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Managing Global Information Strategy: Xerox, Ltd.

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MANAGING GLOBAL INFORMATION STRATEGY: XEROX, LTD.

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Abstract

The diversity of information management (IM) issues and problems that a large multinational company may face are illustrated by showing how Xerox Ltd. managed its IM strategy over a ten-year period. The case study details the IM developments and shows how the Xerox IM team managed by focusing on a six-pronged strategy: business processes, data and information, applications, technology, organization, and human resources. The problems that Xerox faced in each of these areas are discussed and management's approach to resolving them is described. In essence, Xerox's move to managing-by-process required matching changes in IM capability to support it. Xerox's earlier approach, which entailed a decentralized IS model, became inadequate for supporting the dynamic process model, and ultimately customer needs. The case then shows how the process model became heavily reliant on the capabilities offered by IM. As business processes and information systems became increasingly intertwined, Xerox aligned the development of both models and effectively brought their management and coordination together. A centralization strategy was key to bringing these latter changes about.

BACKGROUND

Xerox was founded in Rochester, New York, in 1906 as The Haloid Company. Chester Carlson made the first xerographic image in 1938 and then spent years trying to convince business executives to take up his invention. They didn't believe that there was a market for even a single copier. The Haloid company took up Carlson's invention and became the Xerox Corporation in 1961. Since then it has grown to a dominant global company with 92,700 employees and revenues of $19.4 billion (Xerox 2000).

Xerox is well known for producing photocopiers but its product portfolio includes printers, facsimile machines, multifunction products (printer, fax, copier), computer software, and document consultancy. The focus of this case study is the part of Xerox that is known as the European Solutions Group. Publicly, this is known as Xerox Ltd. and until 1997 was known as Rank Xerox Ltd. This group manufactures and markets Xerox products across Europe, Africa, and the Middle East. It comprises four manufacturing sites, two major research laboratories, and multiple customer business units across more than 24 European countries. The Xerox Ltd. company employs 19,500 people.

Until the 1980s, Xerox enjoyed unprecedented growth. Its products embodied sophisticated technologies that Xerox safely guarded behind a wall of patents. As these patents expired, fierce competition developed and by 1982 Xerox's share of global profits had been halved. Most of this competition was from Japanese firms (Jacobson and Hillkirk 1986). As many Xerox technologies were now being copied, Xerox looked for organizational efficiencies to succeed.

This began when Dr. Fred Hewitt became the sponsor of Xerox's Inventory Management and Logistics (IM&L) process. This is the business process that makes sure that the right things get to the right place at the right time. Hewitt had been the director of distribution and technical services for Rank Xerox, and lead the way in developing multinational systems for optimizing inventory levels among European operating units.

The executive team was known as the Multinational Inventory Optimization Council (MIOC). It was originally composed of senior managers who were important stakeholders in the change efforts that would follow. These senior managers came from different parts of Xerox. Their job was to look for cross-functional, cross-unit opportunities. Effectively, these managers were

an advisory council to Xerox President Paul Allaire and the top five senior executive vice presidents. They gave feedback on the organizational and system changes that were required. In 1988, Hewitt was appointed as Vice President of Central Logistics and Asset Management to address the implementation of these changes.

The business process reengineering that Hewitt led saved Xerox millions of dollars. Following their example, Xerox management in other process areas implemented changes and a major organizational restructuring took place. In essence, Xerox was "forced" to abandon the functionally oriented organizational form simply in order to survive (Watts 1994). Xerox's management delineated the essential business processes through which it operates and reorganized to focus on these (see Figure 1). The traditional reductionist (Taylorist) approaches to management were replaced with a holistic, process-focused approach. The company then wanted to address the question of how to maintain a continuing business process focus and in particular to understand the role that *information management* plays in this. It soon became apparent to Xerox's senior managers that the information management processes needed to be brought up-to-date with the new process-based organization.
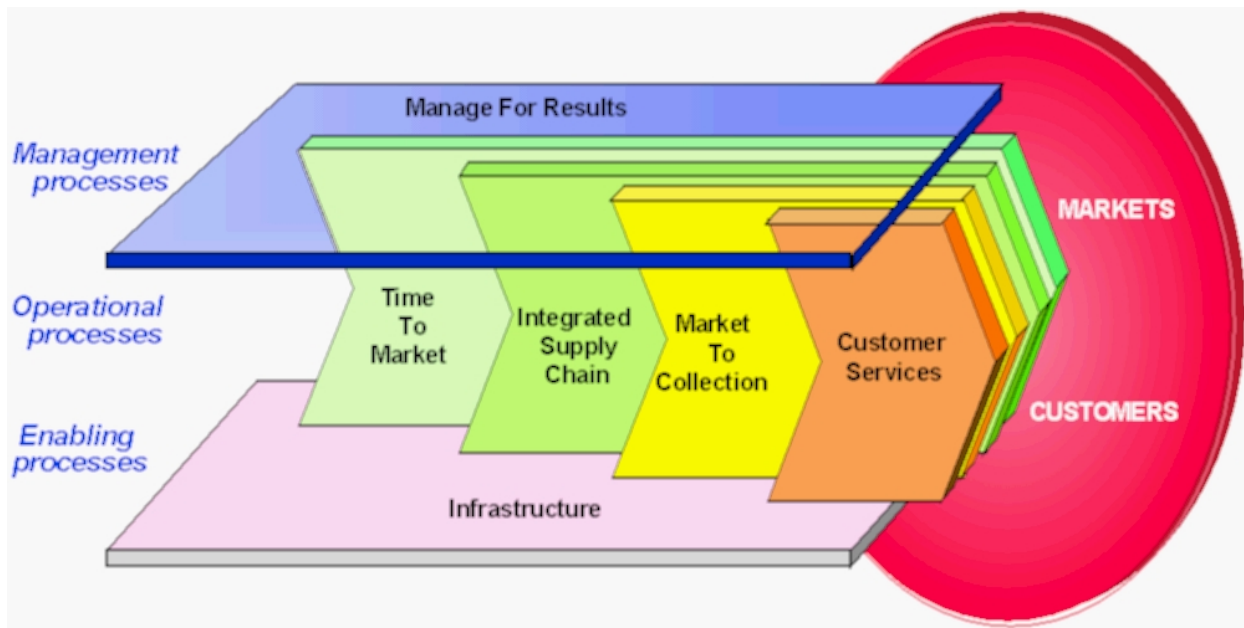

Figure 1. Xerox Business Process Architecture
(Source: Xerox Ltd.)

