INFORMATION MANAGEMENT AND THE HOLISTIC, PROCESS-ORIENTED ENTERPRISE

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This research examines the role of the information management process within a process-oriented enterprise, Xerox Ltd. The research approach is based on a post-positive paradigm and has resulted in thirty-five idiographic statements. The three major outcomes are:

1. *The **process-oriented holistic enterprise** is an organisation that requires a long-term management commitment to its development. It depends on the careful management of people, tasks, information and technology. A complex integration of business processes is required and this can be managed through the use of consistent documentation techniques, clarity in the definition of process responsibilities and management attention to the issues of cross-process decision making. The management of consistent global metrics and the centralisation of the management of the process model are critical to its success.*

2. *The role of the information management process within the context of a process-oriented enterprise is to provide flexible and cost-effective applications, technological, and process support to the business. This is best achieved through a centralisation of the management of information management and of the process model. A business-led approach combined with the consolidation of applications, information, process, and data architectures is central to providing effective business and process-focussed support.*

3. *In a process oriented holistic enterprise, process and information management are inextricably linked. The model of process management depends heavily on information management, whilst the model of information management is totally focused around supporting and creating the process model. The two models are mutually creating — one cannot exist without the other. There is a duality concept of process and information management.*

Keywords : Process Management, Information Systems, Xerox Ltd., Business Processes, Information Technology.

DEDICATION

In memory of Graham Rudge

ACKNOWLEDGEMENTS

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CHAPTER ONE :

INTRODUCTION TO THE RESEARCH

1.1 Introduction

This thesis presents the findings from research that has been conducted in the field of information management (IM). It looks at the IM consequences for a firm that reorganised to manage by process (process management). The research has been funded by the Economic and Social Research Council (ESRC) and by Xerox Ltd. (XL, formerly Rank Xerox). Dr Frederick Hewitt[1], Pro-vice Chancellor at Aston University (AU), has supervised the study. It has been supported by the Director for Business Processes and Information Management at XL, Mr Rodney Darrah.

The study has been conducted over a period of approximately three and a half years and is an in-depth case analysis of information management at Xerox Ltd.. XL comprises a number of Xerox businesses which operate across Europe, the Middle East, and Africa (EMEA). Xerox performs all of the activities in the Value Chain (Porter, 1985), from manufacture, through to distribution and service. Xerox is well known for producing photocopiers but its product portfolio also includes printers, facsimile machines, multifunction products (printer, fax, copier), and document consultancy.

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[1] Dr Hewitt is the former Vice-President of Central Logistics and Asset Management, at Xerox Corporation.

There have been many studies that examine information management activities in firms, but none have looked at, in any adequate depth, a firm that has replaced traditional reductionist (Taylorist) approaches to management with a holistic, process-focused approach. Xerox delineated the essential business processes through which it operates and reorganised to focus on these. 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. This research contributes to that understanding.

When the research was initiated, the late Graham Rudge was XL's director for Business Processes and Information Management (BP&IM). He was concerned about IM practices at that time (1994). XL had reorganised around business processes and Rudge felt uneasy about the suitability of Xerox's existing 'information management' in supporting the 'new' organisation. Hence, this research investigation was initiated — to explore IM and the process oriented enterprise. In essence, the question Rudge posed was 'how can IM best support the process oriented enterprise?'. The next section (objectives) takes this broad management question and develops three substantive areas of research in an attempt to provide preliminary structure to this study.

1.2 Objectives

The start-point for this research was a general feeling of uneasiness that the then director of Business Processes and Information Management had as a result of the corporate-wide adoption of 'process management'. The author thus set out with three objectives — (1) to understand what a process-oriented enterprise is, how it is organised and what process management (PM) means; (2) to investigate the role of the information management 'process' within the context of a process-oriented enterprise; and (3) to understand the relationship (if any) between process and information management.

Although the focus for this research was to be information management, the first objective, to understand process management is necessary because the impetus for the research was presented as 'a problem with IM because the firm reorganised to focus on management by process'. The company's IM requirements were seen by the director of BP&IM to be shifting because of the move away from organising around specialist business functions.

Thus, the first objective to understand process management is necessary so that the organisational context is understood. Rudge assumed that IM needed to change *because* of the organisational changes. The research aimed to investigate this.

The second objective aimed to explore several IM specific issues. This part of the research investigated the role of IM in a process-oriented enterprise; what 'IM people' do, how IM is organised and how and why the role and organisation of IM is changing.

The intention of the third objective is to bring the areas of IM and PM together — to explore their interdependencies. The assumption behind this is that when a firm adopts a process-oriented approach to management, its IM is affected and is forced to change. However, there is a mutually reinforcing assumption, which is almost the converse of that just stated. Changes in IM are required to 'enable' the move to a process-oriented enterprise — or PM *relies* on what can be termed Process Information Management (PIM).

1.3 Scope

The scope of the research has been to look at a single case in depth. Chapter three (Methodology) explains the rationale in following this research approach. However, it is important to note that the *purpose* for conducting this research differs from that which is 'traditional'. The intention here is not to provide 'results' in the form of nomothetic statements to aid in prediction and control but it is to provide *verstehen* (understanding, or meaning experienced in situations). In other words, the research aims to provide *understanding* of the phenomena in question (the three objectives stated previously).

The author has had the rare opportunity of unrestricted access to the case site. This provided the author with the possibility to conduct in-depth research. Most of the research data have been collected from the Business Processes and Information Management group at the Xerox Ltd. headquarters (in Marlow in the United Kingdom). Some additional fieldwork was conducted at Xerox France in Paris (France), and at Xerox UK in Uxbridge (United Kingdom).

1.4 The Value of this Research

The research presented in this thesis may be of value to academics and industrialists for several reasons. Firstly, the research presented here is *revelatory*. Examples in the literature of in-depth research that has investigated information management in process based enterprises, and particularly *with respect to the process based organisation* are non-existent (see chapter two). Research that explores the latter, the process based organisation (with the exception of theoretical speculation), is also non-existent in the literature.

Secondly, there have been many attempts by firms to reorganise to manage by business process as opposed to function. Usually this has been the result of business process re-engineering programmes (for example, ICI, British Gas, and The Post Office (see Jackson, 1995)). However, as is discussed in chapter two, research that is concerned with how to manage the 'new' organisational form on a day to day

basis is lacking. The majority of research to date has focused on how to 'create' the business process focussed enterprise — how to *do* business process re-engineering. The research described in this thesis contributes to an understanding of 'process management' — this is currently lacking in the literature. The managers of firms who are process-focussed, or who plan to 'produce' process-focussed organisations, may be interested in the results here.

Thirdly, a good understanding of information management, which is the focus of this study, is critical to many businesses. It has been shown to affect competitiveness and business survival. Furthermore, the costs associated with IM are often considerable. Frequently these costs have been reported to be in the range of five to ten per cent of gross revenue (Radosevich & LaMonica, 1998). Managers who are responsible for IM in process based organisations may be interested in this research because it provides an understanding of some of the problems that may be encountered.

1.5 Summary

In summary, this research thesis presents an in depth case study of information management at Xerox Ltd.. Its major objectives are threefold :

      (1)   to understand what a process-oriented enterprise is,

      (2)   to investigate the role of information management within the context of a process-oriented enterprise;

and, (3)   to understand the relationship (if any) between process and information management.

CHAPTER TWO :

THEORETICAL BACKGROUND

2.0 Introduction

This chapter looks at the significance of the research objectives (see section 1.2) in relation to current theoretical knowledge in two substantive areas to which they relate — information systems and business process re-engineering. Current works on organisation structure and co-ordination theory are also considered but to a lesser extent. Figure 2.1 (over page) is a graphical representation showing the fields of knowledge to which this research is related. The relevance of each 'field of knowledge' in respect to this research is represented by the size of the circles (larger = more emphasis, smaller = less emphasis). The shaded circle at the centre indicates where this research may be positioned within these wider fields of knowledge.

This chapter 'frames' the research that is presented in this thesis within this extensive field of knowledge in order to define the limits of concern. In doing this, the aim is to understand what is currently known that is of relevance to this study and to show where (within these fields) this research provides a contribution to knowledge.
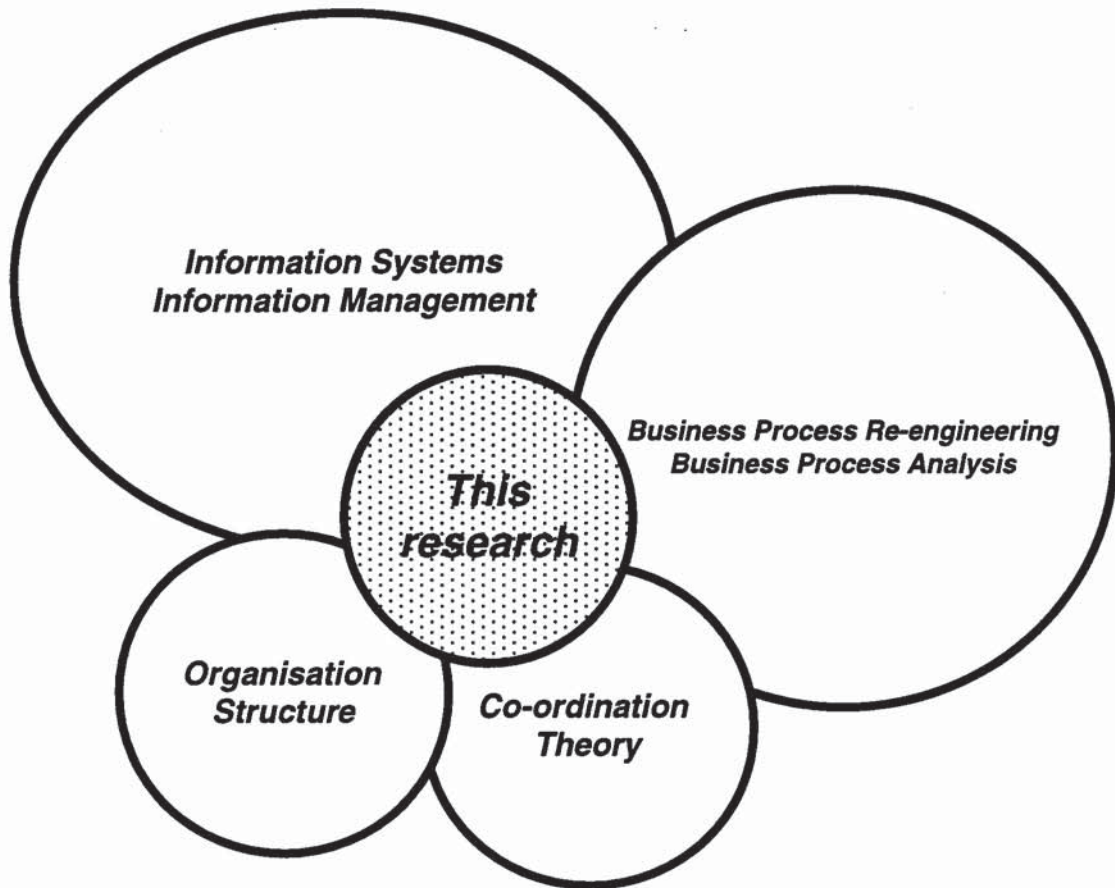
Figure 2.0 : Related Fields of Knowledge and the Position of this Research.

The aim of this chapter is to identify the 'gap' in research knowledge towards which this thesis aims to contribute. The postpositive perspective, upon which this research is based, rejects the notion of research that is based upon *a priori* theory, as this is not compatible with its axioms (see chapter three). Pigeon (1996) refers to the postpositive perspective as 'the qualitative paradigm'. The following quotation from Pigeon is pertinent:

"The qualitative paradigm shares a number of characteristics with the approach of grounded theory, including: an emphasis upon the importance of viewing the meaning of experience and

behaviour in context and in its full complexity (and the use of qualitative data to 'access' this); a view of the scientific process as generating working hypotheses rather than immutable empirical facts; and an attitude towards theorizing that emphasizes the grounding of concepts in data rather than their imposition in terms of *a priori* theory. Put simply, the naturalistic inquirer: 'prefers to have the guiding substantive theory emerge from (be grounded in) the data because *no* a priori theory could possibly encompass the multiple realities that are likely to be encountered; because believing is seeing and [she] wishes to enter her transactions with respondents as neutrally as possible; because a priori theory is likely to be based on a priori generalizations, which, while they may make nomothetic sense, may nevertheless provide a poor idiographic fit to the situation encountered' (Lincoln and Guba, 1985, p. 41)," (Pigeon 1996, p. 80), original emphasis.

Although the fields of knowledge which are to be discussed in this chapter have much 'overlap', for the sake of clarity, they shall be discussed as far as possible in separate sections. The chapter will conclude with a statement of the limits of concern of this research. Figure 2.1 summarises the structure of this chapter.

| Information Systems | Business Process Re-engineering | Other Related Fields of Knowledge | Statement of Limits of Concern |
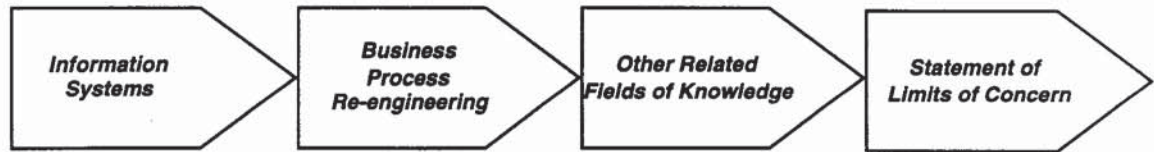
Figure 2.1 : Summary of the Structure of Chapter Two.

2.1 Information Systems Literature

This section (2.1 – 2.1.6) provides a discussion of the broad literature which can be grouped under the banner of 'information systems' (IS). There are many related terms (Management Information Systems (MIS), Information Technology (IT), Information Management (IM), Informatics etc.) and whilst a lengthy debate could be devoted to the disparate definitions of IS and other terms it is not worthwhile to do so within the context of this chapter. 'IS' is used here as an 'umbrella' term to encompass MIS, IT, IM and related fields. Nonetheless, a working definition which is provided by the UK Academy of Information Systems may help as a start-point to the discussion — IS is "the means by which organisations and people, utilising information technologies, gather, process, store, use and disseminate information" (UKAIS, 1997, p. 5).

The next section (2.1.1) considers the 'nature' of the IS field. This is followed by two sections (2.1.2 – 2.1.3) which look at both IS academics' and IS practitioners' views of what is important in the field. The last two sections (2.1.4 – 2.1.5) focus on IS and strategy and IS and structure. These are specifically important to this research.

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2.1.1 A Multidisciplinary Field

Many researchers in the IS field argue that the study of IS is multidisciplinary. This is because much of IS research is really 'organisational research'. In other words, IS academics often study the *relationship* between an information system and an organisation — or particular aspects of it. For example, studies which look at the way users interact with an information system may draw on the fields of organisational behaviour and work psychology.

Land (1992) argues that "information systems are essentially social systems of which information technology is but one aspect" (p. 6). The 'information' aspect of information systems implies that the attribution of 'meaning' (by people) is involved in IS use. Sahay et al (1994) who draw from Bijker et al's (1989) work advocate an understanding of information systems from a perspective based on the 'social construction of technology' (SCOT). SCOT is the process by which "social meaning becomes embedded into an object under study" (Sahay et al, 1994, p. 249). Based on a SCOT perspective Bijker et al posit that IS are subject to 'interpretive flexibility'. This view of IS gives prominence to the need to study users' interpretations of technology and in particular the differences in meanings that social groups 'construct' for a technology (Orlikowski and Baroudi, 1991)

Hirschheim (1992) also recognises the social character of information systems and has written about the importance of IS researchers using

'appropriate' methodologies — i.e. methodologies that are appropriate given the *social nature* of information systems. He recommends interpretative and postpositive approaches. "Information systems epistemology", he explains, "draws heavily from the social sciences because information systems are, fundamentally, social rather than technical systems" (p. 28).

The multidisciplinary nature of IS research and the recognition of its 'social' character have led to complexity in defining IS. The following two sections examine IS academics' and IS practitioners' concerns to build a picture of what the multidisciplinary IS field entails.

2.1.2 Key Information Systems Concerns in the Academic Literature

The aim of this section is to investigate the academic literature on information systems in order to produce a taxonomy of research themes so as to build an understanding of IS academics' concerns — and hence to develop an awareness of the 'meaning' of IS. Part of Farhoomand's (1992) study did this, but the data that were used are from the 1977 to 1985 period.

Based on Farhoomand's approach the following is an up-to-date analysis of the research themes from three information systems journals. The last two years' issues from each journal were analysed.

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Summary information is shown in table 2.1 below.

Journal	Dates	Number of Issues	Number of Papers
European Journal of Information Systems	Mar. '97 – Mar. '99	9	58
Information Systems Research	Dec. '96 – Dec. '98	9	48
Journal of Management Information Systems	Fall '96 – Fall '98	9	91
TOTALS	2 year period	27	197

Table 2.1 : Information Systems Journal Review Summary.

The list of themes that Farhoomand had used has been extended here to account for modern categories such as business process re-engineering. Each of the 197 articles was categorised based on the keywords supplied by the authors where these were available. The following table (2.2) shows the results of this analysis.

Rank	Theme	No. of Papers
1	Databases, systems, software design	43
2	Decision support systems, decision theory	19
3	End-user computing/Teleworking	19
4	Interorganisational systems/EDI/Virtual Orgs.	15
5	Other	15
6	Impact/Evaluation	12
7	Management / planning for IS (incl. investments)	12
8	Business Process Re-engineering	10
9	Organisational design (IS)	9
10	Information requirements analysis	7
11	Strategic use of IS	7
12	Data management, information resource mgt.	6
13	IS research approaches/key issues	6
14	Implementation	5
15	Cost benefit analysis	3
16	Technology transfer	3
17	Outsourcing	3
18	Expert systems, artificial intelligence	2
19	Human-computer interface	1

Table 2.2 : Information Systems Journals Review Results.

The 'other' category was used to count articles that were unique and could not be grouped with each other or the remaining categories. The 'human-computer interface' (HCI) category could be included in 'other' because only one article was found to match this. However, HCI was kept because Farhoomand's list was only expanded upon – not reduced. What is interesting to note is that HCI ranked the third highest theme in Farhoomand's 1977-85 data, and now ranks nineteenth.

In fact, the sets of themes are similar. Farhoomand's set has only been slightly modified to 'fit' current data. The difference in data sets lies in the ranking of the themes. Interestingly, 'databases, systems and software design' ranks top in both sets. However there are significant differences in the rank order of the remaining themes. It is not of import to compare these data sets here, the aim is to develop an understanding of IS academics' concerns.

Thus, by looking at the top ranking themes, (e.g. the first four), it appears that in the last two years IS academics have mostly been preoccupied with 'databases, systems, and software design', 'decision support systems and decision theories', 'end-user computing and teleworking', and 'Interorganisational systems including EDI and Virtual Organisations'. The highest ranking category which may appear to be rather broad — 'databases, systems, and software design', is in fact dominated by articles in the 'software design' area.

