist, then it is no easy task to rationalize the various versions and harder still to integrate them with any newly defined databases, or object databases, based on the corporate information architecture. Until unique versions of subject databases, or identically maintained versions, are available, managing information globally implies managing the differences between actual database versions and consistent data dictionary definitions.

Typically, there is a huge investment in systems, and in most sizeable organizations the cost of maintaining these can be as much as 70–80% of the annual expenditure on systems and technology. Very rarely can the investment be written off—and even if it could be justified, replacements could not be found or implemented quickly. Nor can support and maintenance be abandoned. So, in planning the migration to a new system, it is important to obtain maximum value from current systems. Meanwhile, the provision of critical business information with the necessary quality attributes in an appropriate set of target databases should be the objective of any migration and must still be justified against the business need. This is likely to be a long, multi-step process of progression toward an elusive goal.

It is essential to evaluate the contribution of information in existing systems, with reference to business information needs. Sometimes,

systems will already have associated information and process models and some will be recorded in dictionary systems. Frequently, however, this is not the case, and the structure and contents of individual systems need to be identified if their value is to be assessed. The evaluation process serves several purposes:

- Documentation of the information structure and processes, and system linkages, which helps in plotting the migration path to the desired systems and information architecture, and also in any initiative that may be put in place to enable information sharing and systems integration.
- Recognition of whether current systems are able to provide information to satisfy business needs, either directly or after enhancement.
- Identification of information that can be usefully transferred to an intermediate base of consolidated information for subsequent accessing, perhaps to satisfy composite needs or unstructured enquiries.

Few tools are available for unscrambling the conceptual framework in existing systems, but some CASE tools can provide reverse engineering facilities that can backward-track and document components of existing systems, capturing data definitions, data flows and data and process models.

Provision of a Stable Integrated Information Framework

In aiming to provide a stable information base, there are strong arguments for it being integrated, at least throughout the core business processes. Prompted by many factors in the business environment, it is expected that there will continue to be a steady increase in the number of knowledge workers, and growth in the volume and complexity of internal and external information needed to meet a variety of demands. This means more people wanting more access to more information that is distributed more widely. These increased demands call for improved gathering and dissemination across a wide area such as:

- exchange of information with trading partners;
- support within decision-making processes;
- *ad hoc* end-user enquiries;
- boardroom strategy and planning systems;
- creating new knowledge by combining specialist information;
- obtaining business intelligence through the Internet and external databases.

Widespread sharing of information from a variety of sources requires considerable integration, based on a representative global information model. All users can then look at the same or consistently related models, with the same meanings and definitions and, by and large, the same or copied occurrences of information. Assuming the model is correct, some of the benefits of a well-structured, stable, integrated information resource, which can be easily and quickly adapted, are listed in Box 10.3.

For example, an organization may want to link information about the services a particular customer has used in order to contain risk (e.g. a bad debt in one area would constitute a bad risk in another), or to maximize opportunities by being able to offer the customer a complete range of services. It is for this purpose that many financial service institutions have attempted to implement channel integration strategies to provide a coherent view of the customer across all channels and products.

Opportunities exist in many other fields, including government departments. For example, the UK's Department of Social Security may wish to provide a potentially valid claimant with information and advice on a range of benefit entitlements, or alternatively to provide the authorities with a better chance of detecting false claimants. In these and most cases, the total view is needed at the business–customer interface, more so than at the centre, since the contact takes place in distributed branches.

Rapid Response to Dynamic Business Needs

Rapidly responding to changing business needs is closely related to the previous aim. Not only should the information framework be stable and integrated but it should also facilitate a swift response to an unexpected business need. The 'window' may only be open for a brief period. A completely healthy systems and information architecture that can enable a virtually instant response is a rare occurrence, but there is much that can be done.