Information management is part of the infrastructure core process. The Xerox model of business processes is particularly complex because Xerox performs all of the activities in the value chain (Porter 1985), from manufacture through to sales, distribution, and service.

Having reorganized around business processes, Rudge, the director for Business Processes and Information Management (BP&IM), felt uneasy about the suitability of Xerox's existing information management in supporting the new organization. The question Rudge posed in 1995 was "*how can IM best support the process oriented enterprise?*" During the period 1992-99, two major stages in IM development took place. The following sections describe what happened.

TWO STAGES OF INFORMATION MANAGEMENT DEVELOPMENT

(1) Stage One Information Management

While the Xerox focus on managing by process began in 1988, by 1992 there were explicit attempts to bring the process and information architectures together. Early developments in information management (IM) at Xerox (referred to here as stage one) were intended to support the new process-based organization that was being formed. This IM era relates to the period from 1992 through 1995. The Xerox IM team focused on six strategic areas:

(1) Business Processes
(2) Data and Information
(3) Applications
(4) Technology
(5) Organization
(6) Human Resources

This was a six-pronged strategy that guided Xerox's IM managers through the early years of considerable organizational change. The following sections describe the approach that they took in each area.

(1a) Business Processes

Xerox management declared:

> *Business Processes will drive the Information and Applications Architecture.* (Rank Xerox 1993, p. 5).

During this stage of IM development the aims were to ensure that the process infrastructure was understood across Rank Xerox and that it was implemented in a consistent manner. The Business Processes and Information Management (BP&IM) group planned to ensure that process standards were well defined and that tools were available for the analysis and design of business processes. The responsibilities of the BP&IM group included process training for management and ensuring that they had all the necessary information with which to evaluate existing processes so that they could plan improvement projects. Fundamental to the strategy at this stage was to refocus "vision and planning"—"by process area rather than functional" (Rank Xerox 1993, p. 36). The *management of business processes* was coordinated by the central BP&IM group for the entire Rank Xerox region. This was logical given management's desire to bring process and information architectures together.

(1b) Data and Information

In terms of *data* and *information* the 1992-95 strategic focus was that the BP&IM group would work toward providing Rank Xerox with a *consistent and integrated* data architecture to allow *easy access to information*. This was a requirement because information was considered by management to be, and was being promoted as, a corporate asset. The consistency and integration of data was to be achieved by harmonizing the data codes that were used for the applications databases. These differed from country to country in the Rank Xerox area to the extent that even basic codes such as those for the *same* products or customers differed. The strategic goal was to bring together the companies' data and use this to build a data warehouse. The harmonization of data models was a prerequisite to building the data warehouse. The data warehouse was then to be used as the basis for information with which decision support systems and executive information systems could operate. One of the key goals was to make common management and performance reporting possible. Thus far, it was extremely difficult to compare the business activity of each business unit between countries, except at the bottom line.

In terms of physical architecture, each country was to have its own operational database, which was to be based on a common data model. The operational databases would provide data to the central data warehouse (see Figure 2). The strategic plan was that the common data model was to eventually "support the information requirements of the Business Processes (in line with process design priorities)" (Rank Xerox 1993, p. 49).

(1c) Applications

By 1992, there was a considerable mixture of applications and databases across the operating units. They provided support of varying effectiveness to the business operations (Rank Xerox 1993). Three key problems were cited with the applications environment at that time. First, the time it took to develop applications was unacceptable to management. Second, the cost of applications development was unacceptably high. Third, there were problems adapting applications sufficiently quickly in response to changing business conditions. The applications environment was highly fragmented and this led to increasing support costs.
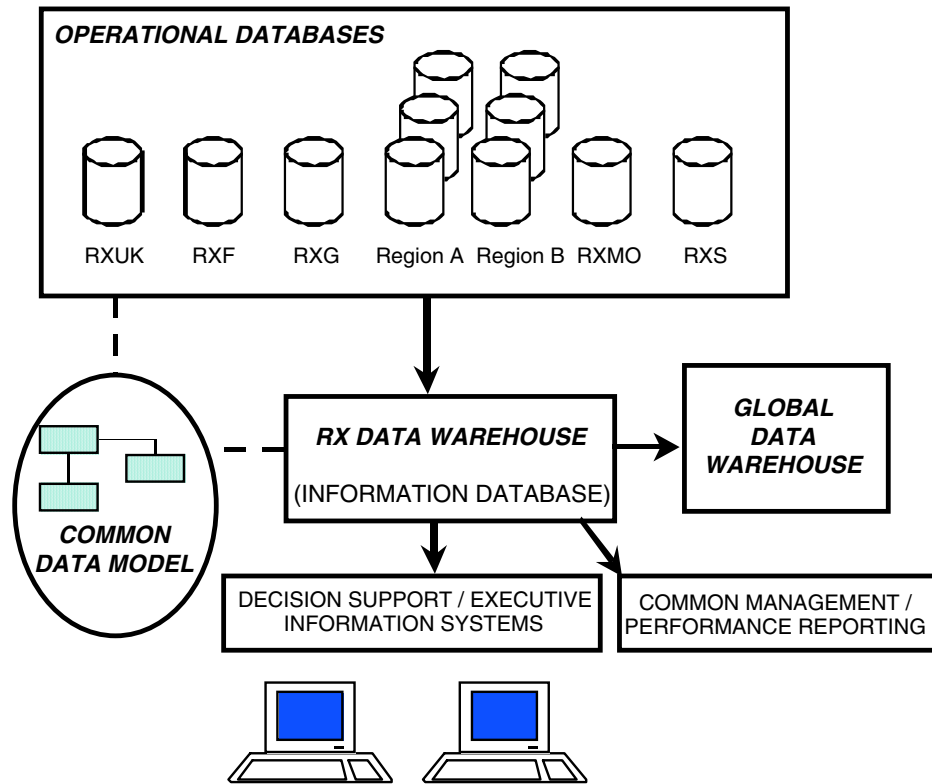
Figure 2. Data and Information Strategy 1992-95
(Source: Rank Xerox 1993, p. 44)

For applications, the IM strategy in 1992 was to reduce IM costs to 3% of revenue. Consolidating the applications architecture was seen by the BP&IM group as critical to meeting this goal. Although the applications throughout the Rank Xerox region were relatively suited to the local needs of the operating units, they were not appropriate for supporting another key strategic objective: "to allow interchange of information across units or [to] satisfy requirements for consistency of information at a pan-Rank Xerox or global [pan-Xerox] level" (Rank Xerox 1993, p. 57). Strategically, the emphasis was to move away from applications that support business functions and toward business process driven applications.