By considering the themes and their ranking, an understanding of how IS academics' might 'define' IS may be postulated. The following section takes a similar approach using the ranking of 'key issues' to determine IS practitioners' possible 'definition' of IS.

2.1.3 Key Information Systems Practitioners' Concerns

In order to develop an understanding of senior executives' 'definitions' of IS this section looks at three 'key issue' studies that have been conducted. The goal in doing this is not to resolve the differences in these studies so as to determine 'the' key issues — but instead to get an idea of the kinds of things that IS practitioners are concerned with and hence build an understanding of how they might 'define' IS. Two main studies have been selected for review here. The first (Brancheau, 1996) because of its extensiveness, and the second (Earl, 1996) because it is concerned with UK headquartered firms (as is Xerox Ltd.).

Brancheau (1996) presents the results of Delphi studies that were conducted among members of the Society for Information Management (SIM) in the United States. The study used a three-round Delphi survey of senior IS executives and entailed follow-up interviews. Brancheau's research replicates the method used in previous SIM Delphi studies that were conducted in 1980, 1983, 1986,

and 1990. The results are based on 1994-95 data and are presented in the table below:

Rank	Key Issue
1	Building a Responsive IT Infrastructure
2	Facilitating and Managing Business Process Redesign
3	Developing and Managing Distributed Systems
4	Developing and Implementing an Information Architecture
5	Planning and Managing Communication Networks
6	Improving the Effectiveness of Software Development
7	Making Effective use of the Data Resource
8	Recruiting and Developing IS Human Resources
9	Aligning the IS Organization Within the Enterprise
10	Improving IS Strategic Planning
11A	Implementing and Managing Collaborative Support Systems
11B	Measuring IS Effectiveness and Productivity
13	Increasing Understanding of IS Role and Contribution
14	Facilitating Organizational Learning
15	Managing the Existing Portfolio of Legacy Applications
16	Facilitating and Managing End-User Computing
17	Using Information Systems for Competitive Advantage
18	Planning and Integrating Multi-vendor Open Systems
19	Developing and Managing Electronic Data Interchange
20	Outsourcing Selected Information Services

Table 2.3 : SIM Delphi Results – 1994/95.

Source : Brancheau (1996), p. 229.

The majority of the SIM respondents were IM executives of American organisations in the USA. The results conceal as much as they reveal. It is difficult to ascertain exactly what is meant by many of the issues because each may cover a wide range of questions or problems. Words such as 'improving' or 'facilitating' are open to interpretation. However, it can be seen that IS practitioners are broadly concerned with the management of information technologies, systems, and with an interface to business and strategic affairs.

In 1996 researchers at the Centre for Research in Information Management at London Business School did a small questionnaire survey of thirteen of the UK's largest companies. They wanted to determine senior management's top IS concerns. The following table shows their results.

Issue	Rank Order
Aligning IS and Corporate Goals	1
Reengineering Business Processes Through IT	2
Building an IT Architecture	3
Understanding New Technologies	4
Organizing and Utilizing Data	5
Educating Management on IT	6
Improving the Systems Development Process	7
Cutting Costs	8
Instituting Cross-Functional Systems	9
Electronic Commerce/Improving IS Human Resources	10

Table 2.4 : Issues in Managing IS (1996).

Source : Earl (1996), p. 3.

What is interesting to note is that two of the top three issues in each study are similar: building IT infrastructure, and the management of BPR. Both lists of issues are alike and suggest a relatively homogeneous understanding of IS among IS professionals.

A more recent analysis of secondary data by Watson et al (1997) looks at management key IS issues studies from different countries and integrates the results with Hofstede's (1991) cultural data. This comparative study endeavours to explain the reasons for the diversity of problems faced by IS managers. Whilst the ranking of issues may be shown to vary from country to country, and Watson et al try to

explain this — the 'sets' of issues which are of interest here are nonetheless similar around the globe. The set of issues presented here gives an indication of what 'IS' professionals are preoccupied with and thus whilst the IS literature lacks agreement with regards the definition of IS — an understanding of IS practitioners' 'definition' may be gained through considering these 'key issues'.

2.1.4 Information Systems and Strategy

The alignment of IS and corporate strategy and the strategic use of information systems are both areas which are reflected in the key management issues that are listed in the previous sections. They are particularly important to this research because a large proportion of the author's participant involvement at the case site was linked to strategic planning — often at a Xerox Ltd.-wide level (i.e. Corporate and Business Unit Strategy; cf. Johnson & Scholes, 1999).

Earl has written extensively on IS and strategy. In 1989 he wrote about IT being critical to many organisations and how it had become a strategic weapon — "IT has become an important support for many firms' strategies; moreover it has *created* new strategic choices for many companies" (Earl, 1989, p. ix, original emphasis).

Venkatraman and Zaheer (1994) show that early connections between IS and strategy (in the 1980s) were dominated by strategic advantage

through 'electronic integration'. "It can be reasonably argued," they posit, "that a major reason for considering IT-based applications as potential sources of strategic advantage lies in the capability for electronic integration among firms that can change the basis of competition in a marketplace" (ibid., p. 184). They provide classic examples of this which are also cited by Earl (1989) such as the American Airlines SABRE reservation system and American Hospital Supply's ASAP system.

Also in 1994, Henderson and Venkatraman argued that "the role of information technology in organizations … shifted beyond its traditional, 'back-office support' role toward that as an integral part of organizations' strategy" (p. 202). Few IS professionals would challenge this view today. It has become clear, at least to IS executives and academics, that IS is critical to much of modern day business.

As the importance of IS to firms has increased over the years, and particularly with respect to strategy, there have been many attempts at evaluating IS. This has proved to be extremely difficult and as shown by Smithson and Hirschheim (1998) "IS evaluation clearly remains a thorny problem" (p. 171). IS evaluation is important for many reasons but particularly when the spend on IS is a considerable proportion of company revenue. Despite the difficulties with IS evaluation, the large and often increasing spend on IS may frequently be 'justified' by

senior management because of its criticality to the support of corporate strategy (Earl, 1988; Henderson and Venkatraman, 1989).

Since the 1980s, the term Strategic Information Systems Planning (SISP) gained currency and is connected with two major themes. The first is the alignment of IS planning with corporate goals and the second the introduction of strategic applications (Lederer and Sethi, 1988).

Nonetheless, that which is missing from the academic literature which relates to information systems and strategy is a view which closely links business processes and information systems. As is discussed in the following sections on business process re-engineering and processes (2.2 – 2.2.5), information technology has often been cited as being an enabler to re-engineering (cf. for example Davenport, 1993). What has not been emphasised, but is shown in this research, is that in many cases business processes *are* the information systems. Thus, the design and management of IS can be seen as operational strategy in that processes are pulled together to deliver a strategic architecture that supports the overall strategic direction (Johnson & Scholes, 1997). This 'strategic information architecture' affects an organisation's 'structure'. IS and structure is the subject of the following section.

2.1.5 Information Systems and Organisational Structure

The term 'organisational structure' is difficult to define because it is an abstract concept (Greenberg and Baron, 1997). It refers to "the formal configuration between individuals and groups with respect to the allocation of tasks, responsibilities, and authority within organisations" (ibid., p. 505). The ability of a firm to compete has often been linked to its organisation structure as this may affect (for example) the organisation's ability to learn (Senge, 1990), or its ability to adapt to changing environmental (market) conditions (Mintzberg, 1991).

Over the last thirty years there has been much debate in the 'strategic management' literature regarding the link between strategy and structure, and in particular whether organisation structure (design) should 'follow' strategy formulation (e.g. Chandler, 1987), or whether it is *part of* strategy development (e.g. Prahalad & Hamel, 1994). It is not the intention to resolve the debate over strategy and structure here but that which is important that can be drawn from the 'strategy' literature is that the two are in some way related. Insofar as information systems and strategy are also related (as was discussed in the previous section), it is thus likely that IS and organisation structure are connected. Indeed, some of the IS literature deals with this issue (e.g. Orlikowski & Robey, 1991; Sampler, 1996).

Sampler (1996) provides an excellent summary of the various perspectives on the relationship between information technology and organisational structure. This is shown in the table below.

1	IT leads to centralization of organizational control
2	IT leads to decentralization of organizational control
3	IT has no uniform impact on organizational control, but instead this relationship is determined by other factors
4	Organizations and IT interact in an unpredictable manner
5	IT enables new organizational arrangements such as networked or virtual organizations

Table 2.5 : Perspectives on the Relationship Between IT and Organisational Structure.
Source : Sampler (1996), p. 6.

The fifth perspective that Sampler identifies, 'IT enables new organizational arrangements', is the most pertinent to the research in this thesis. Earl (1989) cited this characteristic of IT as providing a 'strategic weapon' – "... to enable new ways of managing and organizing..." and, "... to develop new businesses" (ibid., p. 8).

Applegate (1994) provides an early example of the structure-enabling character of IS. She presents a case study of the US firm Frito-Lay. Applegate quotes Frito-Lay's CEO — "It became clear that the organization we needed to create was really a hybrid that allowed us to achieve the benefits of centralization and decentralization

simultaneously... the need to provide more detailed and timely information throughout the organization was essential, and it would need to be available before the organizational restructuring..." (p. 56), "... a much more responsive information and communications system was needed to support greater levels of horizontal and vertical collaboration" (p 63). In this thesis, IS and the holistic approach to process management at Xerox are shown to be 'mutually enabling'.

Whilst the connection between IS and organisation structure is not new, and the recognition that IS or IT can enable new organisational forms is also not new, the literature lacks in-depth examples of the relationship between IS *and* holistic process management. This thesis makes a contribution to this area.

2.1.6 Information Systems Summary

The term 'information management', which is the focus of this thesis is often used interchangeably by academics with the term 'information systems'. Davenport postulates that IM is "the overall management of a firm's entire information environment" (Davenport 1993, p. 71). In using the phrase 'information environment', Davenport 'widens' the scope of IM to include more than IT and IS. Sections 2.1.2 and 2.1.3 provided an understanding of IS academics' and IS practitioners' 'definitions' of IS. Differences in 'definition' or emphasis could be seen among these groups but the aim here has been not to explain or

resolve this but to provide a rich understanding of what the IS field involves.

One of the objectives of the research in this thesis is to discover Xerox's definition of IM, and particularly with respect to and within the context of process management. Thus, this section has not defined IM or IS in detail because the aim is to derive a 'Xerox' definition from the research data. The definition derived from the data will be appropriate to the Xerox context and will in particular represent IM in a process-based organisation.

What is critical to note at this point is that apart from IS academics' articles which relate to business process re-engineering, the review of literature themes that was presented in section 2.1.2 did not reveal any research of IS or IM in process-based organisations. The research in this thesis addresses this. The lack of research in this area is discussed further, with and in respect to the following review of business process literature.

This section on the 'information systems' field has gone part-way to providing an understanding or definition of IS. Information management may be perceived either as part of this area or in Davenport's terms (information environment) wider than this. In line with the postpositive perspective (see chapter three) that has been adopted by the author for this research it would not make sense to

'carry forward' definitions or theory from this review of IS literature in order to 'inform' the study. The aim has been to give a broad understanding of the area in which the research aims to contribute. Furthermore, two specific strands of IS literature were looked at — IS and strategy, and, IS and structure. These areas were chosen because they are specifically important to the research. The part of Xerox that was studied is heavily involved in IS strategy. As discussed earlier, the literature lacks an emphasis that connects process management and IS strategy. This research reveals that in a process-focussed organisation this link is imperative. On the IS and structure side, it was shown that although IS has been recognised as a powerful agent in creating new organisational forms (and this is echoed in the business process re-engineering literature that is reviewed below), the literature lacks in-depth examples of this relationship — especially with respect to holistic process management (cf. section 2.2.3). In particular, the role of IS in the on-going management of a process-focussed organisation (the subject of this thesis) is not represented in the IS literature. This thesis contributes to this area.

2.2 Business Process Re-engineering Literature

In this section (2.2 – 2.2.5), the salient aspects of the wide body of literature on business process re-engineering (BPR) are explored. The research presented in this thesis is not concerned with BPR itself, but with information management issues in process-based enterprises.

The reason for reviewing the BPR literature is that it provides an understanding of how a firm may go about *becoming* process-based. The aim is to consider the basis upon which *process management* may be founded. The assumption behind much of the BPR literature is that the 'creation' of a process-based enterprise follows a re-engineering effort. Thus, it is an appropriate area for review.

2.2.1 The Background to the Emergence of Business Process Re-engineering

The 1990s management focus on business process re-engineering can be traced back to two seminal papers. Successful process re-engineering efforts were described by Hammer and by Davenport & Short in 1990. In doing so, they tried to establish the general 'principles' of re-engineering. Davenport & Short who used the term 'business process redesign' were clear in explaining that process management was not new, but that it had been mostly noted in the 'quality literature' with a particularly focused meaning — "... the focus is usually on improving process control systems in a manufacturing context" (Davenport & Short, 1990).

By the mid-1990s, one of the predominant themes that emerged amongst academics and business leaders was the need for radical organisational change. This 'need for change' represented a "growing feeling among business leaders, academics, and others that the old

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ways of doing business aren't working anymore" (MIT, 1996). The 'old ways' are those that may broadly be referred to as 'Taylorism' or 'Scientific Management'. By simplifying tasks and standardising procedures, F. W. Taylor (1911) developed methods of work organisation that achieved considerably higher levels of productivity than those which were being experienced at the time. Scientific management required workers who performed similar tasks to be grouped together and hence 'functional organisational units' became widespread.

As the functionally oriented organisational form, with its characteristic hierarchical control 'structure' became commonplace, the increasing intensity of business competition, particularly with respect to the global market place, put unprecedented pressures on this type of organisation. "The extensive divisions of labour, functional divisions and economies of scale derived from Adam Smith, F. W. Taylor and Henry Ford worked when demand was high, competition low and customers indiscriminate, but now all of these have been reversed and complacency has to be removed by shifting the focus from producer to consumer" (Grint and Willcocks, 1995, p. 100). Much of the BPR literature claims (at least implicitly) to provide this 'solution' — the assumption is that the shift in focus can be obtained by re-engineering business processes. Indeed, by the mid 1990's many firms had attempted re-engineering and an increasing number of 'business re-

engineering' efforts were reported to have been implemented (Willcocks, 1995).

But the definition of BPR remains unclear. The vast literature on BPR has resulted in a diverse array of definitions. Definitions of BPR differ in their emphasis with some writers presenting it as a tool-based methodology and others as a management philosophy (Hewitt & Yeon, 1996). Davenport and Short (1990) give a pragmatic definition: "The analysis and design of workflows and processes within and between organisations" (ibid., p. 11). While Hammer and Champy (1993) offer a more 'strategic' definition: "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (ibid., p. 33).

Whilst there has been the impetus for dramatic organisational change, and a growing recognition that such change is essential to business survival (MIT, 1996), there are few examples in the literature of firms who have taken the 'risk' (cf. Talwar, 1994) of implementing a reformation. However, some firms can be identified (such as Xerox), who have been 'forced' to abandon the functionally oriented organisational form, simply in order to survive (see for example, Watts, 1994b).

Earl (1994) clarified the 'emergence' of BPR by explaining that there were both new and old aspects to the 1990s concept of process redesign. Three elements are 'old' and three are 'new' he asserts. Earl shows these elements as a 'structural model of two triangles' (see figure 2.2 below).

Figure 2.2 : The Old and the New of Business Process Re-design.

Source : Earl (1994), p. 11.

The *new* aspects are of particular relevance here. Transformation is discussed in section 2.2.3, process in section 2.2.2, and the issue of information technology has been discussed in section 2.1.

These three aspects are essentially the three fundamental characteristics of BPR as reported in much of the literature – radical change (although this is often not the case), a focus on process, and

the use of information technology as an enabler to BPR. Different authors place varying degrees of emphasis on these aspects. Hammer (1990) for example, stresses radical change while Davenport & Short (1990) emphasises the use of information technology.

However, irrespective of the debate on the definition of BPR or of its background, there are two facets of the literature that are particularly important to the research described in this thesis — (1) what can be learned about process, and (2) the 'extent' of process focus in an organisation. The following sections discuss each of these in turn.

2.2.2 BPR and Processes

That which can be learned from the BPR literature regarding business processes themselves will be of use in this thesis because it will provide a basis upon which the discussion of process management may be supported. This will assist in understanding the first research 'objective'; *the nature of a process oriented enterprise*. Two aspects of process will be explored — the definition of process and the various 'types' of process that have been identified.

2.2.2.1 Definition of Process

A simple definition of process is given by Harrison (1995): "... the conversion of inputs (resources) into outputs (goods and services)". Hammer and Champy (1993) define a business process "as a

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collection of activities that takes one or more kinds of input and creates an output that is of value to the customer" (p. 35). The difficult part of Hammer and Champy's definition is the 'value to the customer' piece. This is something that is troublesome to measure or to define but it has gained currency in BPR literature. The idea is that if the 'activity' does not add value for the customer (internal or external — however defined), then it ought to be eliminated — or in Hammer's words 'obliterated'.

Davenport (1993) takes a pragmatic approach by defining the business process as a "specific ordering of work activities across time and space, with a beginning, and end, and *clearly identified* inputs and outputs; a structure for action" (p. 5, emphasis added). Whether it is possible to define all 'types' of business processes to the level of detail that Davenport implies is questionable. This becomes clear with the discussion of process 'types' in section 2.2.2.2 below.

However, what is important to note with the concept of process in BPR, is that a single process may cross functional or even organisational boundaries. It is not that processes did not exist in the past, but that in redesigning processes the idea is that functional boundaries are 'ignored'. Each of the activities that are collected together and perceived as a single process may consist of tasks that have traditionally been undertaken in different functions. What is new is the

focus on the *entire* process and the management of that *holistic* process.