The business models derived from top-down analysis and based on aligning business and information reflect the information-sharing requirements of the business throughout its internal value chain, and into adjacent organizations. During analysis of the value chain, and in particular in examining the information logistics of primary activities, opportunities for deriving competitive advantage by improving information flows will have been examined and built into the required architecture. The ability to satisfy unexpected needs can best be provided if consideration is given to them during the processes of information planning. Applying informed second-guessing, potential information

Box 10.3 Benefits delivered by a stable integrated information framework

- *Businesses better equipped with information to respond as necessary:* to change direction, monitor market and customer needs, competitor activity, build relationships with business partners, and so on.
- *Direct savings achieved in the long run:* even though introducing information management is costly, fragmentation is even more costly when taking into account multiple duplication of information capture, confusion caused by information inconsistencies, and the frustration and chaos in reconciling differences. It can be the cause of lost opportunities through lack of cohesive information.
- *Intraorganizational and interorganizational cooperation improved by making information available across boundaries to a broad community of authorized users:* some of these may be external users, having their own requirements for accessing information; for example, customers placing orders, suppliers enquiring into the status of manufacturing schedules to meet just-in-time delivery requirements, financial analysts collecting global economic figures. In these cases, both user and (information) supplier are beneficiaries.
- *Support for managing businesses in a more integrated way:* traditionally, many businesses have been functionally orientated and IT has supported individual business functions quite effectively. There is now a requirement toward integration along business processes in order to be more customer and market orientated, and thus more competitive. This demands taking a horizontal view across the business; for example, linking all activities relating to a customer and reorganizing information in such a way that the whole of the customer's relationship with a business is logically brought together and presented at the point of contact with the customer—face to face, on the telephone, in concurrent processing, when a written order, query or complaint arrives, or when electronic channels are used.

needs and their sources, relationships and flows can be built into the initial information architecture.

The most appropriate structure for an organization's information and systems is usually that which mirrors the organization itself. Thus, if the

organization is divisionalized and highly decentralized, then the information resources—both applications and information—are probably also best disposed in that form. Determining how best to implement the conceptual architecture is part of the IS/IT strategy process. Clearly, it is also part of the process to look toward future business needs before embarking on what could be very extensive development or redevelopment of systems and information structures. The benefits that can then be delivered are swift responses to:

- identify and exploit an opportunity;
- identify and counter an unexpected competitive action;
- build pre-emptive defence against possible competitive threats;
- supply information to assess a business risk or the probability of its occurrence.

Improved Efficiency and Effectiveness of Information Processes

Improving information processes is an aim of many organizations, and good information planning and management should play a substantial role in meeting this aim. There are a number of factors that contribute to improving efficiency:

- Initially, increased investment is required to create an appropriate integrated infrastructure of 'managed' information. Thereafter, while initial project development costs may be higher, benefits are reaped over a long period in reduced maintenance costs and greatly extended effective life and reliability of applications.
- Critical information is consistent across the business and not plagued by incompatibility problems.
- If a well-constructed data dictionary is employed, fewer information-related program errors are incurred.
- High-level languages, associated with advanced and reliable database management systems (DBMSs), reduce programming effort considerably (e.g. in generating enquiries and reports).

In defining the information architecture along with new applications, many problems can be avoided. But, in considering the current portfolio, it could be worthwhile seeking out long-standing culprits in the form of obsolete information or unmatched needs and supply:

- Archived information held longer than needed.

- Information disseminated when it is no longer needed. Where this used to apply to hard-copy reports, it may now apply to files of information distributed electronically, but never accessed by users.
- Useful information available, but not used.
- Inefficient methods of capture, manipulation, storage or distribution.
- Duplication in several activities—capture, storage, transmission.

Duplication in one or another of these forms is very common. It is usually a consequence of independent developments, and is often perpetuated out of lack of trust between system 'owners'. It is clearly a source of potential errors when information is input more than once. It is not uncommon to find ten or even more different customer databases, some held only on PCs or personal digital assistants (PDAs), in an organization where an extensive portfolio of systems has been built over a number of years. Few, if any, of these will be identical in definition or content. Overlapping is often extensive, even where the products or customers of the enterprise differ widely from division to division and thus from database to database. The degree of overlap varies from case to case. For example, publishers of journals and magazines will have one set of customers who are subscribers and another who are advertisers. In this circumstance, there may be little overlap, nor much potential for generating business from combining the two. Where multiple copies of information exist, whether the physical information needs to be centralized or distributed more widely is an implementation and operational issue.