(1d) Technology

In the period from 1992 through 1995, the technological diversity in terms of computing was such that there were more than 55 development tools and languages being used with 15 different network protocols. This diversity was proving to be costly. Centralized computing was considered as being a more effective way to control costs. The strategic plan was to rationalize technologies. Three critical success factors were identified for the future technology strategy: (1) the coordination of technological directions throughout Rank Xerox, (2) the use of measurable and benchmarked software and hardware tools, and (3) a continuous emphasis on learning about and investment in new technology.

(1e) Organization

During the period from 1992 through 1995, plans were made for the reorganization of IM. This was needed for three key reasons. The first was because of a need to provide IM support at a pan-European and business group level instead of at the local unit level as was the case during the early part of stage one. The second was because Xerox's senior executives asked the BP&IM group to lower costs—from 4.5% of revenue to a benchmark (typical of other high technology industries) figure of 3%. The third reason was critical to Xerox:
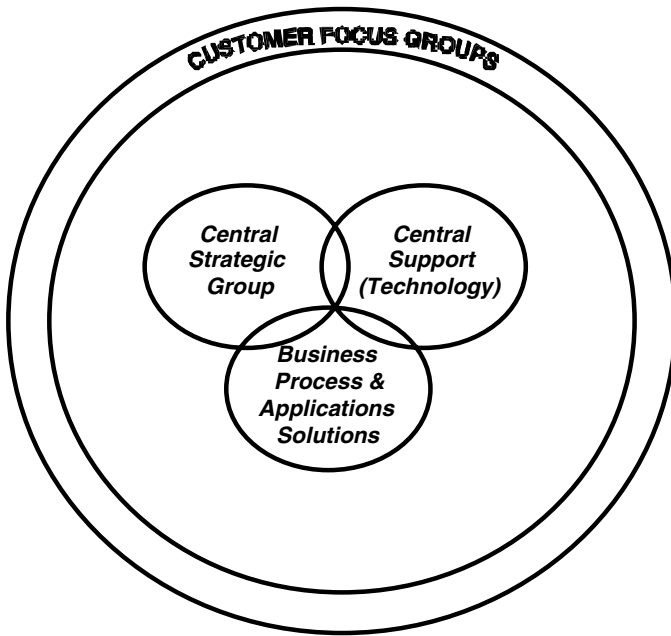
Figure 3. Stage One IM Organization

There is a need to re-engineer Rank Xerox BP&IM in order that it can successfully support the re-engineering of the business. (Rank Xerox 1993, p. 85).

This was emphasized in the 1992-95 BP&IM strategy. It showed that the driving need for change in the IM organization was Rank Xerox's business process focus.

We will move from a functional, applications driven focus to a business process focus with coordinated common development activity. (Rank Xerox 1993, p. 89).

The organization structure during stage one included four types of IM groups. They are illustrated in Figure 3.

(1f) Human Resources

Because of changes in the nature of IM that were referred to by Xerox managers as IM trends, the *skills requirements* within the IM group would need to be transformed. The key changes that were addressed are summarized in Tables 1 and 2.

Table 1. Change in IM Skills

FROM	TO
Technical Orientation	Business Orientation
Detail	High Level
Introspective	Global
Point Solutions	Integrated Solutions
Single Media	Multi-Media
Data Processors	Information / Knowledge brokers
Software Builders	Information Architects
End Point Providers	Infrastructure Providers
Slow/Deliberate/Inflexible/Resistant	Fast/Correct/Flexible/Resilient/Accelerators of Change

Figure 2. IM Trends

PAST	FUTURE
Hierarchical organization	Cross functional partnerships, Self directed work groups
Functionally driven	Integrated processes
Roles defined	Directional, portfolio, matrix
Acceptance of surrogate user	Shape business
Specialists	Generalists and specialists

The tables show the business and IM changes that the BP&IM group expected and the changes that they believed were necessary in order to support the future state of Rank Xerox. Particularly important is the recognition (shown in Table 2) of the company's move away from a hierarchical and functionally oriented organization. The strategic assumption was that unless the changes detailed in Table 1 were implemented, the IM group would not be in a position to effectively and efficiently support Rank Xerox as a process focused organization. Highly important changes are the shift from a technical to a business orientation, and the move away from a focus on software and data to an emphasis on the *management of information.*

(2) Stage Two Information Management

Stage two IM describes IM at Xerox Ltd. during the period from 1996 through 1999. During stage two, IM was continually being refocused and reorganized so that it could better support the Xerox process model. There were three prevalent elements of IM strategy that integrated the previous six: (1) business process led common applications, (2) technology consolidation, and (3) the centralization of business processes and information management and control.

(2a) Business Process Led Common Applications

By 1997, there were more than 1,300 applications in operation across Xerox Ltd. The applications in France, Germany, UK, Spain, Central and Eastern Europe, the Middle East, and Africa were considerably different from each other. The remaining countries did in general operate common applications. Many of the applications were used to support business processes that were now represented by the Xerox Business Process Architecture and they were classified by process area. However, many of the applications had been modified in each location (country, business unit, etc.) and the result was multiple implementations of common systems. In most cases, the changes to applications had been made locally in order to support local needs. The common systems became highly fragmented. The medley of applications and technologies was not providing effective support for the process-oriented enterprise. One employee commented:

> *Process management at the moment, it's horrible really because we've got such a mish-mash and hotchpotch of applications. And it's getting to the point now—for example the DPG thing [systems to support a new business model] that there's loads of other requirements that they have. And it doesn't matter which way you try and bend it—we CAN NOT satisfy their requirements. We can't.*

This was because applications and processes had not evolved in parallel and empowerment provided flexibility to operating units to diverge from the centrally coordinated models. The applications architecture became particularly problematic because it was characteristic of the old business model. The applications had been designed to support different markets and to work with different technological capabilities (mainframe computing, batch processing, etc.). By 1997, business characteristics were changing fast. New business models (e.g., document consultancy) could not be supported using existing systems.

The highly fragmented applications architecture was seen by management to be unsatisfactory. Two problems were emphasized: (in)flexibility and (high) cost. In terms of flexibility, implementing any changes to the existing applications on company-wide basis at Xerox Ltd. was extremely difficult. For example, a change to the Customer Services systems would need to be made to more than 70 different but common applications. This was further complicated when in July, 1994, Rank Xerox signed an outsource agreement with Electronic Data Systems plc (EDS), who from then on undertook the maintenance of existing applications. Making many different changes to a common system as opposed to making the change once on a central system put a huge financial strain on Xerox Ltd.'s information management costs—particularly now that a third party was paid to make the changes.