Despite the majority of the business process literature focusing on re-engineering, Hammer (1996) acknowledges that the focus on process and its management is most important (Alderman, BPRC No. 4). A 'process' can be diagrammatically represented as follows:

| **INPUTS** | **PROCESS** | **OUTPUTS** |
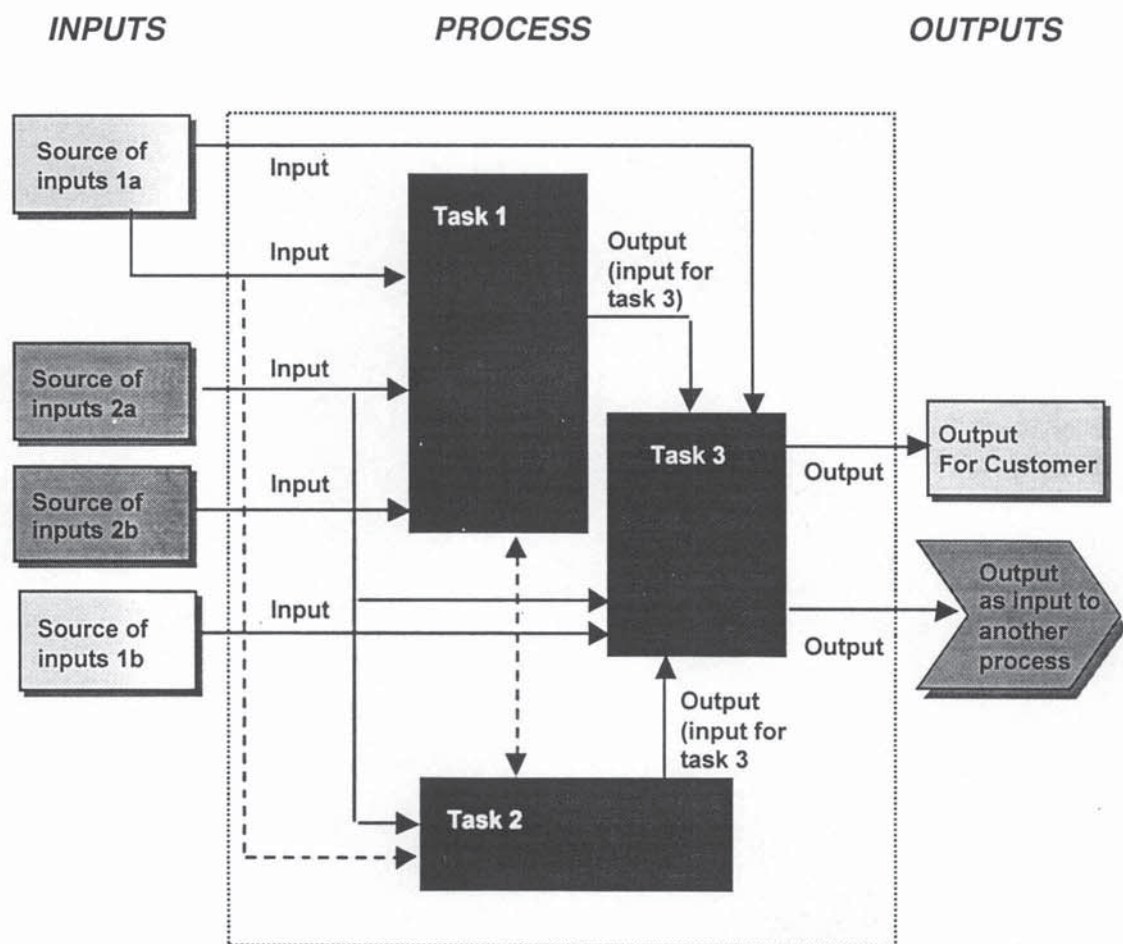
Figure 2.3 : A Generic Process Diagram.

This incorporates the common definitional themes of process. At Xerox Ltd., the formal definition of process is "… the documented workflow of

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work activities that systematically identify potential causes of business outcomes and problems. ... Business processes are designed to be customer driven, cross functional and value based. They create knowledge, eliminate waste, and abandon unproductive work, ... yielding World Class Productivity" (source, Xerox Ltd. Intranet).

In summary, it is clear that there are various definitions of 'process' in the literature. They range from the pragmatic to the strategic. Harrison (1995) concludes his discussion of the definition of process with the following which is most appropriate : "Defining a 'process' is no simplistic task. Like defining 'quality' there are many interpretations and there has been much confusion" (ibid., p. 66). Section 2.2.2.2 extends this understanding of process by exploring the different 'types' of process that are cited in the academic literature.

2.2.2.2 Types of Process

From the literature on BPR, we can identify at least four types of process. Although not very explicitly, Johansson et al (1993) talk of two types — core, and support. The core processes, they explain, "should be those processes that the business's strategy has identified as critical to excel at in order to match or beat the competition" (ibid., p. 59). Earl (1994) clearly describes four types of process — the two that Johansson et al (1993) mention and a further two. Earl's four are —

core processes, support processes, business network processes, and management processes.

Core processes are similar to the primary activities in Porter's Value Chain (1995). Similarly, the support processes are similar to the support activities in the Value Chain. These are usually administrative processes and in terms of 'customer' they satisfy 'internal' (customer) needs. Business network processes are those which extend out of the organisation to customers or suppliers. A good example is the supply chain. By redesigning the aforementioned three types of processes, there is a need to redesign the management processes. These include strategy making, policy, and the co-ordination of business processes. The (re)engineering of management processes *vis-à-vis* a focus on core, support and business network processes is not represented in the literature. This research gives insight into the management of management processes — in particular the information management process and the co-ordination of business processes.

Garvin (1998) provides an extensive discussion on process theories in which he emphasises the importance of a 'process view of organisations'. He presents various frameworks for classifying and distinguishing different types of processes — organisational processes and managerial processes — each consisting of a further three kinds. Garvin's discussion of managerial processes is the most extensive in the literature. He identifies three types; direction–setting processes,

negotiation and selling processes, and monitoring and control processes. The empirical works that Garvin refers to in drawing together the managerial processes have not been concerned with process-based organisation, but with specific managerial processes (e.g. managerial decision-making). Because managerial processes "require flexibility and a sensitivity to context, they seldom unfold in the same set sequence or maintain the same character on every occasion" (ibid., p. 44). Thus, positivist approaches to studying managerial processes are likely to be troublesome because nomothetic statements about these processes are difficult to make. This might partly explain their omission from the literature.

Garvins' framework of processes is however academic. He has brought together a disparate collection of prior work to argue for the importance of a holistic approach in thinking about processes. The extent of process focus is discussed in the next section.

2.2.3 The Extent of Process Focus

As Garvin's (1998) paper clearly demonstrates, academic literature to date has not dealt with processes in a holistic manner. In other words, studies relating to processes (business processes, managerial processes etc.) have been focused on either particular processes (e.g. the supply chain (see for example, Holland, 1995; Towil, 1997)), or on the way that processes can be improved, analysed, or modified — how

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to *do* BPR (see for example, Couger et al, 1994; Coulson-Thomas, 1994; Miers, 1994; Martinsons, 1995)).

Talwar (1994) discusses the variation in the extent of process focus. He posits that there are differences in management's motives when instigating BPR programmes which arise because of "the range of ambition of those who are applying it" (ibid., p. 43). This, he says, results in the 'reengineering spectrum' which consists of four dimensions — mindset change, scope, gains, and risk. Figure 2.3 brings these dimensions together and shows Talwar's classification of the 'extent of process re-engineering'.

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Illustration removed for copyright restrictions

Figure 2.4 : The Extent of Process Change.

Source : Talwar (1994), p. 43.

Process improvement is not considered by Talwar to be re-engineering because only *part* of a business process is involved and this usually lies within a particular business function. Process re-engineering "involves the fundamental rethinking and radical streamlining or total redesign of an end-to-end process" (ibid., p. 44) and is what Talwar considers to be 'true re-engineering'. The main difference between process re-engineering and business re-engineering is the number of processes that are redesigned. Business re-engineering describes a situation where firms seek "step change improvements across all of their processes". This and transformation would appear to qualify as being 'holistic' approaches due to their pervasiveness.

References to holistic approaches to process management are extremely rare in the academic literature. This should not be confused with the literature on *workflow* which is generally about the co-ordination and compatibility of technological systems with a focus on the connectivity of work processes (Palmer, 1998). Nor should it be confused with the literature on *process modelling* that deals with the technical methods for representing and modelling processes — usually using sophisticated software techniques (Phalp, 1998). These techniques may however be useful to those wishing to manage by process but are not the focus of this research. Most process related literature is about BPR, up to the point of implementing re-engineered processes (e.g. Coulson-Thomas, 1994b). However, little is reported in

the literature about how to manage an enterprise that has undertaken 'transformation' — probably because there are few references in the literature of organisations that have done this. A notable exception is the work of Simon (1995, 1995b) which discusses process-based organisation — although this (as does Garvin's work) remains at the level of theory and lacks empirical evidence.

Kettinger et al (1996) also indicate that there is a lack of research relating to enterprise-wide processes. They discuss holistic approaches to BPR in relation to 'information architecture' and provide a model to link the two together. Kettinger et al's conclusion is that further research needs to be conducted in the area of enterprise integration at the process level.

There is a growing body of recent research which can broadly be referred to as the Enterprise Resource Planning (ERP) literature. This is concerned with ERP systems. Holland et al (1999) define these as "highly integrated software packages that automate core corporate activities..." (p. 289). Effectively, this body of literature has mainly been preoccupied with analysing the *implementation* of ERP systems and their consequences. Davenport (1998) warns of the dangers that firms can face with the implementation of ERP systems. The problem is that ERP systems have their own process model (coded in software) — "... they prescribe standard business models of how organisations should manage and control business processes" (Holland et al, 1999, p. 291).

The business processes are implicit (ibid.). The ERP literature does not consider whether a firm is already process oriented or not. Thus, although the ERP literature is related to this research it differs in that it is not explicit in analysing the nature of organisation. The companies cited in ERP literature may be functional organisations who have implemented integrated applications (ERP). Not all of an organisation's business processes 'reside' in its applications and thus we cannot assume that the implementation of an ERP system 'creates' a process-oriented enterprise.

As stated, there is little indication in the academic literature that firms have undertaken holistic approaches to process management. Xerox Ltd. has undertaken such changes. The beginning of the Xerox Ltd. 'transformation' was first reported by Davenport & Short (1990) — "The company began to redesign its business in 1987 ... to restructure the organization around cross-functional processes" (p. 21). This was followed by a paper by Bounds and Hewitt (1995) which gave a case history of the Xerox transformation up to 1994. This was updated in 1998 (Hussey, 1998).

At the present time Xerox Ltd. is organised almost entirely around 'processes'. The Xerox process model is represented by an internal Xerox document which is called the 'Xerox Business Process Architecture' (XBPA). Xerox has a greater focus on process at the level of management than any example reported in the literature. The

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exception which offers limited information would be Garvin's 1995 paper in which it is suggested that three other different types of firms are 'process-based' — United Services Automobile Association, SmithKline Beecham, and Pepsi-Cola North America.

To reiterate, the literature on processes has mostly dealt with BPR up to the point of implementing reengineered processes, but not beyond that point. Furthermore, with the exception of a few 'theoretical' papers on process-based organisation, there is little in the literature to indicate examples of corporate 'transformation' (in Talwar's terms). Because of Xerox Ltd.'s comprehensive (or holistic) focus on processes, the author has referred to this type of organisation as a *'process oriented holistic enterprise'* (POHE) — to represent the extensive focus on processes.

2.2.4 From Function to Process

As was mentioned in section 2.2 an oft-implicit assumption which underpins much of the literature on business processes (particularly BPR literature) is that by doing BPR, the aim is to convert a functional organisation into a process-based one. As there is little in the academic literature to indicate the existence of POHE's, then one can assume that if the aim of re-engineering is to 'create' the process-based enterprise, then the organisations cited in the literature are not process-based but probably functional (or something else).

This is not to say that BPR is excluded from a process-based enterprise that wishes to *re*engineer, but that this is not reported in the literature (cf. Talwar's 'ongoing renewal'). Garvin (1995) introduces his paper on precisely this basis:

> "Reengineering efforts are sweeping the country [USA] as companies shift from purely functional organizations to those that better accommodate horizontal work flows. Broad, crosscutting processes such as product development and order fulfilment have become the new organizational building blocks, replacing narrowly focused departments and functions. Managers, in turn, have begun to develop new ways of working. *But much remains to be learned about how these new organisations are crafted and led*" (p. 77, emphasis added).

Michael Hammer had made similar comments earlier:

> "... once you have been through the re-engineering exercise, you come out the other end of the pipeline... How do you run your company then? How do you manage an organization that's been through re-engineering where you've flattened it, you've gotten away from traditional hierarchies, you've got process orientation. *Almost everything we know about management is no longer germane*" (in Watts, 1994, p. 9, emphasis added).

However, it is also possible that a new firm may be founded and modelled along process lines. One such example is provided by Davenport and Beers (1995) — "Like few other businesses, UCS [AT&T Universal Card] was designed from the beginning around quality and process management concerns" (ibid., p. 75).

The research presented in this thesis is about an organisation (Xerox Ltd.) which has reengineered and moved from functionally based to process-based management. The research studies Xerox to investigate the nature of a (holistic) process-based enterprise. As was mentioned previously, apart from theoretical papers (for example, Simon 1995; Garvin, 1998) — examples of in-depth research in this area do not exist.

Academics have been indicating that the process-based organisation (Hammer, 1990; Scott Morton, 1992; Davenport, 1993; Earl 1994) is emerging as the 'new organisational form' (MIT, 1996) with the 'business process' as the basic organisational construct. Research in this area is lacking. The following quotation from Davenport and Beers (1995) encapsulates the implications of some of the main points that have been discussed so far:

> "...until process management itself is more fully understood and practised, much of the thought devoted to subjects like process information will be, of necessity, speculative. Despite some urging to the contrary there are still no firms that have

deeply embedded the management of business processes into the day-to-day fabric of their organizations" (ibid., p. 77).

2.2.5 BPR Review Summary

This review of the large body of BPR literature has highlighted the aspects which are relevant to this research. Of particular salience is that which can be learned about processes themselves. The definition of 'process' was shown to be unclear, but when combined with an insight into the literature that identifies the different 'types' of process, a better understanding can be formed.

The review of BPR and process literature revealed two areas of interest to be underrepresented. There is little in the literature to provide an understanding of the management of management processes (in particular the information management process in process-based organisations). Additionally, the literature in the area of holistic process-based management has remained at the level of theory. The research described in this thesis contributes to these areas.

2.3 Other Related Literatures

The remaining sections of this chapter discuss other areas of academic literature which are related to the research in this thesis. 'Co-ordination theory' is briefly reviewed because it may provide insight into a management process (co-ordination of business processes) which is not extensively represented in the academic literature (cf. section 2.2.2.2). 'Organisation structure' literature is briefly discussed to show that the POHE is an organisational form of which there are virtually no examples in the academic literature.

2.3.1 Co-ordination Theory

As has been discussed in section 2.2.2.2, the BPR literature provides a good basis from which we may understand core, support, and business network processes. However, the academic literature provides little with which an understanding of the management of management processes can be gained. One such management process is the co-ordination of business processes. A notable exception is the work of Malone and Crowston (1994) and Crowston (1994) which they refer to as Co-ordination Theory (CT).

Essentially, CT "provides an approach to the study of processes" (Crowston, 1994, p. 3). These, Crowston argues, will differ depending on the co-ordination mechanisms that are used to manage the dependencies between the tasks and resources involved in the

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process. The corollary is that where co-ordination mechanisms differ, and these Crowston suggests are primarily information processing, the nature of processes will also differ and thus varying organisational forms are possible.

This early work on CT is based on a typology of dependencies and associated co-ordination mechanisms (see table 2.6). The dependency is determined (in part) by the nature of the tasks (goals and activities) or resources (used or created by tasks) that require co-ordination.

Dependency	Examples of Co-ordination Processes for Managing Dependency
Shared resources	"First come/first serve", priority order, budgets, managerial decision, market-like bidding
Task assignments	Same as for 'shared resources'
Producer/consumer relationships	[blank]
Prerequisite constraints	Notification, sequencing, tracking
Transfer	Inventory management (e.g., "Just in Time", "Economic Order Quantity")
Usability	Standardization, ask users, participatory design
Design for manufacturability	Concurrent engineering
Simultaneity constraints	Scheduling, synchronization
Task/subtask	Goal selection, task decomposition

Table 2.6 : Co-ordination Dependencies and Mechanisms.

Source : Malone and Crowston, 1994, p. 6.

This typology of co-ordination dependencies and mechanisms gives rise to three categories of dependencies between two 'objects' — (1) those between two tasks, (2) between two resources, or (3) between a task and a resource.

Although CT is still relatively new and much investigation in this area remains, it does however provide a conceptual model that is more 'accessible' than earlier works on organisational co-ordination such as that of Beer (1972). Although Malone and Crowston do not state this, it would appear that they have built upon Galbraith's (1973) work.

Galbraith had cited three 'co-ordination mechanisms' — 1) rules, programmes, procedures, (2) hierarchy, and (3) targeting or goal setting. He had originally linked (as Malone and Crowston do) co-ordination mechanisms with organisation design; "In order to complete ... [a] ... task at a high level of performance, the activities that take place in the various groups must be coordinated. ... The organization design problem is to create mechanisms by which an integrated pattern of behaviour can be obtained across all the interdependent groups" (ibid., p. 9).

To conclude this discussion of co-ordination theory, that which is important to note is that an understanding of the management process that deals with the co-ordination of business processes is likely to require the identification of specific dependencies and their corresponding co-ordination mechanisms. The nature of a process is likely to vary depending on the related co-ordination mechanisms — and the structure of organisation is thus likely to be 'shaped' by this. Organisation structure is discussed in the next section.

2.3.2 Organisation Structure

The review of relevant literature in this chapter has already covered two aspects of organisation structure. The aim of this additional section on organisation structure is to draw these points together and clarify the position from an 'organisation studies' perspective. The

organisation studies literature deals extensively with organisation structure.

The first point that was raised earlier in this chapter in relation to organisation structure appeared in the 'information systems' section. It was shown, that whilst the connection between IS and organisation structure is not new, and that there has been early recognition that IS or IT can enable new organisational forms — the literature lacks in-depth examples of the relationship between IS *and* holistic approaches to process management. In fact, it is holistic approaches to process management which are excluded from the literature.

In the latter part of this chapter, with the review of business process literature, it was shown that apart from theoretical papers (for example, Simon 1995; and Garvin, 1998) — examples of in-depth research in process-focussed organisations do not exist. Xerox Ltd. has 'reengineered' and moved from functionally based organisation to process-based management. The functional organisation has been abandoned.

Organisational behaviour literature does not mention process-based organisation as a 'possibility'. However, various academics (Hammer, 1990; Scott Morton, 1992; Davenport, 1993; Earl 1994) have been indicating that the process-based organisation is emerging as the

'new organisational form' (MIT, 1996) with the 'business process' as the basic organisational construct.

Some modern texts in organisational behaviour (e.g. Robbins, 1998), recognise that firms may be organised around business processes and they call this *process departmentalisation.* Other types of departmentalisation (i.e. the structuring of jobs and tasks and their co-ordination) are functional, product, geographical, and customer. In fact Robbins reports that Xerox's organisational structure displays characteristics of 'team structure' — "Xerox have made extensive use of self-managed teams" (p. 491) — and characteristics of 'the boundaryless organisation' — "Xerox now develops new products through multidisciplinary teams that work in a single process instead of around narrow functional tasks" (pp. 495 – 496).

On the whole however, the academic literature lacks examples of research in process-focussed (POHE) organisations. The focus of this research is to understand information management in the POHE and as such an understanding of the POHE must first be articulated. This is the subject of chapter four.

Section 2.2.3 had outlined what is meant by POHE. It has been shown that the literature on 'processes' has mostly dealt with business process re-engineering *up to the point* of implementing re-engineered processes, but *not beyond* that point. Additionally, and with the

exception of a few 'theoretical' papers on process-based organisation, there is little in the literature to indicate examples of corporate 'transformation' (in Talwar's terms). Thus, because of Xerox Ltd.'s comprehensive (or holistic) focus on processes as a method of organising (represented in the XBPA), the author has referred to this type of organisation as a *'process oriented holistic enterprise'* (POHE).