Multiple databases, which have grown out of independent developments, can demonstrate a number of differences. They can contain entirely different coding structures and they may also incorporate different definitions of entities, ambiguous or conflicting meanings, and different logical relationships. In the worst cases, they imply polarization, mistrust and a widespread lack of confidence in combining and sharing information. In these cases, the task is more than one of *information management*; it requires major cultural change as outlined earlier in the chapter. One of the objectives for introducing information management practices involves gaining the confidence of disaffected business users and sometimes colleagues in the IS function.

The risks associated with duplication of information input and storage can be greatly reduced by seeking to enter, update and store information once only. Duplication risks thereafter will be linked to the number of databases into which information is transferred and their distribution around the organization. In systems integration, multiple updating becomes part of the functionality of the integration.

Other factors affect the effectiveness of information processes and of the users who depend on them, but most of these are tackled within the

identification of business IS demand and the resultant information architecture. Characteristics that then determine effectiveness include the availability of required information, ease of access by end-users, timeliness, quality, integrity and consistency. These all fall within information management policies and 'service' criteria.

THE PRACTICE OF MANAGING THE INFORMATION ASSET

The practice of managing and marshalling the information asset is often called *information asset management* (IAM), although there is no universal agreement about its precise definition or constituents, its component activities, scope, organizational focus, policies and tools. It is additionally called by other names, 'information resource management' and 'corporate data management' being two favourite alternatives. It is significantly different from data administration or data management applied at system or business-function level, having a much wider significance and value. In asset-management terms, IAM seeks to build up the information assets of an organization at an acceptable cost, so that they can be employed to deliver value to the business. A definition of IAM and its constituents is given in Table 10.3.[12]

Table 10.3 *IAM and its constituents*

- *IAM* is a holistic approach to the management of the information assets of an organization. The emphasis is on integral, efficient and economic management of all the organization's information. It means getting the right information to the right people at the right time
- *Data (information) administration* is the identification and classification of business information and associated requirements, development of a corporate architecture, development of procedures and guidelines for identifying and defining business data (information)
- *Data dictionary administration* entails describing and cataloguing the information available
- *Database administration* involves design and development of a database environment for recording and maintaining data (especially machine-readable data), development of procedures and controls to ensure correct usage and privacy of data, operational timing, monitoring and housekeeping
- *Information-access services* ensure provision of support services and hardware and software to enable end-users to locate, access, correctly interpret and, where appropriate, manipulate the information available

Table 10.4 *Provisions of IAM*

- *Principles and guidelines*, which form the charter for defining IAM scope and provisions
- *Policies and procedures* for definition, management and usage of information, including its acquisition, protection, dissemination and disposal
- *A business encyclopaedia* of information definitions and usage
- *An enterprise model* and other business models referencing all types of information
- *Multimedia information* in files, databases and in an information 'warehouse'
- *Services*, *methods and tools* to enable IAM activities like information administration, appropriate for the level of information management required
- *Services* to deliver information to users, and tools for users to access information directly
- *Mechanisms* for enabling information sharing
- *Skills*, *competencies and knowledge* in information management disciplines and the information pertinent to the business

In this book, IAM is assumed to include those activities and a number of further components. It contributes a major element of the information-related requirements, in pursuit of business targets. It supplies or facilitates the business in providing a range of standards, guidelines, deliverables and services, as indicated in Table 10.4.