The three largest countries (France, UK, and Germany) had considerably different applications from each other. The diversity across Xerox was the reason that management at headquarters gave for their problems (time to develop applications and cost of change). But these were also the reasons given by managers of the large countries for their becoming divergent: the center could not support them quickly enough nor cater for all their needs.

Essentially the root problem was the fragmentation of applications and processes. Figure 4 shows the problem of increasing applications and process fragmentation. The result is that BP&IM at the center is rendered ineffective with respect to the large country units (France, Germany, and the UK).
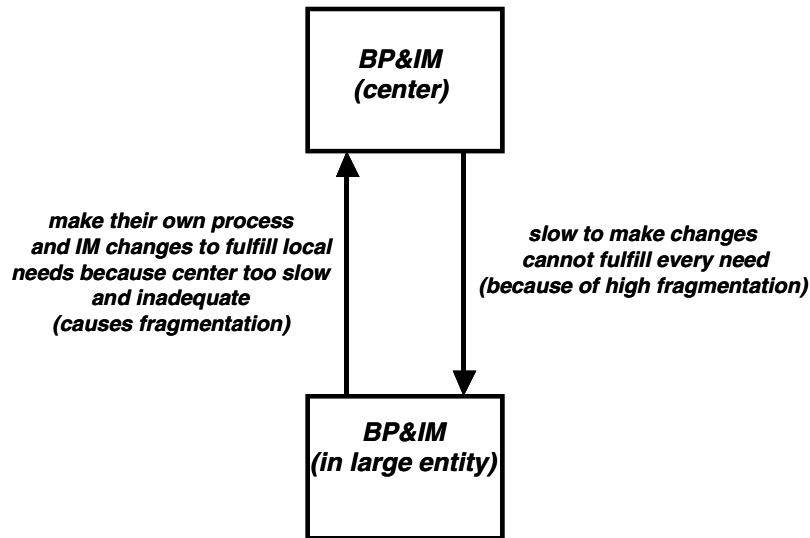
Figure 4. Fragmentation Causes Fragmentation

Management at the center were distressed. The fragmentation caused increasing complexity and high costs.

> *[The] problems that we have with this kind of configuration is that it's an upgrading nightmare. It really is.*

One of the BP&IM managers explained the problem. The effect of *allowing* process and application change meant that from an enterprise-wide perspective there was little commonality between entities. Freedom to diverge from a centrally coordinated model (empowerment) had been given to entity management and this had resulted in loads of processes. This was largely due to a focus on short term planning and an emphasis on management at an operations level. Strategic and long term planning was not common.

1997 was a critical year for IM at Xerox. A major process and information management reorganization was planned. In terms of applications, the key strategic plan was to implement a single core application to support each core business process area. The plan was that these core applications would be implemented throughout Xerox Ltd. and would *include* the large operating companies (France, Germany, and the UK). The applications would be maintained and physically located on servers in *one central location*. Modifications for differences in language, currency, and legal requirements between countries would be allowed (where absolutely necessary), but these would not be allowed to affect the underlying core application. Through the implementation of these core systems that were being *designed* to support core process areas, the business processes were to be *standardized* throughout the Xerox Ltd. region. The core applications were being developed centrally by BP&IM and in close collaboration with the core process owners - the managers of the core business processes.

In general, a package approach to applications development was being used by BP&IM. This meant that where possible off-the-shelf software applications were purchased. Flexible applications were investigated—those that allow process variation. The focus was not to look at the outputs that can be produced by the application, but to ask "*Can the system do what Xerox Ltd. wants it to do: support a process and therefore support an operation?*" Systems development *starts* with the definition of the business processes and aims to match a system (package) to support those processes. The focus was totally on the operation at process level—on the *way of doing things*. The data in the system was seen as secondary to developing a system that effectively and efficiently supports a particular way of doing things and the consequence is that the strategic use of data—enterprise-wide data—was lost. The benefit of this approach was that IM is close to the business. These packages were then tailored to meet process needs.

The package approach was seen as being a more rapid means of satisfying (internal) customer needs. The main exception to buying packages was the application (Xcalibur) that was being developed by BP&IM through an Indian software house. This was being designed to support the customer facing part of the market to collection core process. It was based on the capabilities of a package (TeleMagic) that had already been implemented across much of Xerox Ltd. to support telephone sales. Telemagic was not suitable for a large-scale operation, and Xcalibur, with enhancements to satisfy the large trading companies (UK, France, and Germany) was being developed. The processes that Xcalibur handled were Xerox's most customer facing—bespoke development of this application was seen by management as key to sustaining competitive advantage.

(2b) Technology Consolidation

At Xerox headquarters, a small group of people is responsible for the management of technology and infrastructure throughout Xerox Ltd.—the Technology and Architecture (T&A) group. A large part of the outsourcing agreement in 1997 was for EDS to manage the implementation and maintenance of the technical infrastructure and computing hardware for Xerox Ltd. The T&A group at the center were effectively left to manage the T&A strategy and to coordinate the EDS contract.

During stage one, the diversity of Xerox Ltd.'s technological infrastructures were considered to be unsatisfactory. By 1997, there were seven different technical architectures. This contributed to the fragmentation of the applications architecture because different versions were needed for different architectures. Throughout stage two, legacy applications (those running on mainframe computing) were being retired and replaced by client-server technology. In late 1997, together with the plans for the implementation of core process applications, the strategy for technology and infrastructure was to continue the technological consolidation.

Technological interoperability was to be achieved through an arbitrating layer of infrastructure (integration layer), which is known at Xerox as *message broker*. This is a highly complex application that allows incompatible software to be integrated.

(2c) Centralization of BP&IM Control

By late 1997, BP&IM's managers realized that they needed to take control (Xerox Ltd. 1997). It was an implicit recognition that the center did not have control but needed it in order to implement the centralized core process applications strategy that had been proposed. Effectively, control needed to be taken away from IM management in the various countries. What was really being taken away was the freedom that the management in the countries had to diverge from central BP&IM plans. BP&IM saw this freedom as having caused the high fragmentation of applications and technical architectures. This fragmentation was now seen by BP&IM to be preventing the effective implementation of the process model and its integration: it was becoming increasingly difficult and costly for BP&IM to support the businesses needs. IM costs were increasing (Xerox Ltd. 1997). In order to avoid the core process applications from becoming fragmented, any modifications would, in future, need to be sanctioned by senior management at the center.