2.4 Conclusion – The Limits of Concern

The review of relevant literature in this chapter has been aimed at addressing the following questions:

- What do we already know about process and information management?

and, • What has not been answered adequately in previous research and practice?

This final section draws the chapter together to answer the following question by providing a statement of the limits of concern.

- How will this new research add to theory in this area?

Firstly with regards to theory. This research has been based on a postpositivist perspective. The rationale for doing so is explicated in the following chapter. However, the approach that has been taken may be referred to more generally as 'theory-building research'. The following quote from Eisenhardt (1989) clarifies the position that has been adopted here :

"...theory-building research is begun as close as possible to the ideal of no theory under consideration and no hypothesis to test. Admittedly, it is impossible to achieve this ideal of a clean theoretical slate. Nonetheless, attempting to approach this ideal is important because *preordinated theoretical perspectives or propositions may bias and limit the findings...*" (p. 536). "...However, there are times when little is known about a phenomenon, *current perspectives seem inadequate because they have little empirical substantiation*, or they conflict with each other or common sense. ... In these situations, theory building from case study research is particularly appropriate because theory building from case studies does not rely on previous literature or prior empirical evidence. Also, the conflict inherent in the process is likely to generate the kind of novel theory which is desirable when *extant theory seems inadequate*" (p. 548, emphasis added).

This research will contribute to the foundational literatures that have been reviewed. The limits of concern of the research in this thesis can be summarised thus:

- With respect to the information systems literature the contribution will be to understand IS and its role *vis-à-vis* process-based organisation. This will also contribute to the area of co-ordination theory.

• With respect to the business process re-engineering literature, the contribution will be to explore the nature of organisation at the 'transformation' end of Talwar's (1994) spectrum — in other words the nature of holistic process-based management. This will also contribute to organisation theory as it will provide an in-depth understanding of a 'new' organisational form.

The following chapter provides a discussion of the research methodology, methods, and data collection techniques that have been used to address the contribution to theory that this thesis makes. It provides an understanding of the philosophical background to the way in which the research has been conducted together with an appreciation of how the results have been used to generate the theory that is presented.

CHAPTER THREE :

METHODOLOGICAL CONSIDERATIONS

3.0 Introduction

The discussion in this chapter deals with the methodological issues which surround this research. It covers three main areas. The first two sections (3.1 & 3.2) provide a discussion of the philosophical background to the research and the choices which the author faced with respect to methodology and research method. Section 3.2 concludes with a summary of the author's 'thought process' in dealing with these choices.

Sections 3.3 to 3.6 focus the preceding discussion to elaborate on the research method and data collection techniques which were chosen for this research. This part provides the theoretical rationale for 'doing' case study research within a postpositivist paradigm.

The chapter concludes (section 3.7) with a discussion of the practical implications of doing this type of research. The author has provided an account of what it is like to use the methods and data collection techniques in practice. Consideration is given to the effect that 'real world' circumstances have had on the implementation of the research method(s) and the implications for the research as a whole. Figure 3.0 summarises the structure of this chapter.
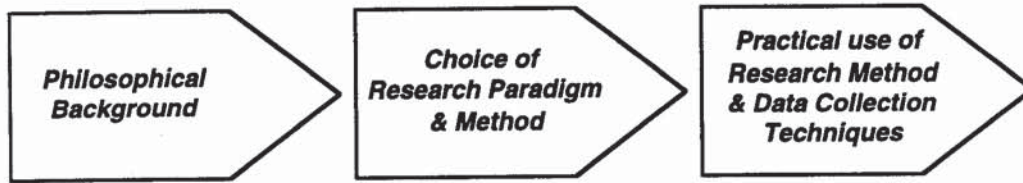
Figure 3.0 : Summary of the Structure of Chapter Three.

3.1 Epistemology, Ontology, Axiology

The importance to doctoral research of methodology and research design can not be understated. The methodology which a researcher uses, either implicitly or explicitly, in doing and thinking about his or her research needs to be understood in order to comprehend a study. This is because the methodology which underpins, in particular, research action and the interpretation of results, comprises of a set of (often implicit) assumptions. A knowledge of these methodological assumptions is critical if one is to fully understand a study and the implications of its results.

The methodological assumptions represent ontological, epistemological, and axiological interpretations that may lead to a representation of 'truth'. Whilst it is not the intention of this author to explore the long philosophical debate relating to the question of 'what is truth?', the author believes that it is important to begin an understanding of methodology with an appreciation that there is more than one 'answer' to this question. Thus what is implied here is that different ontological, epistemological, and axiological assumptions depict different ideas of 'what is truth?'.

These different 'sets' of assumptions which Gummesson (1988) refers to as "the 'rules' that govern ... thinking and action" (p. 19), are referred to by many writers on methodology as 'paradigms'. The idea of the paradigm may be traced back to Thomas Kuhn (1962) when he referred to the paradigm as the researcher's value judgements, norms, standards, frame of reference, perspective, ideology, myths, theories, concepts, categories, etc. (ibid.).

Lincoln and Guba (1985) posit that inquiry has passed through a variety of 'paradigm eras' which may be characterised by particular 'basic beliefs'. They describe three eras, the prepositivist, the positivist, and the postpositivist.

The prepositivist period was from the time of Aristotle through to the early eighteenth century and is characterised by 'quiescent observation'. 'Science' progressed to the positivist era when scientists began to "reach out and touch, to try ideas and see if they worked" (ibid., p. 19). Research that is based on this paradigm is usually referred to by writers on methodology as 'positivist research'.

Positivist research is typically characterised by a nomothetic approach to inquiry. In many cases, the positivist approach seeks to 'test' certain hypotheses which are 'drawn' from existing knowledge in the field. The result of a positivist inquiry is often to produce law-like generalisations which are in essence probabilistic statements (May,

1997). This type of research output has proved useful, and continues to do so, within the boundaries of its intended purpose. A major objective of positivist research is to produce findings that may be useful for prediction and control (Lincoln & Guba, 1985).

At the levels of ontology, epistemology, and axiology — there are serious issues regarding the assumptions of a positivist paradigm, which, when made explicit cast doubts as to the paradigm's merit for use in conducting research that places emphasis on human interpretations and meanings — as has been done in this thesis.

In the information systems field, the importance of social issues and human interpretations and meaning has been emphasised by Walsham (1995). He shows that over recent years there has been an increase in the recognition of the significance of social issues associated with research into computer based information systems. Walsham refers to two research paradigms — positivist and interpretivist. The latter is similar to the 'postpositivist' paradigm and that which Walsham suggests is more appropriate for research into computer based information systems. The information management part of the research in this thesis is explicitly related to computer based information systems.

To reiterate, the assumptions of positivist research are difficult to adopt when the researcher wishes to place an emphasis on social

phenomena (as has been done in this thesis). There are four main assumptions connected with a positivist perspective (Lincoln & Guba, 1985).

The first is an ontological assumption of an external reality, that what is studied may be broken down into parts that may be examined separately. The problem is the implication that the part which is studied may be 'understood', or is 'meaningful' in isolation, irrespective of other parts. This is a difficult assumption to adopt when one wishes to study complex phenomena in which it is unlikely that any single part can provide a sufficient understanding of the whole.

The second positivist assumption relates to epistemology. The assumption is that the researcher may be separated from that being researched. In a study such as this one, where the researcher *is*, in the main, the 'research tool', it is unlikely that such independence can be claimed. One would wish to claim that 'knower' and 'known' may be separated when it is important to say that that which is researched is 'unaffected' by that which researches. This study does not try to make such a claim because in reality, and with the type of research that has been conducted, the opposite is likely to be true, the implications of which are discussed in section 3.7.5 (and 7.2.3).

The third assumption of the positivist paradigm is that what is true at one time and in one place may also be true at another time and in

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another place. This relates to the possibility for generalisation from a positivist study and the desire to produce nomothetic statements. In this research, because little is known (*a priori*) about the phenomena in question, the author considers this assumption to be an unreasonable one and has not been able to adopt it. The aim has not been to produce nomothetic statements but idiographic interpretation or *verstehen* (understanding, or meaning experienced in situations) (ibid.).

The fourth is an axiological assumption that the results of a positivist study are free of bias. It would be impossible to claim that this research is free of bias (discussed in sections 3.7.5 and 7.2.3) and so adopting this assumption is also infeasible.

When this research began the author perceived there to be several methodological problems. As was shown in the previous chapter, most of the literature in the field of information management (IM) has not been concerned with the problems of organisations who had taken holistic approaches to process management (as had Xerox). In fact the concept of process management has rarely been defined. Furthermore, the literature describes studies in which business process management has largely focused on the problems of business process re-engineering (BPR), usually up to the point of 'creating' a process-based organisation, but not beyond that point. Thus, the question of the nature of a process-based organisation, what

it *really means to be* process-oriented is foreign to existing literature. Therefore, as the 'context' for the research was unclear, the researcher decided that it was necessary to conduct this study using a methodological approach that was suited to 'exploratory' work — with the aim of providing models to allow for a deeper understanding of IM in a process-based organisation. Thus, to research IM in a process-based organisation, given that existing literature could provide little direction, that the main research data collection technique to be used was the qualitative research interview (Cassell & Symon, 1994, cf. section 3.3), — the postpositivist paradigm (at the level of its assumptions) was judged by the researcher to be most appropriate. There are four main assumptions of the postpositivist paradigm. They are virtually the reverse of those which characterise the positivist paradigm. Although the assumptions are discussed separately, they are heavily interdependent.

The first is an ontological assumption of multiple realities that are 'constructed' (Berger & Luckman, 1967). The idea is that what is studied can only be understood *in relation to* the context that it is in. For example, the importance of a computer application may be understood when we consider contextual information such as who perceives the 'importance' and how *they* perceive (or define) 'importance'. In terms of 'importance', the idea of external reality as in the positivist paradigm, that the computer application may *have* importance independent of anything else – would not make sense.

The second postpositivist assumption relates to epistemology. The assumption is that researcher and researched are inseparable. Indeed, where the research instrument is the researcher himself (or herself), there will be inevitable bias. The relation between researcher and researched needs to be acknowledged, and the research results need to be interpreted 'in that light'. This is further discussed in section 3.7.

The third major assumption is that only idiographic statements are possible. This is because the idiographic statements depend heavily on local circumstances and the contextual factors involved. Given the ontological assumption of multiple realities and that 'meaning' is perceived as constructed between (and by) the subjects and objects under study, then only idiographic statements are possible.

The fourth assumption is an axiological assumption that the research is 'value-bound'. This means that the postpositivist researcher recognises that the research is influenced by his or her own values, the methodological paradigm, and the values that distinguish the context in which the inquiry is carried out (the respondents' values for example).

Lincoln & Guba (1985) refer to inquiry that is based on a postpositivist perspective as 'naturalistic inquiry' and its appropriateness for this research is articulated in the following:

"In doing research from a naturalistic perspective, N [the researcher] is forced into the natural setting because he or she *cannot specify, without an a priori theory or hypothesis, what is important to control or even to study.* Until N has spent some time in the setting he or she cannot specify the focus ... in more than rudimentary form, or place boundaries on it. N *could not design a contrived study* (an experiment, say) because he or she *would not know what to contrive.* ... Since N cannot specify the precise form of the data to be sought, he or she must fall back on an open-ended adaptive instrument: the human being, who, like the "smart bomb," can identify and wend its way to (purposefully sample) the target *without having been precisely programmed* to strike it", (ibid., p. 43, emphasis added).

Thus, the methodology chosen for the research that is described in this thesis, has been based on the postpositivist paradigm (or naturalistic inquiry).

To clarify the discussion above, table 3.1 is presented. It summarises the assumptions and axioms of the postpositivist (naturalistic) and positivist paradigms.

Axioms About	Positivist Paradigm	Naturalist Paradigm
The nature of reality	Reality is single, tangible, and fragmentable.	Realities are multiple, constructed and holistic.
The relationship of knower to the known	Knower and known are independent, a dualism.	Knower and known are interactive, inseparable.
The possibility of generalisation	Time- and context-free generalisations (nomo-thetic statements) are possible.	Only time- and context-bound working hypotheses (idiographic statements) are possible.
The possibility of causal linkages	There are real causes, temporally precedent to or simultaneous with their effects.	All entities are in a state of mutual simultaneous shaping, so that it is impossible to distinguish causes from effects.
The role of values	Inquiry is value-free.	Inquiry is value-bound.

Table 3.1 : Contrasting Positivist and Naturalist Axioms.

Source : Lincoln & Guba (1985), p. 37.

In the following section the question of choice of paradigm and how it is related to choice of research method(s) is discussed. These decisions are interrelated and their discussion will further clarify the rationale behind the author's choice of the postpositivist paradigm.

3.2 The Choice of Paradigm and Research Method

As has been discussed in the previous section the author has conducted this research based on the principles and assumptions of a postpositivist paradigm. Research that is based on a postpositivist paradigm has been described as naturalistic inquiry (Lincoln & Guba, 1985). It has many parallels with grounded theory (Glaser & Strauss, 1967), and is also similar to interpretivist research (Walsham, 1995).

The argument for the author's choice of paradigm was presented in the previous section and was made at the level of assumptions (ontology, epistemology, and axiology). However, this choice can also be seen to be related to other factors — these are discussed in this section. The research method(s) that a researcher will use is another major choice that he or she needs to make. The choices of both paradigm and method are interrelated.

Yin (1994), referring to 'research strategy' (that which is termed 'research method' here), says that there are three conditions which influence the researcher's choice. He contrasts the case study method with four others (experiment, survey, archival analysis, and history) and relates them to the following three conditions: (1) the type of research question posed, (2) the extent of control an investigator has over actual behavioural events, and (3) the degree of focus on contemporary as opposed to historical events. Although Yin seems to

oversimplify the issue of choice, when he presents the range of choices based on the three conditions in table form (cf. table 3.2 below) this decision looks to be more complex.

strategy	form of research question	requires control over behavioural events?	focuses on contemporary events?
experiment	how, why	yes	yes
survey	who, what, where, how many, how much	no	yes
archival analysis	who, what, where, how many, how much	no	yes/no
history	how, why	no	no
case study	how, why	no	yes

Table 3.2 : Relevant Situations for Different Research Strategies.

Source: Yin (1995), p.6.

The first of Yin's 'conditions' is usually rather critical — that the type of research method may be more or less appropriate in particular situations depending on factors such as the research problem. For example, action research is most appropriate where the researcher (and researched) intend for the study itself to cause a change in that being investigated – as a direct result of the research intervention (see for example, McNiff et. al., 1996). Another type of research method, survey research, is often associated with asking the same questions to

members of a sample taken from a pre-defined population — with the aim of generalising for the entire population (a positivist paradigm would support this approach), (see for example, Blaxter et. al., 1996).

Certain research methods will be more or less appropriate depending on (especially), 1) the philosophical paradigm that underpins the research, and 2) that which is being researched. If for example, the researcher adopts the positivist paradigm (its assumptions) as his or her philosophical approach, and he or she wishes to conduct a study of perhaps 500 firms, then the survey method may be fitting. It is unlikely that the in-depth case study method could be applied to each of the 500 firms because the intense resources that are needed for case study research in terms of time, or funding (for example) are not likely to be available.

Similarly, as with the study conducted for this thesis, where the aim has not been to test hypotheses and the author has not been able to begin with an *a priori* theory, a positivist paradigm and any methods that are based on 'repeatable experiments' would not be suitable. In this case the phenomena to be researched were little understood. For example, at the beginning of the study the author could not identify any other firms which were similar to Xerox in respect to process management because there was little indication at that time (in academic publications) of what process management actually was. The author decided to conduct 'exploratory' work. Thus, the author

was forced to look for methods that are appropriate to that mode of investigation.

A single in-depth case study approach was chosen by the author as an appropriate research strategy given these circumstances (case study research is discussed in section 3.4). In this respect, the argument regarding choice of paradigm and research method is 'circular'. Kuhn was the first to identify this problem. He asserts that the choice of paradigm results in a circular argument because the paradigms are incompatible. Furthermore, Kuhn maintains that this argument can not be 'scientifically' resolved, "... whatever its force, the status of the circular argument is only that of persuasion" (Kuhn, 1970, p. 95).

However, as has been stated above, this author has chosen a single-case approach. The rationale (or persuasive argument) is that a positivist paradigm does not fit where: the unit of analysis is to be the entire organisation; it is not reasonable to assume that researcher and researched are independent; it is not reasonable to assume that the research will be value-free; and it was not possible to decide to study smaller units of analysis (within Xerox) as the phenomena in question were not understood. The quotation from Lincoln & Guba (1985) on page 78 is again most appropriate in emphasising this argument.

What should be clear from the discussion so far is that any researcher needs to make choices regarding paradigm, research method, and data collection techniques (data collection techniques are discussed in the following section). These choices are to some extent constrained by, for example, the phenomena under study, the aim(s) of the researcher, the level of research access available to the researcher (access to data, people to interview, documents etc.) and the supply of other resources (funding, time etc.), Many such variables need to be considered by the researcher and a balanced choice needs to be made. As can be seen by this list of example constraints (above), some decisions are philosophical and others will be practical.

The process of decision making and thought which the author went through in deciding upon his choice of research paradigm and method for this research is summarised in figure 3.1 below.
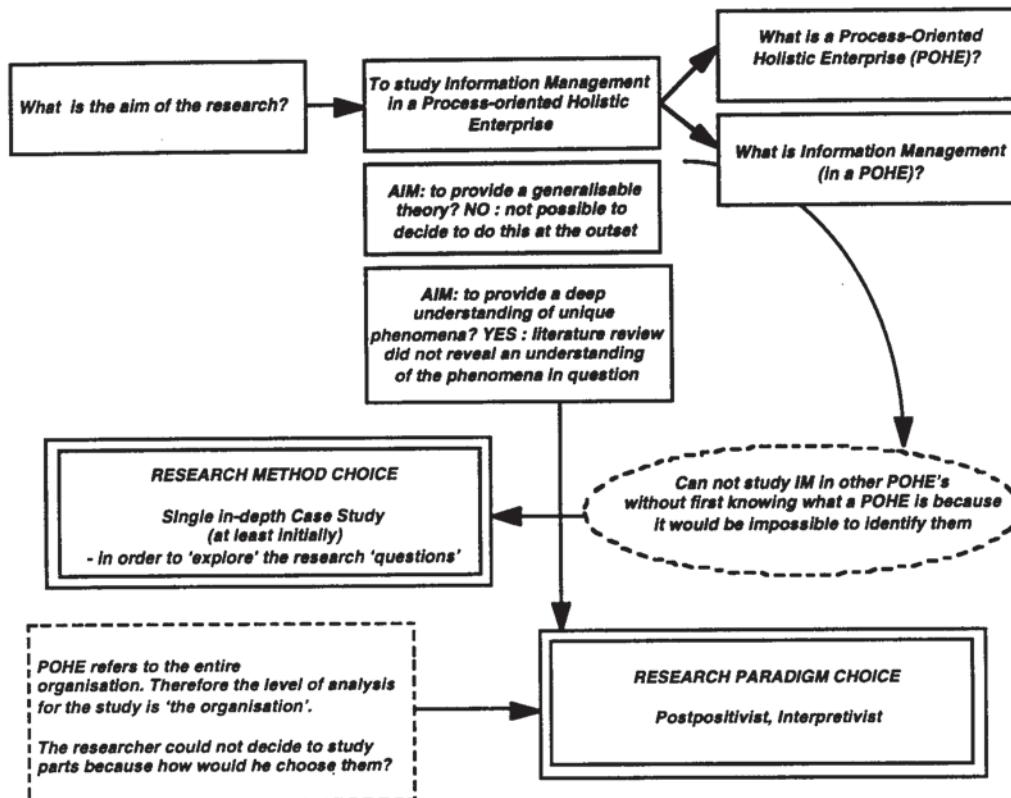
Figure 3.1 : Choice of Research Paradigm and Method.