Principles and guidelines for IAM

Principles and guidelines for IAM should be given careful consideration, both when IAM is first introduced and when it is reassessed and updated to meet changing business needs. Aspects to consider include criteria for:

- determining the cost versus value of providing information;
- defining standards of information quality, accuracy, security and timeliness;
- responsibilities and allocation of ownership;
- satisfying the individual's need for information;
- sources and types of information to be catered for;
- what levels and forms of information should be provided (e.g. raw, unit, summary, etc.);
- how to determine the scope and methods for key practices (e.g. enterprise modelling, information sharing);
- principles relating to making the user community aware of the scope of IAM, and how to optimize their use of information;

- what constitutes an issue that needs to be resolved, and the means to do so.

Determining the Right Scope and Structure of Information to be Managed and Modelled

A key issue in IAM is deciding what is the right scope for the 'managed' information environment and how it should be structured. The total information environment does not stop at an organization's boundaries; it extends into the external environment, inhabited by customers, buyers, competitors and other organizations and influences. This external environment is very volatile and can never be modelled completely, nor can its contents be captured easily and made accessible. Internally, information is often fragmented and growing ever more so, as users of personal computing have built up their own caches of information. Systems designed to meet specific business needs are unable to communicate directly with one another, and are often unable to share, exchange or combine information effectively, because of inbuilt differences in definition or usage. Figure 10.3 illustrates the various information environments associated with a typical business. A significant portion of the information may be automated, but usually only a small proportion is managed.

The target scope of the managed environment is determined by business needs and priorities. Typically, it will contain information that must be accurate and reliable such as customer order information or billing information. It is information used by a broad section of the business and often by its external partners. Everyone uses a common definition and, while there may be more than one copy of the information, it is managed by procedures that ensure consistency and integrity. Primarily, this is the information used by key operational applications.

For any business, IAM has its foundation in its business IS strategy, where information needs are defined and the information architecture for each business unit is constructed. When several business units have developed their own IS strategies, either independently or collaboratively, they may decide to compare and rationalize, and possibly combine all or part of their information architectures or application portfolios. As long as due consideration is given to likely long-term needs as well as to immediate requirements, it may make very good business, resource and economic sense to collaborate in this way. Where two businesses have entirely different technology strategies, then the collaboration can extend no further than the conceptual architecture level. More frequently, a single business unit opts to introduce IAM within its own boundaries and sometimes in even smaller subdivisions of the business.

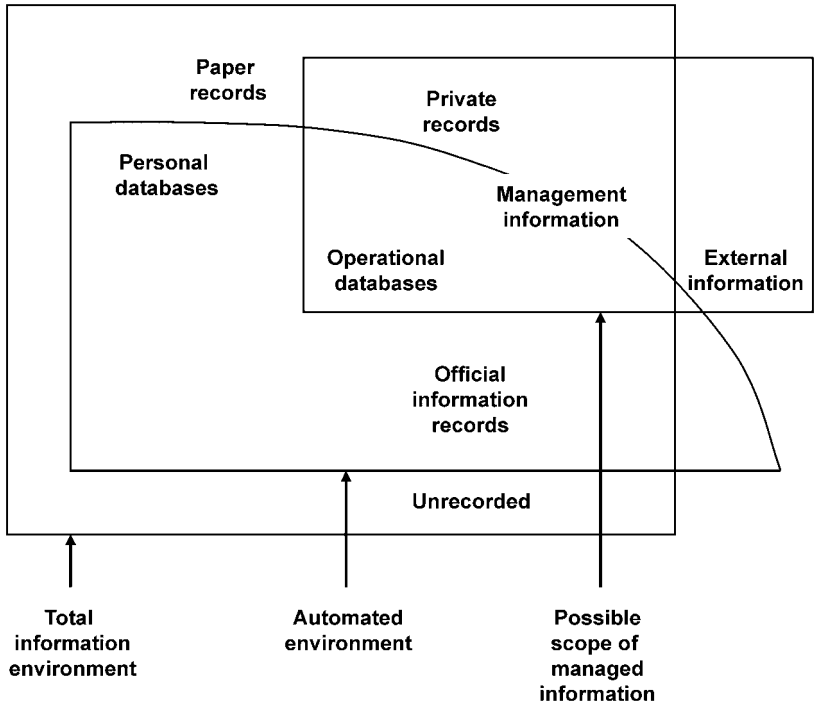

Figure 10.3 *Information environments*

Questions of centralization and decentralization of decision making, steering mechanisms, location of applications and resources, which were discussed at some length in Chapter 8, can be applied in much the same way in consideration of the ownership, location and management of information, and the location of the supporting IAM resources.