IM strategic plans since 1997 were characterized by centralization, consolidation, simplification, rationalization, commonality, and consistency. The centralization of applications and processes in separate pan-European organizations were planned to achieve strategic goals of lower costs, and increased productivity and customer satisfaction. Centralization was considered to be the key to supporting the process model of organization—a model that includes enterprise-wide process commonality.

Enterprise-wide management information, which was considered by management to be critical for implementing long term corporate strategy, was to be gained through the centralization of IM. Business processes that do not require direct engagement with the (end) customer were to be centralized in pan-European centers. For example, back-office processes for the entire Xerox Ltd. region (e.g., invoicing, credit collection, etc.) were being centralized in a single center in Dublin, Ireland. This was to be achieved through the core applications strategy.

(3) Information Management and the Process Model

Since 1988, Xerox management realized that if Xerox was to survive, functional organization needed to be replaced by a business process focused approach. However, the customer focused process model required continual updating to *match* customer requirements as they changed. From time to time, customer needs and process capability drifted apart. By 1993, the two had drifted so far apart that management were planning another large reengineering effort—similar to that of the 1980s.

A second cycle of reengineering was planned (between 1993 and 1998, with plans through 2000). In parallel, the two distinct phases of IM development—stage one IM and stage two IM—took place. The second cycle of reengineering and stage two IM are intertwined. Because of uncoordinated local process improvements and IM modifications, the holistic process model became fragmented, both in terms of processes and IM. This and a rapidly changing business environment has *forced* Xerox through this second cycle of change.

The second cycle of reengineering (re)creates a process model that is capable of exceeding customer requirements. In this second cycle, however, IM and specifically enterprise-wide applications were being used as the *structuring and coordinating mechanism* to reengineer the process model. The *centralization* of process management and information management are critical to achieving this.

Since the early stages of the development of the process model, IM plans clearly intended to *support* and receive *direction from* the business (process) model. This was the case both during stage one and stage two. The activities of the BP&IM group are specifically managed to provide support to the process model. BP&IM teams are arranged by core process area. What has varied with time is BP&IM's *capability* to support process. This was shown in Figure 4 with the fragmentation of the process model and applications architecture. During the first stage of IM development, the IM capability at Xerox supported the evolving process capability with the integrated applications that were developed.

By 1997, IM support for the process model was becoming less effective and more costly. This was due to the high fragmentation of *both* the process and applications models. Plans to realign the process model to match customer needs were matched by IM plans to support the updated process model. These stage two IM developments improved IM capability in terms of the process model. The stage two IM applications were being explicitly designed to support new processes. Effectively, the new core applications were being developed *as the process itself.* Increasingly, *the process is the application.*

(4) Organization and Process Centralization

The fall in the cost of operating a pan-European business infrastructure is closely linked with modern IM capabilities and reductions in the cost of telecommunications. Client-server technology, wide area networking, and the Internet are among the many technological advances that have contributed to the improved cost economics of operating a pan-European business (Scott Morton 1992). Lower cost communications have meant that information systems may be "live" throughout a pan-European business and information exchange can be almost instantaneous across vast distances. These capabilities are critical in operating a centralized model. IM capabilities such as overnight batch processing of data across national boundaries did not provide the consistency or speed of data and its interchange that is needed to drive a centralized operation. The technology strategy in stage two IM planned to rectify this.

With the centralization of non-customer facing processes, the operating units were left to concentrate on the sales processes. Processes such as credit collection, invoicing, customer record management, contract management, etc., were until now duplicated in each operating location (customer business unit/entity). The IM capabilities of providing wide area network infrastructure and real-time information access (enabled through, among other things, the fall in telecommunications costs) support this arrangement of processes: both customer facing units and senior management at the center can be provided with up-to-date information.

(5) Enabling Information Technology

In addition to the careful development of applications in support of the process model, the Xerox technical infrastructure and the capabilities that it provides make the process model possible. By 1998, the Xerox technological infrastructure had changed considerably and the capabilities were such that the implementation of integrated applications supporting enterprise-wide processes was possible.

The centralization during stage two IM involved consolidation of some of this technology, particularly the applications servers. The key point is that, without the technological capabilities, the process model would be impossible to implement. Thus the Xerox process model is heavily dependent on the implementation of suitable supportive or enabling information technologies. The realignment of the process model and the business change that had taken place demanded more of an end-to-end approach to the applications development than that provided by the legacy systems. The new core process applications were being developed to take advantage of Xerox's technological capabilities. It would not have been possible to organize information on such a large scale with the integration and speed that was necessary for the process model to *work* without the enabling technology.

Centralization meant that many processes were located (managed and operated) in one physical place. Repetition and duplication was reduced and the process model also became technologically easier to support.

CASE SUMMARY

Xerox's management were forced to transform their organization to survive the competition. They reorganized the company and focused on business processes. The information management capability was critical in producing and sustaining the new organizational form. Over the last decade there were two main stages of IM development. IM managers have had the complex task of transforming applications architectures and technical infrastructure to support and create the new organization. In doing this, an elaborate web of organizational and technical issues needed to be confronted and resolved. One Xerox manager commented that, in practice, it was "like changing an aircraft's engine whilst in-flight."

Six main areas were the focus of management's attention: (1) business processes, (2) data and information, (3) applications, (4) technology, (5) organization, and (6) human resources. The decentralized information management approach that characterized the earlier years could not be sustained and during the latter years a centralization and consolidation of technology and applications architectures took place. This supported, in fact made possible, the centralization of the management of the process model of new organization. The modern advances in information technology have made this previously unimaginable organizational form a reality.

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MANAGING GLOBAL INFORMATION STRATEGY: XEROX, LTD.
Instructor's Notes

TOPICS COVERED BY THIS CASE

(1) Alignment of information systems (IS) with corporate strategy and business models
(2) Business process management
(3) Information systems enabling new organizational forms
(4) Information systems and competitive advantage
(5) Centralization versus decentralization of information systems and business processes

RECOMMENDED APPROACH FOR INSTRUCTORS

This case describes a very complex multinational IS environment and demonstrates some of the many problematic choices that a CIO may face. It is an excellent case for illustrating the dramatic changes in IS strategy that are often required to support changing corporate strategy and business needs. As such, it portrays the *dynamic* nature of IS strategy in a continuously changing business environment, which contrasts with how to develop *an* IS strategy per se. The classic IS advantages or rationales—to enable new organizational forms and to build competitive advantage—are reinforced. Structural aspects of creating an IS infrastructure are explored and the centralization/decentralization debate is rekindled. The increasing tendency to consider the IS itself as a *part of* the product or service is introduced with the discussion of IS and business process convergence.