In summary, two main choices were made. One relates to the research method, and the single in-depth case study was chosen; the other relates to the research paradigm, and a postpositivist approach was selected. In the following section the data collection techniques which were used in this study for the collection of the research data are discussed.

3.3 Data Collection Techniques

This study of information management in a process-based organisation has been an exploratory one. The exploratory mode of research was chosen by the author as little was known about the

phenomena in question. The author needed to make a decision with regards to the data collection techniques.

In choosing which data collection techniques to use, the 'type' of data that the researcher would like needs to be considered. As has been established in the earlier part of this chapter, the research approach that was chosen for this study is postpositive. One of the objectives of postpositivist research is (usually) to generate theory from the data that are gathered. The nature of that data and how it is gathered can vary considerably.

The data that is associated with postpositivist research is often qualitative. This does not mean however that quantitative data can not be used or are not appropriate. The type of study does not necessarily imply the use of a particular type of research data either. Hammersley states that, "One can distinguish between studies that are primarily exploratory, concerned with description and with generating theoretical ideas, and those that are more concerned with testing hypotheses. But these types of research are not alternatives ... Nor is the former necessarily qualitative and the latter quantitative" (Hammersley, 1996, p. 166).

Others seem to have less flexible views with regards the type of data that is appropriate for a particular kind of study. For example, Marshall and Rossman (1995) conducted an exploratory study of hospital

culture and are quite assertive regarding the type of data they believed to be appropriate — "Engaging in exploratory research where the relevant variables had not been identified and uncovering the tacit aspects of organizational life demanded qualitative methods" (p. 10).

Davenport and Beers (1995) studied twenty organisations using a structured interview approach. Regarding qualitative and quantitative data they comment, "Because our respondents did not always view their activities in the terms of our questions ... we felt that quantitative analysis of the survey results was not appropriate" (p. 60).

Pettigrew's (1985) position on this debate is pertinent. "The important thing to recognise ... is not whether researchers can be divided along the qualitative - quantitative dimension and therefore to give exclusive credence to differences in method, but to ask more basic questions about differences in rationalities, assumptions, and orientations of researchers as they influence theory and method, and therefore the link between theory, method, and practice" (p. 54). These basic questions are what this chapter attempts to answer.

The study presented in this thesis has been based on qualitative data. Research that predominantly uses qualitative data is referred to by many writers on research method as 'qualitative research' (see for example, Richardson, 1996; Denzin and Lincoln, 1998). There are many types of qualitative research and many data collection

techniques that are associated with them. Possible types of research that can be conducted using qualitative data collection techniques include: case study research, surveys, experimental research, and action research (see for example, Blaxter et. al., 1996; Gummesson, 1988).

Among the unique strengths of qualitative methods is the fact that many of them stress and aim to take account of the research context, setting, and the participants' frame of reference. This is congruent with the postpositive approach.

When the author began this research he met with a Xerox manager who provided an in-depth description of the company and how it is structured. When the manager was asked by the author, "How do you know this?" the response was, "I just know it". She indicated that one could not gain an understanding of what she had described by referring to a document, but only through experience with the company. The manager added, "Few people have this level of understanding of how things work here, because they don't have the overall view, they understand their part only". Thus, the author realised at an early stage, that the qualitative research interview was going to be necessary for eliciting the type of data that may be useful in addressing the phenomena under investigation. One could not pick up a company guide to understand how Xerox was organised or operated. It was necessary to build a picture based on people's

understandings — the author needed to ask them. Qualitative research interviews are discussed in section 3.3.1.

During the early stages of the author's interviewing at the case site, he was offered an in-depth level of involvement. The opportunity arose for the author to assist in a project which was to explore Business Process Owners' (BPOs) future requirements and to propose a strategy for aligning Information Management activity with these. This unexpected opportunity allowed the researcher to engage in participant observation. This method of research allows the researcher to study events in their actual context. Participant observation is discussed in section 3.3.2.

The third source of data that has been used in this study is documentary. Documentary evidence was available to the researcher from various sources. Often, interviewees supplied documents relating to what they were describing or what they believed would be useful to the researcher. Other sources included the Xerox Intranet, Electronic Mail (company 'Broadcasts'), and documents generated by the members of project teams that the author was involved in. Documentary evidence is discussed in section 3.3.3.

3.3.1 Qualitative Research Interview

There are many kinds of qualitative research interview (see, King, 1994). Interview types are often distinguished by their level of structure. The two main types are the structured interview and the unstructured interview. Structured is where the questions have been determined in advance by the researcher and the interviewee is bound to answer those questions only. This type of interview is suitable where the researcher is able to define in advance what he or she thinks are the relevant questions.

In contrast, the unstructured interview is more suited to exploratory work because questions cannot be defined in advance due to the lack of prior understanding of the phenomena in question. Unstructured and semi-structured interviews have been used in this study.

In an unstructured interview, the questions (if any) may be asked in any order and the interview is influenced by the actual situation encountered by the interviewer. It is an extremely flexible approach to data collection because it allows the interviewer to explore any unexpected ideas that are raised by the interviewee. The interviewee is free to talk about whatever they wish, usually within the subject area that the researcher has indicated that he or she is interested in. One of the main aims of the unstructured interview is to elicit what the informant conceives as being important — and not what the

interviewer 'thinks' might be important. The author's experience in conducting this type of interview in practice is discussed in section 3.7.

3.3.2 Participant Observation

As has been mentioned in section 3.3, the opportunity arose for the author to conduct research as a participant observer. The author had joined the Business Processes and Information Management (BP&IM) group at Xerox. This level of involvement at the case site may be seen as a type of consultancy (Gummesson, 1988) because the researcher had assisted Xerox people with various projects. These included:

- the planning of Information Management strategy for the Europe, Africa & Middle East (EMEA) region,
- the alignment of Information Management activity with Business Process Owner's future requirements,

and • the selection of a business partner for a major information management project.

Participant observation provided an excellent means for the researcher to form a deep understanding of the case under study and to collect context-specific data. The participant observation method gives the opportunity for the researcher to "immerse themselves in the day-to-day activities of the people whom they are attempting to understand" (May, 1997, p. 133).

Malinowski (1985) studied the culture of Trobriand islanders and provides a good definition of participant observation, one that matches precisely the experience of the author in conducting the research for this thesis. The observer, Malinowski believes, becomes integrated through regular contacts over a long period. "This observer would become involved in daily life and customs, while trying not to alter them by his or her presence or through the observational process. The use of key informants, with whom close contact is maintained, makes it possible to collect remarks in situ, which could shed light on direct observations" (in, Hamel et. al., 1993, p. 3). Using this method, the author has spent in excess of twelve months investigating the case site. The length of time spent investigating the case site is extremely important to this mode of research.

"... we believe it to be the case that the probability that findings (and interpretations based upon them) will be found to be more credible if the inquirer is able to demonstrate a prolonged period of engagement (to learn the context, to minimize distortions, and to build trust), to provide evidence of persistent observation (for the sake of identifying and assessing salient factors and crucial atypical happenings), and to triangulate, by using different sources, different methods..." (Lincoln & Guba, 1985, p.307).

The data that has been collected through this mode of research includes:

- the researcher's field notes of observations,

- the researcher's notes pertaining to the work he was involved in (e.g. meeting notes),

and - hundreds of documents, including memos, company manuals, training documents, copies of presentations, project plans etc.

3.3.3 Documentary Evidence

Documentary evidence is research data in the form of a document. Definitions of what constitutes a document vary but the wide definition by Scott (1990) is sufficient, "... a document in its most general sense is written text". We may add to this 'and/or graphics'. This type of research data may arise from many sources. In this research documents were collected from a variety of places. Often informants would provide documents to support what they were explaining, or they would provide the researcher with documents that they felt he may be interested in (based on their conversations). The participant observation mode of research, which is discussed in the previous section also 'produced' many documents (field/observation notes, meeting notes, project notes, memoranda, meeting agendas, proposals, progress reports, and other internal documents).

Much of the documentary evidence used in this research has contained qualitative data. One advantage of documentary evidence is that it is a source of data relating to historic events. As such we may learn a great deal about what happened in the past — possibly more than that which informants can recall.

However, documentary evidence needs to be considered with caution. A document may not necessarily be an accurate record of what it describes. We rely on the author's interpretation of what he or she has written about. Furthermore, the real 'motive' for the publication of a particular document may not be obvious. The author may have 'distorted' the content in order to convey a particular message. This problem is referred to by May (1997) as 'authenticity'. Thus, researchers using documentary evidence (especially historic documents) need to take care. Practical use of documentary evidence in this research is discussed in section 3.7.

3.3.4 Data Collection Techniques - A Summary

In summary, three main data collection techniques have been used in this research. They have been chosen because of their appropriateness or fit with the research paradigm and method and because of the practical opportunities and circumstances which the author faced. Figure 3.2 summarises the techniques that have been used.
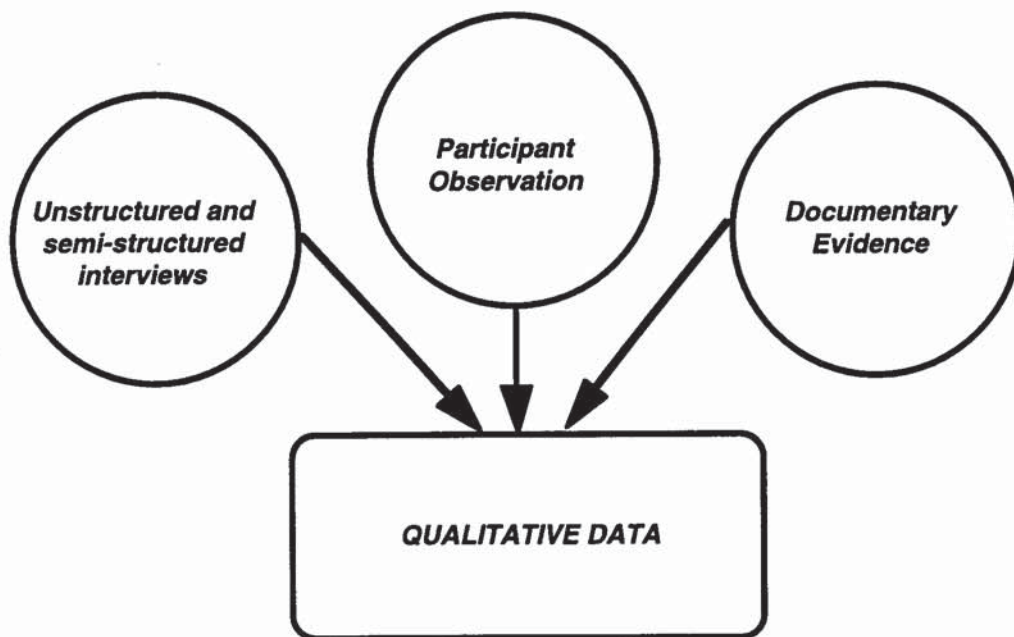
Figure 3.2 : Data Collection Techniques Used in this Study.

The strengths and weaknesses of these techniques are summarised in table 3.3 below. The author's experience in using them is discussed in section 3.7.

Source of Evidence	Strengths	Weaknesses
Interviews	- targeted, focuses directly on case study topic - insightful, provides perceived inferences	- bias due to poorly constructed questions - response bias - inaccuracies due to poor recall - reflexivity-interviewee gives what interviewer wants to hear
Participant Observation	- reality, covers events in real time - contextual, covers context of event - insightful into interpersonal behaviour and motives .	- time-consuming - selectivity, unless broad coverage - reflexivity, event may proceed differently because it is being observed - cost, hours needed - bias due to investigators manipulation of events
Documentary	- stable, can be reviewed repeatedly - unobtrusive, not created as a result of the case study - exact, contains exact names, references, and details of an event - broad coverage, long span of time, many events and many settings	- retrievability, can be low - biased selectivity, if collection is incomplete - reporting bias, reflects (unknown) bias of author - access, may be deliberately blocked

Table 3.3 : Strengths and Weaknesses of Data Collection Techniques Used.

Source : Yin (1994, p.80).

As stated, the majority of the data that has been 'gathered' using these techniques is qualitative. The manner in which these data were analysed is discussed in section 3.6. In the next section, the theory of

case study research, the 'method' that has been used in this study (cf.

section 3.2), is discussed.

3.4 Case Study Research

The earlier part of this chapter has shown that the case study method was chosen by the author for this study. The rationale for making this decision was shown to rest on several arguments. The main thrust of these are that the case study method provides a most appropriate fit with the study's underlying methodology (paradigm) and the premises regarding the study's purpose — to provide a deep understanding of process management and of information management within that. In research conducted by Davenport and Beers (1995) into process management, their comment regarding methodology is most pertinent;

> "Both the semistructured interviewing and the case study method are consistent with the exploratory analysis appropriate to any area of emergent management practice such as this" (p. 61).

In the next part of this section the definition of a case study is looked at. This is incorporated with a discussion of the various types of case study and the issues which need to be considered when choosing from them.

3.4.1 Definition of a Case Study

The discussion in the earlier part of this chapter might appear to the reader to be slightly confused when referring to 'case study'. The

confusion arises because the term 'case study' may be interpreted in many ways. This section is intended to clarify what is meant by 'case study' in this thesis.

Hamel et al (1993) introduce the debate concerning the status of the case study as a method or an approach. They postulate that case studies use various methods (as in this research — interviews, participant observation etc.), but that the term 'case method' implies it is a method. Their conclusion is that the case study is better seen as an approach. Hamel et al define the case study rather loosely as, "...an in-depth study of the cases under consideration" (ibid., p. 1).

Yin (1981, 1994) who has written extensively about the theory of case study research defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially [useful] when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p. 13). Emphasis is placed on the 'real-life context' and the assumption is that what is studied may be better understood in this 'natural' setting. Using Yin's definition for the research described in this thesis, the phenomenon is Information Management and the context is Process Management. The aim here is to understand both, and the boundaries are certainly not clear.

Eisenhardt (1989) provides definition for the case study through an explanation of its purpose and aims. "Case studies typically combine

data collection methods such as archives, interviews, questionnaires, and observations" (p. 534). This complements Hamel et al's view that the case study is an approach *within* which methods are used. Eisenhardt (ibid.) continues to define the case study at the level of its objectives; "case studies can be used to accomplish various aims: to provide description (Kidder, 1982), test theory (Pinfield, 1986; Anderson, 1983), or generate theory (e.g., Gersick, 1988; Harris & Sutton, 1986)," (ibid., p. 535).

Much of Yin's writings lean toward the objective of testing theory and seem to be based on positivist ideas. The research in this thesis uses the case study approach to *generate* theory. Thus, combining these ideas to form a working definition that is suitable for the research in this thesis, the following may be proposed:

> 'The case study is a research approach in which several research methods or data collection techniques are employed. Emphasis is placed on studying phenomena in their natural context because this is where they may be adequately understood'.

This working definition is clearly based on the assumptions of a postpositivist paradigm (cf. section 3.1), and thus needs to be interpreted in that light. Following on from this working definition, in the next section the number of 'cases' and the 'level of analysis' are

brought into consideration. Together they represent the 'case study design'.

3.4.2 Choice of Case Study Design

Yin (1994) provides a good discussion of what he refers to as 'research design' for the case study approach. Basically, Yin presents the starting assumption that a single case study differs from a multiple-case study (one where more than one case is considered) with respect to research design. The other dimension that distinguishes the research design is the unit of analysis. Again, Yin proposes two choices, single and multiple. Combining these dimensions the following 2 X 2 matrix shows the possible research designs.

	single-case designs	multiple-case designs
holistic (single unit of analysis)	TYPE 1	TYPE 3
embedded (multiple units of analysis)	TYPE 2	TYPE 4

Figure 3.3 : Basic Types of Designs for Case Studies.

Source : Yin (1994), page 39.

Each design (Type 1-4) is appropriate under certain circumstances and the researcher needs to make decisions about the two dimensions. So two questions apply : Will the study look at a single case or multiple cases?; and will the unit of analysis be single or

multiple? The answers to these questions 'define' the research design. It is possible however, as with the research described in this thesis, that the 'type' may shift during the study. Yin recommends that this should be avoided if the research questions change, in which case he suggests starting again with a new design. This is based on positivist thinking — that the study may be contrived in advance.

In the research described in this thesis, the author began conducting a Type 1 study (this was his intention). But as events unfolded and various opportunities arose, it became a Type 2 study. Yin suggests that a single case design is appropriate in three circumstances; when the case represents the critical case in testing a well formulated theory; when the case represents an extreme or unique case; or when the case is the revelatory case.

The research in this thesis was based on a single case approach because the author believed that the Xerox model of process management was probably a unique case. Little existed in the literature to suggest that other firms managed as extensively by process as Xerox does (cf. chapter 2). Furthermore, the extensive access to the research site that the author established provided the opportunity for the case to be revelatory — no other researchers have had the chance to investigate these phenomena in this context, and in such depth.

The question of whether the study described here was to utilise a single or multiple unit of analysis design was undecided at the outset. As the study progressed the author had the opportunity to carry out research as a participant observer for three 'projects' and he also conducted additional research through interviews and the collection of documentary evidence. These 'projects' may be perceived (in Yin's terms) as four 'levels' of analysis, and thus the study in this thesis can be considered to be a Type 2 study - 'single case design, embedded'.

The author's intention was to conduct a Type 1 study because the nature of the phenomena in question (process and information management) are likely to require a holistic view. To study parts of these may not be meaningful. However, in reality it is not possible to study the entire case in any relevant depth and the study of parts are inevitable. This argument rests upon the perception of what constitutes a part and what may be considered 'a case'. However, in whichever way the research in this thesis is classified, as Type 1 or Type 2, it should be noted that the 'projects' or 'units of analysis' that were mentioned above, were concerned with organisation-wide (holistic) issues and thus the distinction between types becomes blurred.

Further confusion arises because the author also collected data from two other sites within the case company — from Xerox France and Xerox UK (the main site was the Xerox Ltd. headquarters at Marlow, in the United Kingdom (UK)). Can the study then be considered to be a

multiple case? The matter is one of definition and has not had any serious effect on the manner in which the research has been conducted. This is because the research design has been emergent and not formulated in advance — which is congruent with the postpositive paradigm that was chosen. Yin's idea of the multiple-case investigation is that the study is replicated at each site — with the intention of producing similar or contrasting results. Therefore, the study in this thesis would not in-fact qualify as a Type 3 or 4 study because this did not happen — and was not the researcher's intention. The additional sites were chosen to provide triangulation of findings and a greater depth of understanding.