Whatever the business scope in terms of business units, the information architecture becomes the long-term implementation blueprint for IAM in that business, although it is extremely unlikely that the whole set of business information would be managed. At first, only certain parts of the architecture may be analysed beyond a global level, but piece by piece the information relevant to the business's key processes will be added until an information blueprint is complete to an appropriate level. This is likely to be a continuous process, and it will never be static, as new information is taken into the managed resource and perhaps other information is excluded as not having current significance and not warranting being managed under the IAM umbrella. Care needs to be taken to prevent this becoming a case of permanent analysis, without any value being delivered.

Remember, there is no suggestion that the information in the business environment should be stored in a single comprehensive database. Far from it—it is almost certain that there will be a number of separate databases in use. However, every attempt should be made to retain consistency of definitions across all databases and to confine the entry of information so that it is only input once. It is quite possible for there to be several copies of the same database, depending on the systems integration approach taken for linking legacy systems, new applications and packages.

Information Sharing

The ability to share information is a usual requirement when introducing IAM. Sharing can encompass interfaces within one business unit, several units, divisions or companies within the same group, and with external organizations. In its simplest form, information sharing means that only one copy of a piece of information is held and that all authorized users have access to it. In practice, this is very difficult to accomplish, because the same information is often used by several legacy applications, each with their own databases, and by installed packaged applications. Complexity increases if multiple vendors, hardware platforms, operating systems, DBMSs and network protocols are involved. In this case, it is very difficult to achieve a single source of information, and the complexity and risk increase if the situation is volatile and frequent changes to the environment and application portfolio are expected. Then a solution that incorporates consistent copies of information must be found, which enables information sharing and information management to be accomplished. This can be a very complex technical problem, well outside the scope of this book. A 'flavour' of the possibilities are considered in the next few subsections.

Single Vendor Solutions

Here a large proportion of the application portfolio is covered by one enterprise system supplied by one vendor, who also supplies the required integration. This approach has the great advantage that all functionality comes already integrated, but it is a feasible solution only if the organization is willing to lock into a single vendor, for one and possibly multiple sites, and is also willing to sacrifice the existing applications, covering this area.

This may be successful when requirements are relatively uniform and it meets information management and information-sharing requirements internally, if not externally. But it tends to have a number of drawbacks from other points of view:

- For most, except the simplest, businesses, no single vendor solution will meet all requirements, and the shortfalls have to be procured from other vendors and then integrated with the main applications. Many organizations pursue a 'best-of-breed' strategy, actively sourcing solutions from multiple vendors.
- Having to replace existing applications may produce a poor return on investment for those applications, plus the high cost of new software and training costs.
- The chosen solution may not be a good fit for all strategic business units (SBUs) if it is implemented across the whole organization.
- There is a higher risk in depending on a single vendor, who may also charge higher-than-average rates for support and development of the applications.

Point-to-Point Integration

Here tight connections are built between applications that need to share data in an integrated environment. The approach is evolutionary, and is relatively easy and low cost if only a small number of connections need to be made. However, if the numbers of applications, operating systems, DBMSs or interfaces are significant, and changes happen frequently, then it is both costly and high risk, as each interface is unique. Changing, upgrading or adding an application, or making changes to the application and network configuration, can produce risks of failure at any point in the business or technology environment.

Data Access

Data access means providing data access to users across the business regardless of the location of the users or the source of the information. This solution gives desktop tools to users for data manipulation, decision support, *ad hoc* enquiry and report generation. Its main focus is the provision of an information library or warehouse, refreshed with operational data on a regular basis, from operational systems, to perform limited integration and analysis functions. A data warehouse requires powerful servers to deliver high performance to all users.