The diversity of topics covered by this case gives students a clear indication of the complexity of IS strategic decisions and the smorgasbord of possible issues. Students should be encouraged to explore alternative strategic possibilities while applying methods and frameworks to assess their appropriateness. To develop the longitudinal issues the discussion can be divided into four periods:

(1) pre-1988 functional organization,
(2) 1988-1993, first stage of process-based IM development,
(3) 1993-1998 second stage of process-based IM development, and
(4) post 1998 which will be speculative, focused around Figure TN7.

For each time period the strategy and its strengths and weaknesses can be discussed. Discussion of the nature of technological capabilities for the time period in question will be important for providing appropriate perspective to the problem.

CASE ABSTRACT

The diversity of information management issues and problems that a large multinational company may face are illustrated by showing how Xerox managed IM strategy over a ten-year period. The case study details the IM developments and shows how the Xerox IM team managed by focusing on a six-pronged strategy: business processes, data and information, applications, technology, organization, and human resources. The problems that Xerox faced in each of these areas are discussed and management's approach to resolving these is described. In essence, Xerox's move to managing-by-process required matching changes in IM capability to support it. Xerox's earlier approach, which entailed a decentralized IS model, became inadequate for supporting the dynamic process model and ultimately customer needs. The case then shows how the process model became heavily reliant on the capabilities offered by IM. As business processes and information systems became increasingly intertwined, Xerox aligned the development of both models and effectively brought their management and coordination together. A centralization strategy was key to bringing these latter changes about.

Critical Ideas

- **Alignment of information systems (IS) with corporate strategy and business models.**

  - The case indicates that operating a process model of organization is heavily dependent on IS capability. Although during the earlier phases of IM development it would appear that IM needed to evolve to catch-up with the requirements of the process model, during the latter stages of development IM clearly leads process development. Information systems capability provides opportunity for effective operation and coordination of corporate-wide process management.

  - Figures TN3 through TN7 (see below) show the stages that Xerox went through in aligning IS with the dynamic business models. The figures are purely schematic representations to give students a sense of dynamic progression. The x-axis represents time, but the y-axis is something open to discussion. The idea of "increasing customer needs" can mean many things—for example, more complex customer needs, or more rapidly changing customer needs. The IM shaded areas represent the "limit of IM capability." This is also open for discussion. The intention is for this to represent IM effectiveness in supporting the process model. The process curve is to be considered relative to the IM shaded areas and the customer needs curve. It is intended to represent the changes in the process model, relative to supporting customer requirements.

  - In terms of corporate strategy, two main strategic concerns are referenced. These are those that have been set by management at a senior corporate level and the case shows how the BP&IM group intended to support them. They are the lowering of costs and the support of customer needs. Consolidation and centralization of IM was implemented to promote the lowering of costs. This had organizational (structural) and technological implications. The rationalization of IS—a core systems strategy to reduce the more than 2,500 systems to four core systems—and organizing IM to support of the process model was to contribute to satisfying customer needs.

- **Information systems enabling new organizational forms.**

  - The assumption is that the capabilities of the information systems and information technologies make the process-based organization possible. It is difficult to envisage organizing pan-European interconnected business-processes without modern IS and IT capabilities. Students should be encouraged to consider whether there are alternatives to the management of a global process-based organization without the use of IT based IS. Further discussion can center on what exactly these capabilities are and how they may be sustained and developed.

  - Increasingly, many processes can be handled by applications and hence the process model and IM are converging.

- **Information systems and competitive advantage.**

  - The early part of the case discusses the manner in which Xerox management were forced to change their organization in order to survive competition. It was later shown that the new process-based organization could not survive without appropriate IS support, thus key to competitive advantage. The focus of advantage is on being able to manage by process. The previous discussion on the imperative nature of IT and IS in managing this type of organization will contribute greatly to students' discussion of competitive advantage. Further thought can be devoted to what can be done to protect any IS supported competitive advantage from imitation.

  - Information systems development policy toward the latter part of the case was to buy off-the-shelf applications packages that were flexible enough to allow for some process modification. The exception was the system with most customer-facing processes: market to implementation (Xcalibur). Implicit is the belief that competitive advantage is critical with these types of processes and that a package approach would be inappropriate. Discussion can focus on questioning the appropriateness of firms' purchasing commercially available application packages for processes that contribute to competitive advantage.

- **Centralization versus decentralization.**

  - This case presents centralization as providing better support for a process-model of organization, lower costs, and more responsive and flexible IM processes.

– Centralization is not shown as appropriate for systems and processes that are most customer facing, such as the sales processes. Although not discussed in the case, this was usually due to country differences in language, culture, legal requirements, etc. Class discussion about how these problems may be overcome is recommended.

– Linked with "information systems enabling new organizational forms," a centralized pan-European (process-based) operation would not have been feasible ten years ago. Modern IS/IT and telecommunications capabilities, together with the dramatic drop in the cost of operating such infrastructures, have made possible the centralized approach on such a large scale.

- **Supporting figures.**

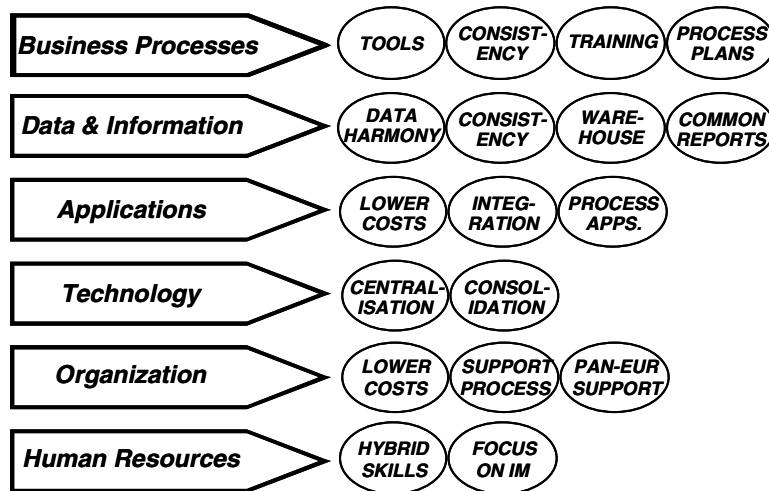 – Figure TN1 is a summary of the key elements of **stage one IM**.