Thus far, the discussion in this chapter has provided the author's rationale for the choice of paradigm, method or approach and data collection techniques. The following section deals with the issues of validity, reliability, and objectivity.

3.5 Issues of Validity, Reliability & Objectivity

Validity (internal and external), reliability, and objectivity are criteria that are often used for judging whether research findings are consistent, generalisable, and free of bias. In some ways they may be seen as measures of confidence or assurance.

These criteria are used by researchers who adopt the positivist paradigm. They are not appropriate criteria for 'judging' postpositivist works (such as the research in this thesis) because of the differences in the assumptions at the level of paradigm — ontology, epistemology, and axiology (cf. section 3.1 & 3.2). The analogous criteria that are appropriate to 'assessing' a postpositivist study are credibility (for internal validity), transferability (for external validity), dependability (for reliability), and confirmability (for objectivity), (Lincoln & Guba, 1985).

Internal validity can be defined as the extent to which variations in a dependent variable (or the outcome) can be attributed to a controlled variation in an independent variable. This rests on the positivist assumption of external reality. The postpositivist position regarding ontology (as was discussed in section 3.2), is that reality is a multiple set of mental constructions — in humans' minds. Thus, the concept of internal validity does not make sense. The analogue is credibility. The researcher "must show that he or she has *represented those multiple constructions adequately*, that is, that the *reconstructions* ... that have been arrived at via the inquiry are *credible to the constructors of the original multiple realities*" (ibid., p. 296, original emphasis).

The criterion of external validity refers to the extent to which research results are generalisable, that is, they will apply to other samples of the same population. The ontological basis is to produce nomothetic statements that are time and context free. The postpositivist rejects this

ontological assumption in favour of multiple realities — generalisation is not possible, and on this basis does not make sense.

The postpositive analogue is transferability. This refers to the applicability of the postpositivists' results in another context. Transferability is something that the postpositive researcher cannot make a judgement about, unless he or she knows a great deal about the 'other' context. Lincoln & Guba (1985) provide a most poignant discussion. They suggest that the postpositivist researcher:

"...can only set out working hypotheses together with a description of the time and context in which they were found to hold. Whether they hold in some other context, or even in the same context at some other time, is an empirical issue, the resolution depends upon the degree of similarity between sending and receiving (or earlier and later) contexts. Thus, the naturalist [postpositivist researcher] cannot specify the external validity of an inquiry; he or she can only provide the thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility" (ibid., p. 316).

The criterion of reliability refers to the extent to which a study can be considered to be predictable and consistent. This is normally shown by repeating the study under similar conditions to obtain similar

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results. Again, this idea rests on the assumption of external reality and is thus not congruent with a postpositivist perspective.

The postpositivist researcher substitutes this criterion with 'dependability'. Lincoln & Guba outline several routes to dependability but the one which is most straightforward is triangulation. This is where different research methods (data collection techniques to use the terminology here) are used on the same problem (Gummesson, 1988). Where these produce the same results, dependability is improved.

Finally, the criterion of confirmability is the postpositivist analogue for objectivity. This can be attained in the postpositivist sense by maintaining what Lincoln and Guba refer to as the 'confirmability audit'. This in its fullest sense is an extremely complex auditing procedure, but the basic types of data (or categories for the audit) which should be kept by the postpositive researcher can be summarised thus;

- raw data (e.g. documents, interview transcripts, field notes),
- data reduction and analysis products (e.g. summaries of notes, working hypotheses, data summaries),
- data reconstruction and synthesis products (e.g. conclusive findings, case reports),
- process notes (e.g. methodological notes, audit notes),
- materials relating to intentions and dispositions (e.g. research

proposal, personal notes),

and • instrument development information (e.g. interview schedules, case study protocol), (ibid.).

The notion is that an interested party could look back through the audit to 'see' how a research conclusion was arrived at. An additional assumption would be that the audit can provide enough information so that if the study were to be repeated, similar results would emerge. This would not of course be possible in practice and is in any case not compatible with postpositivist assumptions.

Much of the discussion of criteria has thus far been based on Lincoln and Guba's (1985) work. This is because the author believes that these ideas are more useful for the study of social and organisational life and phenomena, than are positivist approaches. Yin (1994) however, who writes about case study method — that which has been used in this research — presents similar arguments to Lincoln and Guba's (1985), although his treatment is far more basic.

Yin (1994) would suggest that external validity be satisfied using what he terms "analytic generalisation". This is where a previously developed theory is used as a template with which to compare the empirical results of the case study. This does not apply to the research in this thesis because it is not compatible with the axioms that have been adopted (cf. section 3.1).

To conclude this discussion of criteria upon which research may be 'judged', the author believes that the following quotation from Lincoln and Guba (1985) is highly germane:

"... [postpositivist] criteria of trustworthiness are open-ended; they can never be satisfied to such an extent that the trustworthiness of the inquiry could be labelled as unassailable. This fact stands in marked contrast to that of conventional [positivist] inquiry. There it is putatively possible to arrange things so that one can address questions to "Nature Itself" and have Nature's direct and unaltered reply. The conventional inquirer who can demonstrate that he or she has randomized or controlled all confounding variables, selected a probability sample that is representative of a defined population, replicated the study, ... and secured intersubjective agreement can claim absolute trustworthiness— the inquiry is, within that closed system, utterly unassailable. One is *compelled* to accept its trustworthiness. But naturalistic [postpositivist] inquiry operates as an *open* system; no amount of member checking, triangulation, persistent observation, auditing, or whatever can compel; it can at best *persuade*" (p. 329, underlined emphasis added, original emphasis in italics).

The following section discusses the data analysis strategy that was developed during this research. Many of the procedures which would provide for better credibility, transferability, dependability, and confirmability have been incorporated in this 'strategy'.

3.6 Data Analysis Strategy and Techniques

The aim of this section is to describe the data analysis strategy and techniques that were used for the research in this thesis. At this point the discussion in this chapter moves from the theoretical to the pragmatic. The data collection techniques that were used have been set out in section 3.3 (see figure 3.2).

The research presented in this thesis has been exploratory. As such, the approach to building theory may be referred to as an inductive approach. The theory is 'grounded' in the data — Glaser and Strauss (1968) call this 'grounded theory'. The idea of grounded theory, emerged from their work in the 1960s. They used the term 'grounded theory' to refer to the idea that theory is generated by (or grounded in) an iterative process that involves the continual sampling and analysis of qualitative data. The process is a constant interplay between data and the researcher's developing conceptualisations, 'a flip-flop between ideas and research experience' (Blumer, 1979).

The method that Glaser and Strauss propose for analysing qualitative data is called the 'constant comparative method'. The data analysis for the research in this thesis has been based on this method. It initially involves setting up 'categories' in which to sort the data. This process is referred to as 'coding'. The categories will either 'emerge' from the data or be constructed by the researcher. For example, preliminary coding for this research involved categorising the data into three areas — information management, process management, and both together. These were the 'areas' that the researcher set-out to investigate. The following extracts from the research interviews serve as an illustration of this preliminary coding.

CODED AS INFORMATION MANAGEMENT

"... I thought that was one of the ideas of going with someone like Oracle, was that, you know, at least everything could talk to each other, or, and you know, there's a lot of stuff you can do over the Internet, that erm, I mean that's you know, you can actually use the Internet as this means of communication, can't you? - which we don't seem to do very effectively...".

CODED AS PROCESS MANAGEMENT

"... There's no product so far that we've launched, that you know, from concept to launch has actually gone through the Time to Market process. It's also taking them a lot longer to roll it out than they thought it was going to, which I find a bit ironic, because it's meant, you

know, Time to Market should be quick, and they say 'well bear with us', you know, 'this is not a quick process', and then you start to sort of question, well, what is the message? ...".

CODED AS PROCESS AND INFORMATION MANAGEMENT

"... I'm not sure who has the responsibility and the budget if you like to support the IM specifically for Time to Market. I mean I guess it comes out of this corporate engineering centre, you know, it must be part of their budget. But I mean, how that then sort of, what systems they're looking at and how they interface with other systems, I've no idea ...".

In principle, the early part of this 'coding' process is what Miles and Huberman (1994) refer to as data reduction. It is one of the three components of data analysis that they describe – the other two are data display (data organisation and assembly) and the drawing of conclusions.

Subsequent coding of the data was conducted to identify 'semantic relationships'. This was based on Spradley's (1980) typology of 'relationships'. These are:

- strict inclusion — X is a kind of Y;

- spatial — X is a place in Y, X is part of Y;

- cause-effect — X is a result of Y, X is a cause of Y;

- rationale — X is a reason for doing Y;

- location for action — X is a place for doing Y;

- function — X is used for Y;

- means-end — X is a way to do Y;

- sequence — X is a step (stage) in Y;

and   • attribution — X is an attribute (characteristic) of Y (ibid., p. 93).

These 'semantic relationships' have been invaluable in helping to code that data in ways that allow an exploration of relationships. Examples of data that were coded using Spradley's typology are:

RATIONALE : "... Because the idea of it was that it was for the user only, for them to monitor their own progress — that's the whole point of empowerment ...".

CAUSE EFFECT: "... If it falls over, [it's a] big cause of aggravation, but it doesn't stop the business on-line...".

FUNCTION: "... and people like George will look at a report from one country which shows fantastic results and then look at the same report for everybody else and go 'Why isn't everybody else doing that? - What's wrong with it?' ..." [name disguised].

MEANS-END: "... What we were trying to do is trying to get the UK into the EWG [Empowered Work Groups] hold so that we only had to maintain one system".

As the coding process continues, the categories become saturated. This is where any additional coding of the same category provides little or no new insight and the data in the category becomes repetitive. When categories are saturated and their properties understood, relationships become more apparent in the data and the researcher can begin to write the explanatory theory. The findings from this research are presented in chapters four (Process Management) and five (Information Management), and they are brought together in chapter six. To simplify the data analysis, the data was divided into four segments. Each of first three segments relates to a 'project' that the author was involved in (the planning of Information Management strategy for the Europe, Africa & Middle East (EMEA) region, the alignment of Information Management activity with Business Process Owners' future requirements, and the selection of a business partner for a major information management project). The fourth segment represents data collected specifically for the research (observations, documents, and qualitative interviews).

The following sections describe the author's experience in using the research methods that have been discussed in this chapter.

3.7 Research Methods in Practice

In section 3.3 of this chapter, the rationale for choosing the three main data collection techniques was presented. In the following sections these techniques are discussed with the aim of providing the reader with an insight into how the author used them in practice. The discussion is in no way an exhaustive account of 'what happened', but an attempt to provide the interested reader with a 'feel' for what it is like to *really* use these methods.

3.7.1 Qualitative Interviewing in Practice

Twenty qualitative research interviews were conducted for this research. Three of these were associated exclusively with the projects in which the author participated. From the remainder, five were exclusively intended for the research and the others were mixed — that is, part dedicated to one of the Xerox projects and part intended for the research only. The interviews (and parts of) which were associated with the Xerox projects did not produce data that was in any way less 'valuable' than those which were 'intended' for use in this research.

The interviews, or parts of, which were intended to collect data for the research, were semi-structured in nature. The respondents were 'free' to discuss whatever they wanted after the author introduced his areas of interest. Often, the author would begin these interviews, (or parts of)

by assuring confidentiality and anonymity of the respondent's identity. The author's introduction was normally as follows:

> "I am trying to understand what process management is at Xerox and within that process 'view of the world' how IM operates? — What is IM?"

Effectively, the 'introduction' differed depending on the situation, but in general the aim was to present a question or questions that were similar to saying: 'Tell me about Process Management, and tell me about Information Management'. This allowed the respondent to focus on their interpretation of the phenomena under investigation. It allowed the author to build a picture of the respondents' understanding of process and information management, their accounts of events, and their responses [to] and interpretations of those events.

All of the interviews were tape recorded using a battery operated mini tape-recorder. Most of the interviewees did not seem to be 'distracted' by the tape-recorder and thus it acted as a relatively unobtrusive means of producing an accurate record of the interview. Occasionally the interviewee asked the author to switch the tape-recorder off so that they could convey what they perceived as extremely confidential information. Most of the interviews lasted for ninety minutes, but some were as long as one hundred and eighty minutes.

All of the interviews were fully transcribed using a pedal controlled playback machine and word-processor software running on a personal computer. The printed transcripts amount to approximately eight hundred pages of single-line spaced text. The transcribing process was extremely time consuming. On average, the author spent nine hours to transcribe a ninety minute interview. It took longer when the sound quality of the recording was poor. Poor sound quality was usually caused by background noise from air-conditioning units. Some respondents 'mumbled' from time-to-time, and this also made transcribing difficult. When both the respondent and the interviewer spoke at the same time, the dialogue was difficult to distinguish. However, in general, the recording and transcribing of interviews has produced relatively accurate records of invaluable research data.

During the interviews, the author also took hand-written notes. This was done for several reasons, but in particular to ensure that some record was kept in case of failure of the tape recording. Note taking also gave the respondents an indication that the interviewer had 'absorbed' what was said. The notes were useful during the interview because they helped remind both the interviewee and interviewer of what had been discussed. The interviewer used the notes to summarise and feed-back to the interviewee what he had understood. This was critical because it allowed the author to 'check' that he had a 'valid' account of the interviewee's constructions.

Also during the interviews, the respondents sometimes suggested other people whom they thought that the author should interview to gain further understanding. Respondents sometimes provided the author with documentary evidence to support what they were describing, or to help explain or provide additional insight into what they were saying. In some cases, documents were provided after the interview because the respondent did not have them to hand.

Additional interviews were conducted by the author at Xerox France (at Aulnay in Paris) and at Xerox UK (at Uxbridge). In both these places, the author spoke with senior IM people to explore information and process management. The author also intended to interview management at Xerox in Germany, but the German IM manager declined suggesting that he had no time. Xerox France, UK, and Germany were chosen as additional sites because they were often referred to by Xerox people working at the Marlow headquarters. These three countries represent the largest of the 'operating companies' (OPCOs), (in terms of volume of trade as compared with the other XL OPCOs).

On the whole, the semi-structured qualitative research interviews have been an invaluable data collection technique for this research. The author has been extremely fortunate because he had almost perfect research access and was able to interview practically anybody at the case site(s).

3.7.2 Participant Observation in Practice

As has been stated several times, the author was fortunate in that he was able not only to interview Xerox people, but also to participate in their daily life. During a thirteen month period of involvement, the author was a member of three project teams (the planning of Information Management strategy for the Europe, Africa & Middle East (EMEA) region, the alignment of Information Management activity with Business Process Owners' future requirements, and the selection of a business partner for a major information management project).

This involvement with the case site allowed the author to develop an understanding of how some aspects of process management and information management operated in practice. As all of the three projects dealt with XL-wide management issues, they provided observations that were at the level of analysis of the organisation.

Most of the author's time at the case site was spent in the Business Processes and Information Management group at the Marlow headquarters. The author was provided with office space, a telephone and a personal computer — with access to the Xerox Intranet and a Xerox electronic mail account. Basically the author was provided with the same facilities as Xerox employees. He was issued with a 'contractor's' identity card which gave him free access into and out of the Marlow building.

Participating in daily life at Xerox was made extremely easy for the author. He quickly felt accepted as an 'insider' and soon began to learn the 'Xerox language'.

The author took field-notes during his visits to the case site. Some of the notes related directly to the project work (e.g. minutes of meetings, action plans, records of 'brain-storms' etc.), and others were taken as research data. The field notes were transcribed and added to the research database (see section 3.7.6). In total, the author visited the case site eighty times. This provided ample opportunity for the author to become acquainted with the main case site and to develop a good understanding of the phenomena in question (process and information management).

The main problem that the author experienced in researching as a participant observer was that because he did not intend to conduct action research he needed to try to participate in ways that would not cause change in what was being studied. This was difficult to do because the researchers' 'advice' was sometimes sought by other members of the project teams. In fact, on many occasions, Xerox people expressed interest in the author's view because they perceived him as a 'newcomer' and someone who would not be influenced by past events (that he had not experienced).

May (1997) is clear in acknowledging the strenuous requirements of this technique: "... participant observation is the most personally demanding and analytically difficult method of social research to undertake" (p. 138). On the whole however, the participant observation mode of research provided an excellent opportunity to investigate the case site in depth. Because the researcher was given such good access, it was an extremely flexible method and one that provided excellent support for exploratory work.

3.7.3 Collecting Documentary Evidence

The collection of documentary evidence was both intended and consequential. Documents were collected as part of the author's 'participation' at the case site, and others were collected explicitly for the research. The documents include project plans, company manuals, process guides, memoranda, copies of electronic mail, strategic plans, reports, presentations, etc.. Many of the documents are on paper but a large number are in electronic format (stored on computer). These documents are in fact several thousand pages of text and graphics.

The management of such a large number of documents for the research is a difficult task. The researcher produced 'rules' for the naming of documents so that they could be linked to the research

database (see section 3.7.6). The two main document naming rules are as follows:

- Documents supplied by interviewees:

    SURNAME/DATE/DOCUMENT NUMBER

    e.g.   SMITH/16-7-97/1

- Other documents on something in particular (e.g. Xerox Business Architecture):

    IDENTIFIER/DATE

    e.g.   XBA/16-5-97

The document 'name' was written on each (paper) document and it was linked as an 'off-line' document to the research database. Electronic documents were normally imported directly into the database and given an appropriate document name.

Documentary evidence is an extremely difficult type of research data to manage. This difficulty arises from the fact that a very large volume of data has been collected and this data is of many different formats. As was stated previously (section 3.3.3) a major problem can be that the bias of the author(s) is often unknown.

However, documentary evidence has been advantageous in that it has provided a wealth of permanent data. In many cases the documents have provided the author with an understanding of something that

could not be totally described by a verbal account (e.g. from an interviewee) because of its complexity (for example, a several hundred page guide to a core process area). Documents have also given the author good insight into how things were in the past (for example, previous Information Management strategy documents).

Overall, documents have been an invaluable source of research data for this research. If managed in a systematic manner, problems that arise because of the large volume of data that they provide, can be partly overcome.

3.7.4 Triangulation of Findings

By using several (in this case three) different data collection techniques, the author has had the opportunity to 'triangulate' some of the findings. Triangulation provides a means of 'checking' the validity of findings by observing the same or similar 'result' elsewhere. With a postpositivist approach triangulation helps to provide credibility (cf. section 3.5) because the findings have been based on several 'sources' of data and the chance that the researcher can build a better understanding of the phenomena in question is likely to be improved.

The author triangulated some of the findings that had been generated from data gathered at the Marlow headquarters site that related to Xerox France and Xerox UK by speaking to management in those

locations. Often another source of data could be used to provide a clearer understanding of something in particular.

Sometimes however, different sources of data produced 'conflicting' evidence. This provided some understanding of the divergent views and interpretations of the people involved. The multiple data collection techniques and multiple sources of data have given the author greater confidence in his interpretation of the phenomena in question.

3.7.5 Bias

The purpose of this section is to discuss the practical issues relating to bias in this research. The philosophical issues associated with bias were discussed in sections 3.1, 3.5, and 3.7. There are at least two aspects which need to be considered. One is the bias inherent in the research data and the other is the researcher's interpretative bias.

Considering the first aspect, bias in the research data, there are several characteristics of this research that may have contributed to a minimisation of bias of the data in general. This is not to say that any particular 'unit' of data (e.g. interview transcript or document) is free of bias, but that taken as a whole, bias in the data may have been reduced because of the following. The author was able to 'act' as a Xerox 'insider' which meant that he was able to observe and 'validate' findings over an extended period of time. This compares with typical

research access which often amounts to a couple of interview hours at a site. The author's prolonged engagement with the case gave him the opportunity to develop a detailed understanding of the phenomena in question — with relative confidence that the 'findings' are accurate. The author was able to stay in the field for a sufficiently long time to grasp the complex nuances of what was being studied. The author guaranteed to treat 'sensitive' information with confidence and believes that this helped to reduce 'reflexivity'. Interviewees, for example, did not appear to be 'reserved' in their discussions, nor conservative toward the author. In general, the author did not feel that information was withheld or that interviewees provided dishonest accounts. The fact that the author was 'supported' by the Director of Business Processes and Information Management — a senior Xerox manager, may have affected respondents' co-operation — in the author's view this was positive.

The researcher's bias in interpretation of the data is of course inevitable. Every researcher will be influenced (at least subconsciously) by their existing knowledge and frames-of-reference. To claim interpretation that is free of bias is nonsensical. By adopting the axioms of the postpositive paradigm, by 'definition' the researcher wishes to take account of the different values of the people involved in the study. The fact that people 'see things in different ways' is precisely the point and the postpositive researcher attempts to 'reconstruct' these multiple realities. The author often stressed this to interviewees

— "It is *your* understanding of process and information management that I am interested in". Bias is inevitable, and wherever possible this has been taken into account.

3.7.6 Research Database

Qualitative research methods and data collection techniques, such as those described in this chapter, often 'generate' large amounts of data. In this research, the transcribing of interviews produced approximately eight hundred pages of single-line spaced text. The collection of documentary evidence resulted in thousands of pages of textual and graphical data. In addition, the author's notes taken during 'participant observation' filled two note books.

The majority of this data is qualitative and textual. The author set up a database to store much of the research data for analysis. The interview transcripts, author's field notes, and references to documents were entered into the database. A computer software package called NUD•IST (Non-numerical Unstructured Data Indexing Searching and Theorizing, developed and manufactured by Qualitative Solutions and Research Pty Ltd.) was used for this. The NUD•IST software was invaluable in that it helped to sort and index the data.

Coding of the data as described in section 3.6 was possible in NUD•IST. The author found the most useful feature of this software to

be its quick retrieval capabilities. Units (sentences, paragraphs, etc.) of text could be retrieved from anywhere in the database within seconds. Logical operators (AND, OR, NOT etc.) can also be used in searching the database. For example if the author wanted to retrieve all text units that had been coded as 'information management' and 'centralisation', a simple query could be entered into the NUD•IST software and all matching text units would be retrieved. Where the author included references to information that could not be directly entered into the NUD•IST database (off-line documents), these references would be retrieved by the software and the documents could be 'manually' reviewed.

The main problem that the author experienced in using the NUD•IST software was the fact that it was only possible to add basic textual documents to the database (formatting such as bold or italicised type was 'lost'). Any charts, tables, graphs etc. could only be recorded 'off-line' (i.e. a reference to the document was entered in the database).

The database that was created in NUD•IST was essential in managing and analysing the vast quantity of qualitative data. A manual system of recording coded data on cards, as described in much of the literature, would have been extremely time consuming, and this may have constrained the analytical process. The author can not imagine conducting the analysis for this research without the aid of computer software such as NUD•IST.

3.9 Conclusion

This chapter has presented the philosophical basis upon which the research that is presented in this thesis is based. The author has faced many 'choices' in relation to methodology and research method and the chapter has attempted to describe the author's rationale in making these choices. The 'choices' are interrelated and it has been difficult to explain them in 'series' and separately.

As there are many ways to conduct research, it is perhaps not so important why a particular method was selected or used (although clearly some will be unsuitable) — but it is most important to understand the assumptions and especially their implications for understanding the study and its results. This chapter has attempted to reveal some of these assumptions and their implications.

The philosophical basis that was 'selected' for this research is the postpositivist paradigm. At the level of the paradigm's assumptions, it was shown that it was more suitable than a positivist approach for conducting an exploratory study. The manner in which the research was conducted can only be understood (or judged) with an understanding of the assumptions that underpin postpositivism.

Issues of validity, reliability, and objectivity were shown to differ in a postpositivist study. Analogous criteria for judging the research were presented — credibility, transferability, dependability, and confirm-

ability. However, it is important to note that a postpositivist study can never be unassailable — "it can at best *persuade*" (Lincoln & Guba, 1985, p. 329, original emphasis).

To summarise the discussion in this chapter, figure 3.4 is presented. It is an extension of figures 3.1 and 3.2 and aims to summarise the methodological issues that concern this research.
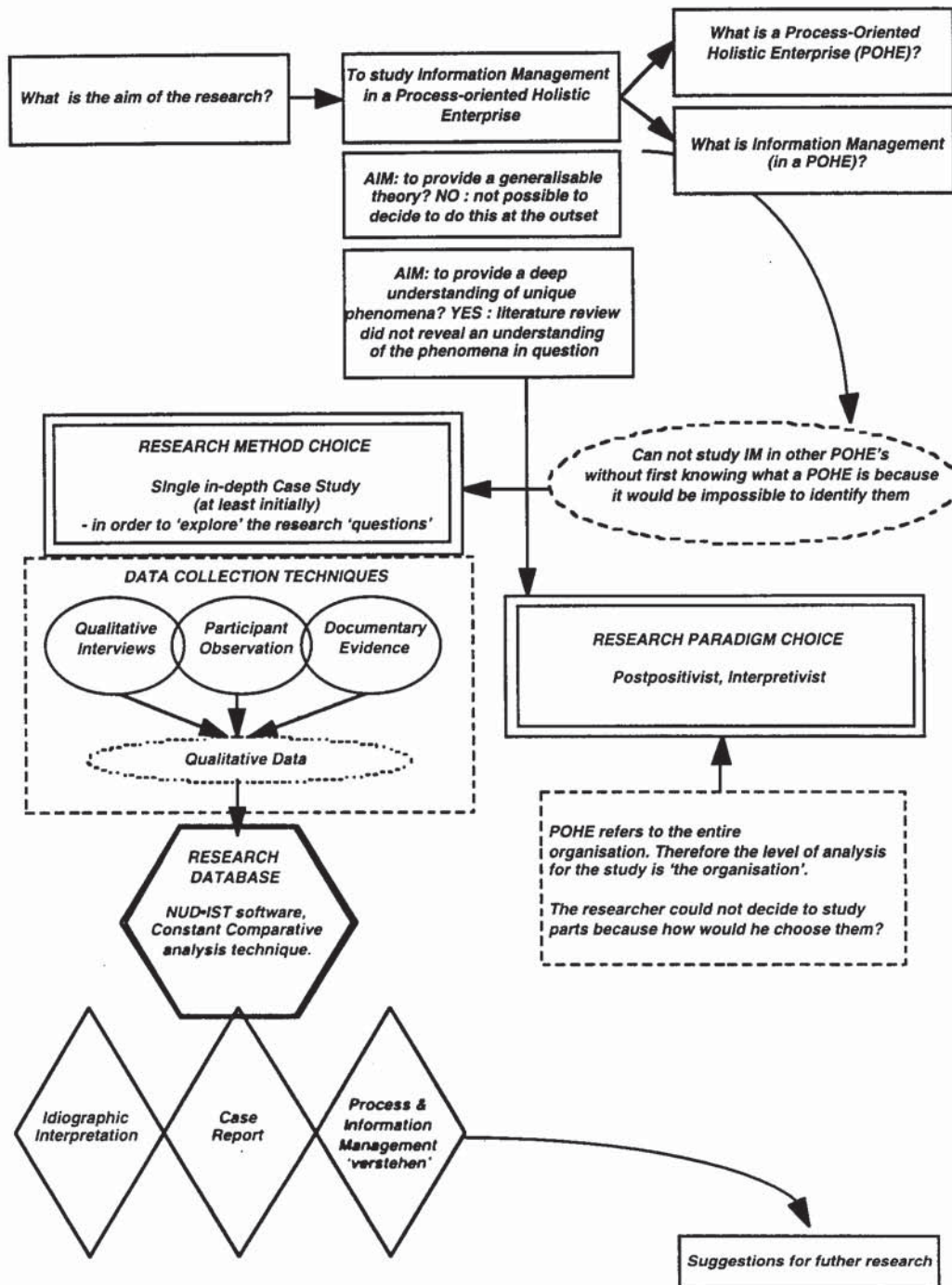
Figure 3.4 : Summary of Methodological Issues.

CHAPTER FOUR :

MANAGING THROUGH PROCESSES AT XEROX

4.0 Introduction

This chapter presents the research findings in relation to the first objective as outlined in chapter one — *to understand what a process-oriented enterprise is, how it is organised and what process management means*. In chapter two, it was shown that the bulk of academic literature that relates to process management is in the area of business process re-engineering. Moreover, it was shown that the literature and research to date is inadequate when one wishes to understand organisations that have organised themselves to manage by process. There are no examples in the literature of empirical research that reveal what it means to manage an organisation as extensively by process as Xerox Ltd. do. This chapter aims to reveal the nature of the process oriented holistic enterprise (POHE).

Three main data collection techniques were used in this research (cf. figure 3.2) — documents, interviews, and participant observation. The results that are presented here have been derived from the data that was collected using these techniques. This chapter has been structured around each type of data collection technique. The data from participant observation has been divided into two sections which relate to two of the three 'projects' that were outlined in section 3.3.2.

The third project is more appropriate to the discussion in chapter five and is presented there. Figure 4.0 summarises the structure of this chapter.
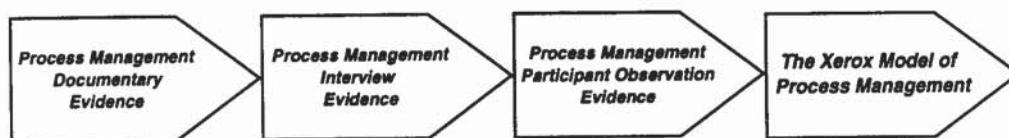
Figure 4.0 : Summary of the Structure of Chapter Four.

4.1 Process Management : Documentary Evidence

Xerox is "The Document Company" and documents are abundant. The author collected hundreds of documents both in the course of his participant observation and explicitly in order to help provide insight in respect of the first research objective. This section presents evidence from documents to help develop *verstehen* in relation to process management.

Undated Rank Xerox documentation (from the Xerox Intranet) indicates that the focus on management by process began in 1988. Evidence in the literature that was cited in chapter two pointed to process management beginnings in 1987. The evidence points to 1987 as the year that planning took place and in 1988 action to focus on processes began. It was then that the Xerox Central Logistics and Asset Management (CLAM) team began to analyse Xerox by process. The CLAM team (headed by Dr Fred Hewitt, who at the time was the

Vice President of CLAM) re-engineered the processes that they had modelled, and made dramatic improvements with huge cost savings (cf. for example, Bounds & Hewitt, 1995).

Throughout the early nineties, Rank Xerox undertook many such re-engineering programmes throughout the organisation. Business processes were modelled using the documentation conventions of what is called the 'Xerox Business Process Architecture' (XBPA)[1] (see section 4.1.1) and were re-engineered where any improvements in cost, efficiency, and customer satisfaction could be achieved.

By 1993 'Business Process Management' as it became known at Xerox, was included as an important element of the Xerox Management Model (XMM). During this year, the XMM was communicated to senior management and in 1994 it was communicated across the Corporation (Xerox Corporation, 1995). The XMM is a model that defines the Xerox management processes at a general level. The processes are designed to focus on customers and markets, to produce 'business results'. Essentially the model's message is: 'Management leadership + people (HRM) + information & tools + process management = a profitable and productive Xerox'. On closer inspection, process management, which can be seen as including 'information and tools', is the most pragmatic and tangible of

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[1] The XBPA is also referred to as the Xerox Business Architecture (XBA)

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all the elements. The process management part of the XMM is shown as incorporating the XBPA. This is discussed in the following section.

4.1.1 Xerox Business Process Architecture

The XBPA is a critical document that provides the foundation to process management. Essentially, it is a model of Xerox in process terms. It represents the *"composition and relationships* of the processes by which work is done" (Rank Xerox Ltd., 1993, p. ii, emphasis added).

The XBPA is the central point of reference for *managing by process*. The *holistic*[2] nature of the XBPA as a model that depicts processes on an enterprise-wide basis is important. The holism of the process representation, that is, the bringing together of enterprise-wide business processes in a *single* model is intended so that 'improvements' can be 'systematically' employed. The holistic process model gives an 'end-to-end' process view of the organisation — functional boundaries are ignored.

Documentary evidence that directly discusses the XBPA — that is, formal XBPA documentation separate to that of the XBPA itself — asserts the following as 'rationale' for using this approach:

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[2] Holistic, from Greek *holos* meaning whole, in entirety

- as a prerequisite for managing by process,

- as a prerequisite to business process re-engineering,

- to allow for systematic improvements,

- to allow for improvements to specific parts,

- to provide management of 'end-to-end' processes which provides the means for 'breakthrough productivity improvements',

- to provide a clear method for communicating process understanding,

- to provide a clear method for communicating process 'interactions',

- to provide a holistic 'view' of the organisation that helps to scope improvement opportunities,

- to help manage holistic change by providing an understanding of what is done,

- to provide a common language for communicating change and for implementing results,

- to provide 'modular' and globally transferable 'best practices',

- to divide the complex whole into manageable parts,

- to provide a framework for co-ordination and collaboration at the level of process,

- to allow individuals to visualise 'their part' toward the accomplishment of the organisational whole,

- to provide a method for 'defining and bounding' empowerment,

and, • to provide a model of critical processes without 'imposing implementation' (i.e. models the what, not the how).

Clearly, this is a long list of benefits or desired goals of the model. The data that is presented in the subsequent sections of this chapter provides an understanding of any 'benefits' or problems that have been observed to occur in practice. However, by analysing the list (content analysis), the major objectives fall into four categories. These are summarised and shown as figure 4.1 below.
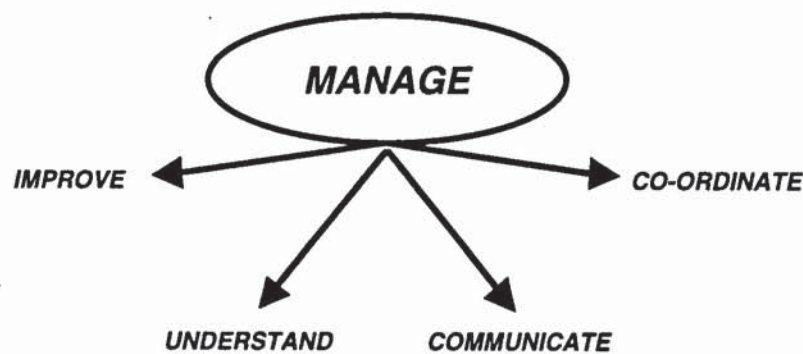
Figure 4.1 : Key Objectives of the XBPA.

The XBPA is a 'layered' model of processes. Each layer is called a 'level' and each level shows increasing detail. Figure 4.2 is the XBPA representation of level 1, the 'highest' level.

Figure 4.2 : XBPA Level 1.

Source : Xerox Intranet.

That which is shown at the highest level are the six processes that span the entire organisation. The following provides a short description of each (a fuller description is provided in appendix 2).

- Manage for Results (strategic management),

- Time to Market (business and product development and delivery),

- Integrated Supply Chain (which includes; planning materials and resources, managing demand fulfilment, manufacturing & distribution),

- Market to Collection (which includes; market intelligence, sales operations, order fulfilment, customer payments, and customer relationship management),

- Customer Services (which includes; developing services strategies, managing services operations, the provision of operational services),

and, • Infrastructure (which includes; Finance, Human Resources, *Information Management*, and Facilities).

Each of these 'core' processes consists of sub-processes that are shown at each 'level' of the XBPA as a 'layer' of increasing process detail. The four processes that are shown in figure 4.2 between 'Manage for Results' and 'Infrastructure' are referred to as the 'critical core operational processes' (Xerox, 1997). Effectively the model is of a hierarchical process structure. XBPA documentation on the Xerox Intranet estimates that there are "approximately 200 stable processes... with some 2,500 inter-process flows".

The sub-processes are shown as boxes and they are connected by 'document flows' — "The word 'Document' is used in ... the classic Xerox meaning of the word, namely as a package of *information* intended for human consumption" (Rank Xerox Ltd., 1993, p. vi, emphasis added). In a Xerox Intranet document the possible 'flows' are defined as "documents, data, people, cash, plant, physical objects, etc.". In practice, a flow is 'any process output'. At its destination, the 'flow' may be an input to another process or some product for a customer. Figure 4.3 is an example of processes that have been modelled using XBPA notation.
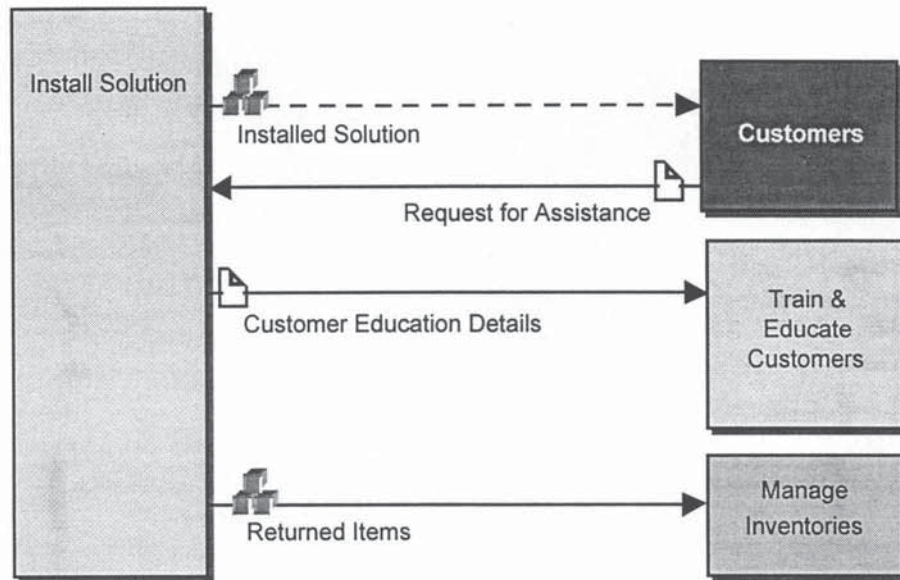
Figure 4.3 : XBPA Notation Example.

It is based on an extract from the XBPA and shows three processes and customers. The flows that are shown are in this case physical products and goods, and 'information' that is represented by a document icon. The complete XBPA is a large network of such diagramming (for another example see figure 2.3 and appendix 3). At another level 'down', we would see similar diagrams that represent the sub-processes of the processes shown. For example, the processes involved in 'manage inventories' would be shown as sub-processes (e.g. receive goods, manage warehouse, maintain stock schedules) at a lower level.