Figure TN1. Process-based IM—Stage One

– Figure TN2 shows the six key elements of IM that were established during stage one and how they were grouped in stage two.
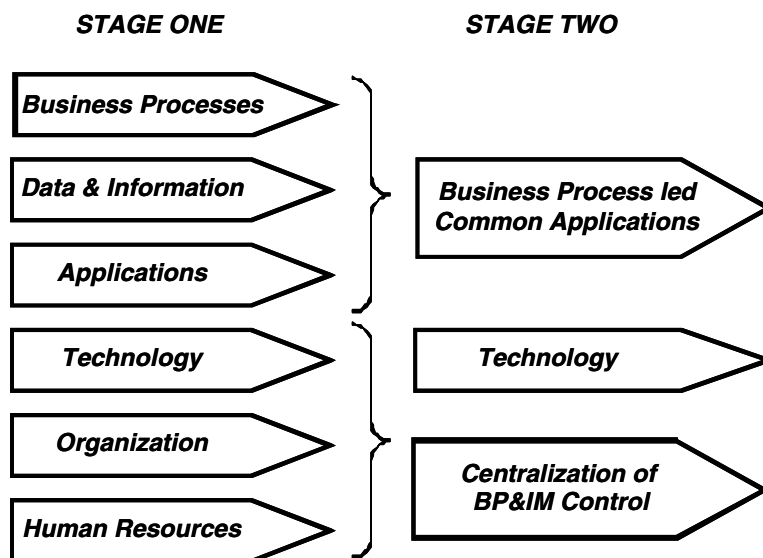
Figure TN2. Stage One and Two IM Groups

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ANALYZING THE DEVELOPMENT OF INFORMATION MANAGEMENT AND THE XEROX PROCESS MODEL

The Xerox Process Model

Since 1988, Xerox management realized that if Xerox was to survive, functional organization needed to be replaced by a business process focused approach. However, the customer focused process model required continual updating to *match* customer requirements as they changed. Figure TN3 shows how the process model periodically drifted and needed to be realigned with customer needs.
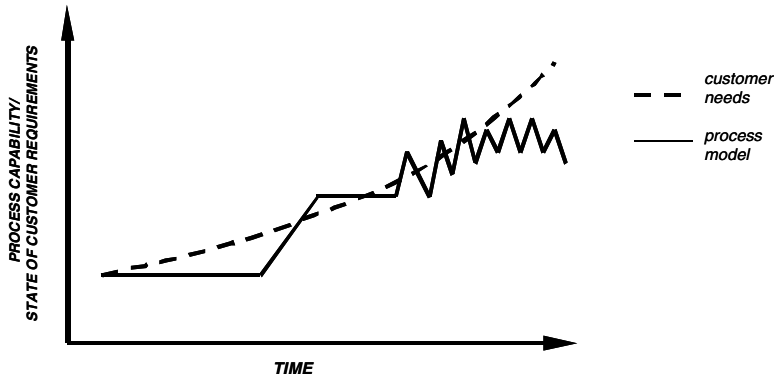
Figure TN3. Matching Process and Customer

The first part of the process model curve is horizontal. This represents the pre-1988 functional organization where processes were not managed from the perspective of a process model and thus the assumption is no change. As changing customer requirements (the dashed line) could not be efficiently and effectively met through functional organization, the curves diverge to show this. The process curve is *below* the customer curve to show that it is inadequate. From 1988, the process model was harnessed, and through corporate-wide reengineering and the implementation of a process focus the diagram shows the curves converging again. The new process organization was able to meet—and for a time exceed—customer needs, and Xerox's market share was on the increase. The process model is shown to be stable for a period, the curve is again horizontal. This represents a period where process management is internalized while Xerox gets used to the new process world. Then, the process curve is shown to fluctuate. This represents the period when separate operational units make local changes to the central process model. This is done in reaction to changing local customer needs. On an enterprise-wide level, however, the *overall* process capability becomes uncoordinated and is unable to match new customer requirements. The fluctuating process curve begins to diverge from the customer curve. It moves below the customer curve showing that the overall process capability is again inadequate.
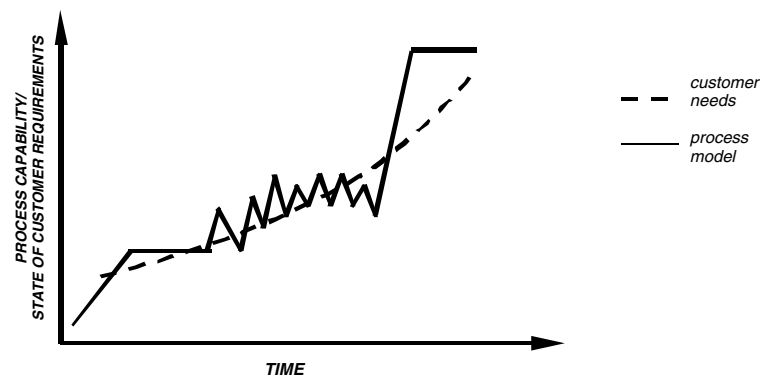
Figure TN4. Second Cycle of Reengineering

A second cycle of reengineering was planned (between 1993 and 1998, with plans through 2000). In parallel, the two distinct phases of IM development—stage one IM and stage two IM—took place. The second cycle of reengineering and stage two IM are intertwined. Because of uncoordinated local process improvements and IM modifications, the holistic process model became fragmented, both in terms of processes and IM. This and a rapidly changing business environment has *forced* Xerox through this second cycle of change.

The second cycle can be shown to move the process curve from that of fluctuation to a position above the customer curve (Figure TN4). The second cycle of reengineering (re)creates a process model that is capable of exceeding customer requirements. In this second cycle, however, IM and specifically enterprise-wide applications were being used as the *structuring and coordinating mechanism* to reengineer the process model. The *centralization* of process management and information management are critical to achieving this.

IM Capability

Since the early stages of the development of the process model, IM plans clearly intended to *support* and receive *direction from* the business model. This was the case both during stage one and stage two. The activities of the BP&IM group are managed to provide support to the process model. BP&IM teams are arranged by core process area. What has varied with time is BP&IM's *capability* to support process. This can be shown using the diagram presented previously (Figure TN5), which shows the changes in customer needs and in the process model.
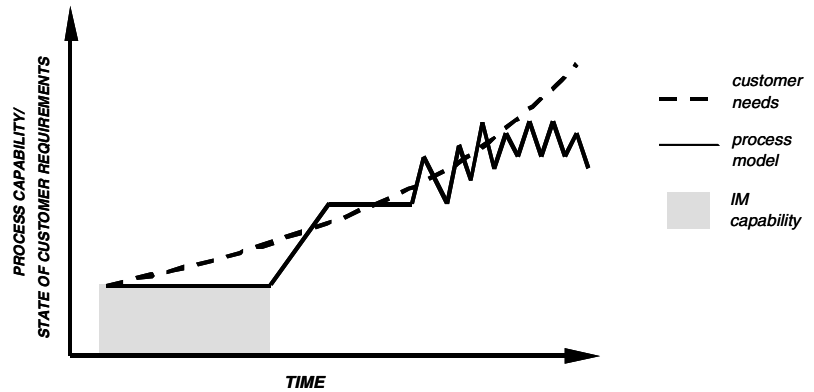
The shaded area which has been added to the diagram (Figure TN5), represents the *limits of IM capability*. This is shown to reach the level of being able to support pre-1988 functionally oriented Xerox.
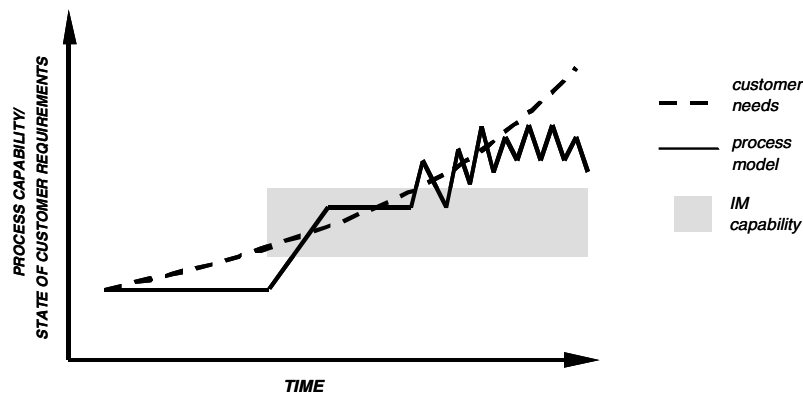
Figure TN5. Pre-Stage One IM Capability

Figure TN6. Stage One IM Capability

To support the new process organization efforts were made by BP&IM to create a suite of *integrated* applications based on the new processes. These systems were an attempt by BP&IM to move from functional applications to process applications. During this stage of IM development (stage one), the IM capability at Xerox can be shown to shift up to support the evolving process capability (Figure TN6).

By 1997, IM support for the process model was becoming less effective and more costly. This was due to the high fragmentation of *both* the process and applications models. Plans to realign the process model to match customer needs were matched by IM plans to support the updated process model. This was stage two IM. This is shown as a shift up in IM capability and matching the shift in process capability (Figure TN7).
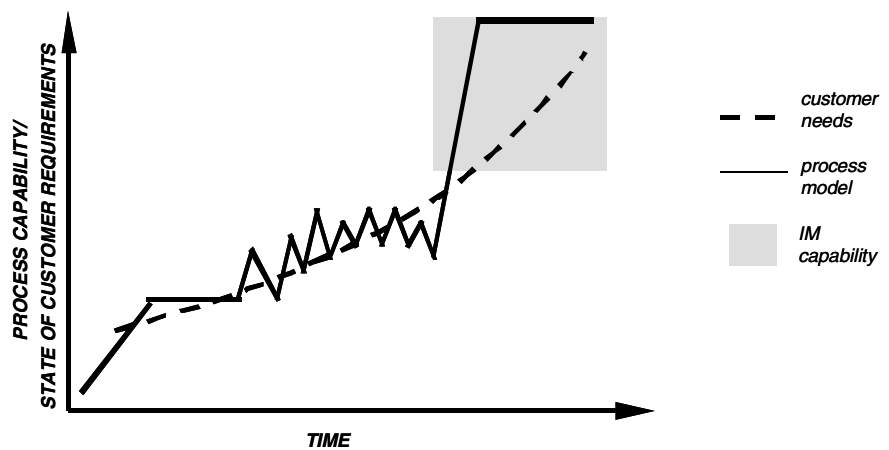
The stage two IM applications were being explicitly designed to support new processes. Effectively, the new core applications were being developed *as the process itself*. Increasingly, *the process is the application.*

Figure TN7. Stage Two IM Capability

Questions (most relevant section of the case in brackets)

1. What is a process architecture? [1]
2. What is an information architecture? [1]
3. How might information and process architectures be related? [1]
4. Can business processes be managed separately from those of IM? [1a]
5. What alternatives are there for the management of data architectures in global forms? [1b]
6. What impact do each of these have on the management of IS? [1b]
7. What could Xerox's IM executives do to alleviate the problems that they experienced with the applications environment in the early 1990s? [1c]
8. What alternatives to the centralization strategy could Xerox have considered? [1d, 2b, 4, 5]
9. How does Xerox's BP&IM group differ from the traditional IS function? [1e]
10. Why is a fragmented applications architecture a problem for global business? [2a]
11. How can the fragmentation of process and information architectures be avoided? [2a]
12. What are the advantages and disadvantages of a package approach to systems development? [2a]
13. Has information management a role to play in competitive advantage? [2a]
14. How can IM be used to coordinate or structure business processes? [3]
15. How can Xerox's IM capability and changes to the process model be described and represented? [3] [use diagrams TN3-TN7 in teaching note]
16. Is there a case for managing business processes and information management processes separately?
17. What factors have helped Xerox reorganize both the process and information management models?

Note on Data and Methodology

This case has been compiled from research data collected by the author during the period from 1995 through 1997. Multiple data collection techniques were used that included documentary evidence, unstructured interviews, and participant observation. The majority of findings have been based on the in-depth participant observation data that was gathered over a 12-month period.

Further Reading

About this case in particular:

Seltsikas, P. "Developing Information Systems Strategy for International Process Oriented Holistic Enterprises: A Case Study at Xerox Ltd.," *EM–International MIS, Electronic Commerce and Financial Services. EM–Electronic Markets* (9:4), March 2000 (URL: <http://www.electronicmarkets.org/netacademy/publications.nsf/all_pk/1304> [09/24/99]).

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Jacobson, G., and Hillkirk, J. *Xerox: American Samurai,* New York: Macmillan, 1986.

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Davenport, T. H. *Process Innovation: Reengineering Work Through Information Technology*, Boston: Harvard Business School Press, 1993.

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