In summary, the XBPA is a hierarchical process model of Xerox Ltd.. It is a consistent documentation tool for the definition, communication, and control of business processes. The XBPA provides the *holistic*

view of the organisation that was perceived by Xerox management as necessary for the reorganisation and improvement of Xerox so that it could face competitive pressures in the late 1980s and early 1990s. The reorganisation that included a focus on business processes also involved the assignment of new posts to manage the processes. These are discussed in the following section.

4.1.2 Process People

From an analysis of Xerox documentation it can be seen that there are at least three 'types' of people who are involved in the management of business processes — Process Owner (PO), Area Sponsor (AS), and Process Analyst (PA).

The term Process Owner is used to refer to a person who is 'responsible for the entire process'. As there are recursive levels of process, PO is used to refer to both the manager of the 'core' process (e.g. Market to Collection), and to managers of 'sub-processes' within that (e.g. Market to Order, Order to Implementation, Implementation to Collection). Documentation (Rank Xerox, 1992) states that the PO manages *people, tasks, information and technology'*. These can be seen as being the 'formal' (as declared in documentation) manageable elements of processes. They are depicted in figure 4.4 below.

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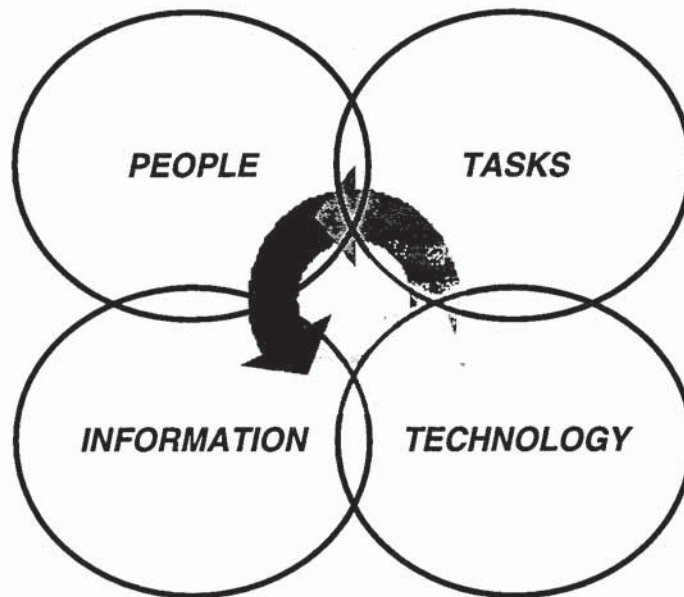
Figure 4.4 : Manageable Elements of Processes.

The second type of 'process manager' that can be identified from an analysis of documentation is the Area Sponsor. The AS's task is to support the process owner by providing 'hands on management'. The AS decides on strategy and provides *resource*. The sub-processes that were referred to in the previous paragraph are sometimes described in Xerox documents as 'Process Areas'. Thus, the AS can be seen to be a process owner for part of a core process – the same as the second 'type' of process owner that was referred to previously.

The Process Analyst (PA) or Process Area Business Analyst (PABA) as it is sometimes referred to, is somebody who is closest to the operations of the process itself. The PABA is responsible for supporting the implementation of processes and any improvements or changes that are required. The PABA also looks after any 'systems' that are associated with the process (e.g. information systems,

manufacturing systems etc.) and plays an essential role in *"information strategy"* (Rank Xerox, 1992, p.5).

In summary, the people who are involved in process management may be thought of as being analogous to the 'traditional management posts' but for the process context. This analogy is shown in table 4.1 below.

Process Management Posts	*Traditional Management Posts*
Process Owner	Senior Manager
Area Sponsor	Middle Manager
Process Analyst	Operations Manager

Table 4.1 : Process and Traditional Management Posts.

In addition to the single-person management posts that have been described, evidence from documents indicates a vision that sets a process role for 'everyone'. The Xerox Intranet quotes the 1990 – 1999[3] chairman and CEO of the Xerox Corporation, Paul Allaire:

> "I envision ... many, many small groups of people who have the technical expertise, business knowledge and *the information tools* they need to design their own work processes, and improve and adapt that process continuously as business conditions change. ... Our ultimate goal is to organize the entire

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[3] As of April 6th 1999 G. Richard Thoman became Xerox's CEO, Paul Allaire remained as board chairman.

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company into self-managed work teams — or what we call productive work communities" (emphasis added).

Process Teams are defined elsewhere on the Xerox Intranet as "a collection of people with *various skills* who are brought together to work intimately with a process or set of processes." These teams consist of different types of people — 'insiders' and 'outsiders'. The idea is that the insiders are Xerox people who know the current process intimately and can provide in-depth knowledge about it. The outsiders can be consultants or people from *different* parts of Xerox who will feel no loyalty to the current process. Thus, it is assumed that the outsiders can bring "an outside opinion to the table".

Figure 4.5 below, is a summary of the people involved in process organisation that can be identified from the documentary evidence that was collected during this research.
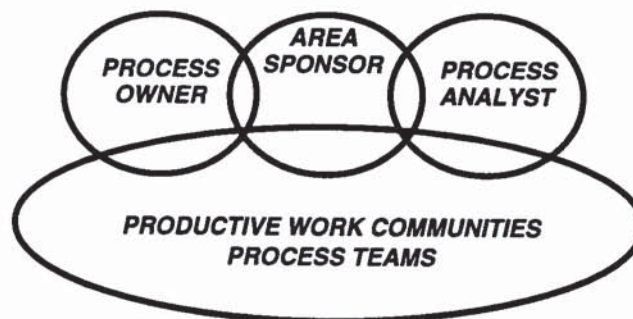
Figure 4.5 : Process Organisation People.

This arrangement of process people occurs at different levels of process (e.g. at several levels of the XBPA). However, for the most part, higher levels of the XBPA relate to management processes, and lower levels to operational processes. A diagram to represent all the people involved in process organisation (vis-à-vis the process model) would be a recursive version of figure 4.5. This is shown as figure 4.6 below. The textual detail from figure 4.5 has been removed for clarity.
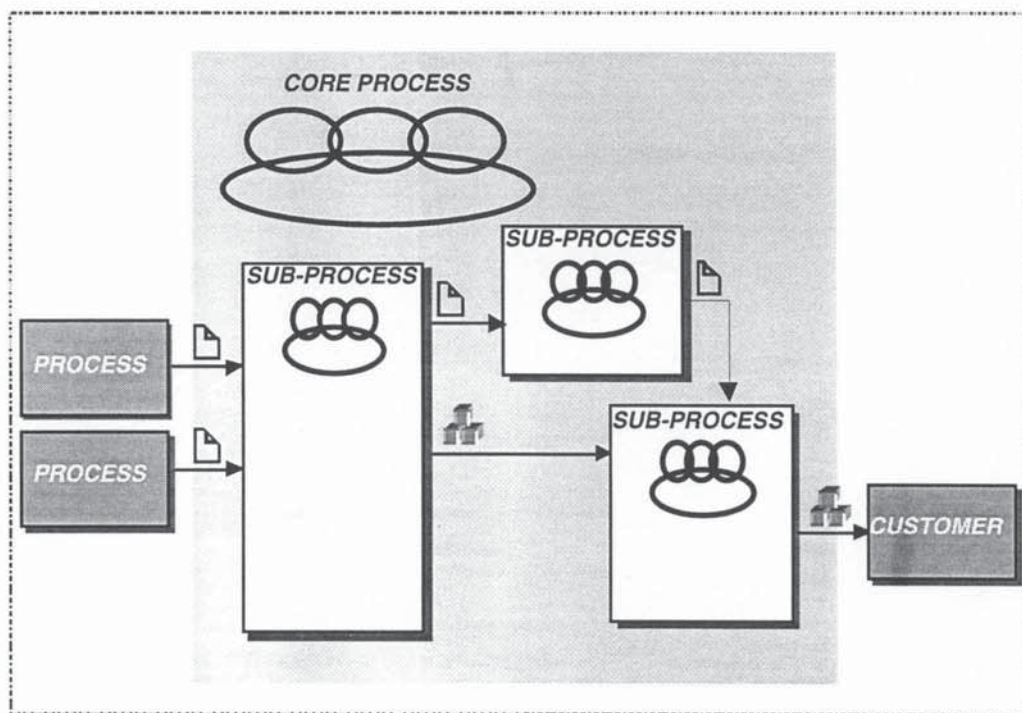
Figure 4.6 : Process Model showing Process People.

At the lower, operational levels of the model, fewer process management people are involved but PABAs are still required. Process teams and productive work groups can be placed anywhere — flexibly created and disbanded as and when required.

In summary, thus far, the evidence from documentary sources provides a 'picture' of process management that includes both a hierarchical process model (for the management, improvement, understanding, communication, and co-ordination of business processes), and different types of 'process people' (for the management, implementation and operationalisation of business processes). A further area of documentation which contributes to an understanding of process management is that which relates to the core business processes themselves. This is discussed in the following section.

4.1.3 Core Processes

This section examines documents that relate to the core business processes that are shown in level one of the XBPA (cf. figure 4.2). These documents are usually referred to as 'reference manuals' or 'process guides'. Core process manuals or guides provide a detailed explanation of the entire core process and its constituent parts.

Through an analysis of core process documentation for the Market to Collection and Time to Market core processes, several characteristics of process management can be derived. Firstly, a process is contextualised by presenting it with clear 'guiding principles'. The aim of the process and why it is required is explained.

The start and end points of the processes are defined, together with a description of the major 'steps' or activities that are required. This is an articulation of *what* is needed to perform the process, and not *how* it should be performed.

Together with the definition of process steps, criteria by which the sub-processes may be evaluated are shown. These are known as *process metrics*. The purpose of process metrics are to 'measure' the performance of a process using an appropriate standard. Examples of process metrics could be time taken to complete a process (or cycle time), cost of the process as a percentage of revenue, percentage of defective output from the process, market share, etc.. For the purposes of process improvement, process guides include 'performance targets' which are usually defined in terms of the process metrics. For example, the current cycle time for issuing an invoice to a customer following the installation of their order (expressed in days) may be currently measured as thirty days. The process guide might show the performance target as a 'desired future state' of one day.

Core process documentation also shows who is *responsible* for each particular sub-process. In the Time to Market documentation this information is presented as a 'phase activity/responsibility matrix'. Four 'responsibilities' are defined – the accountable or responsible organisation or group, the decision maker, the organisation or group that provides agreement or disagreement with proposed decisions or

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actions, and the groups that are required to provide written input to a proposed decision or action. Clearly, this is a detailed breakdown of responsibility assignment.

Figure 4.7 below summarises the major characteristics of process management that can be derived from an analysis of core process documentation.
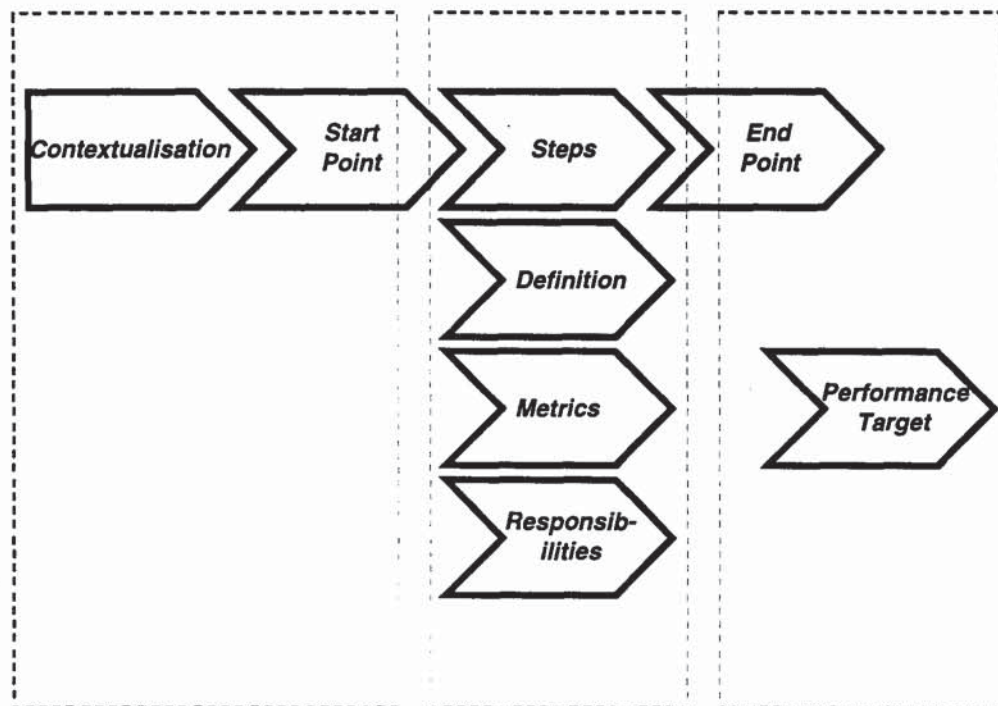
Figure 4.7 : Process Management Characteristics from Core Process Documentation.

4.2 Process Management : Interview Evidence

This section (4.2.1 – 4.2.7) presents the research findings from interview evidence. As has been explained in section 3.3, the research interviews were semi-structured and qualitative in nature. Some of the interviews were conducted specifically for this research and others

were done in the course of the projects that the author participated in at the case site.

The interview transcripts were analysed using a computer software package called NUD•IST (cf. section 3.7.6) and the results that are presented here have been derived using the 'constant comparative method' (cf. section 3.6). In summary, this technique involved the identification of 'categories' from the data to which more and more evidence was added until they become 'saturated' (nothing new is learned). The saturated category can then be articulated.

The following sub-sections describe the major categories that have been identified from the interview data. In the process of defining these theoretical categories, relationships arise. This is normally where respondents connect two or more of the categories and it becomes difficult to 'allocate' a unit of data to only one category. These 'relationships' can then help in linking the theoretical constructs. The result of the 'relationship' analysis is shown in section 4.2.8.

In order to preserve the anonymity of the respondents, because the author guaranteed this, all interview quotations have been referenced using anonymous codes. Each interview has been allocated a letter of the Greek alphabet. The referencing of the quotations (and of some citations) shows this identification letter, the number of the text unit (sentence or paragraph – as allocated by NUD•IST), and the year in

which the interview took place (e.g. [δ, unit 897, 1997] – represents text unit 897 in interview 'δ' which took place in 1997).

4.2.1 Process Areas

The interviewees were extremely consistent in referring to Xerox as a company that is divided up into 'process areas'. Each process area is a logical collection of business processes. The process areas that respondents referred to are those defined at level one of the Xerox Business Process Architecture (cf. figure 4.2; Market to Collection, Integrated Supply Chain, Customer Services, etc.). The concept of process areas was shown by the respondents to have been internalised. The respondents were of 'management level' and so it can not be assumed that the concept of process areas is understood throughout the organisation. One respondent commented:

"... if you go up to anyone and said *at management level*, you know, 'what process areas, or business areas is the company divided into?' – they'd reel these ones out" (ρ, unit 1023, 1998, emphasis added).

The management of the process areas were seen by the respondents to resemble organisations. By 'organisations' the respondents implied that a process area could be defined as a discrete group of management who can be perceived of as a 'team' or a 'department'.

Thus, each process area is seen as consisting of the process owner and his/her management staff. The process areas are located at the Xerox Ltd. headquarters, which at the time that this research was conducted was in Marlow, UK.

"...they've got their specific responsibilities and they've got staffs as well who work under ... and [?] quite a few people work in that office on the 2nd floor – Some of these are MTC people, some are Customer Service people..." (ι, unit 399, 1997).

Thus, the picture that emerges is one of a collection of management organisations – one for each *core operational process* – located 'centrally' at Xerox headquarters. Respondents indicated that the process areas *support the business groups and entities*. The business groups are the product organisations that Xerox Ltd. is divided into (e.g. Xerox Channels Group, or Office Document Products), and the 'entities' are its geographic organisations (e.g. Xerox UK, Xerox France), (see Appendix 2). By 'support', the core process organisations (process areas) provide business groups and entities with centralised management of business processes. The business groups and entities are the (internal) *customers* of the process areas.

This evidence is congruent with the documentary evidence that has been presented in section 4.1. In particular, figures 4.5 and 4.2 can be

combined. Figure 4.8 shows this combination and represents that which may be understood from the interview evidence thus far.
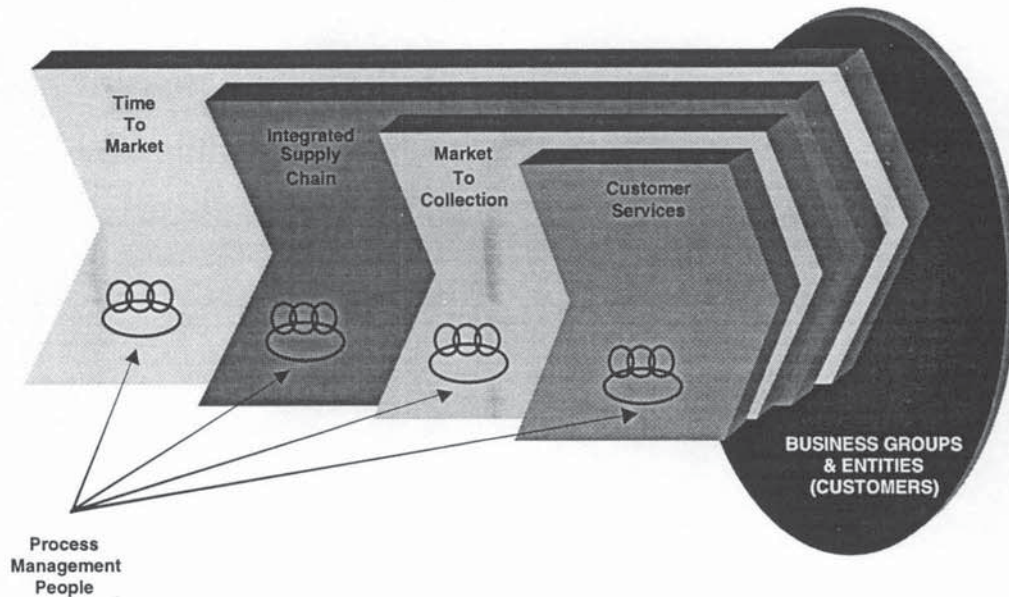
Figure 4.8 : Core Operational Processes as 'Organisations'.

4.2.1.1 Process Boundaries

The concept of 'process boundaries' was frequently referenced by the respondents. The idea of the process boundary was used to describe where processes 'crossed' areas of responsibility. In this case, the 'linking' of process areas across their boundaries was referred to by many of the respondents as 'touch points'.

The process boundaries were generally perceived by the respondents to be 'around' the core process areas. However, the concept of

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process boundaries was usually referred in a negative sense — as being problematic.

> "...we don't have those functional breaks, but we do have an equivalent – process breaks" (π, unit 377, 1998).

The implication that the process boundaries cause 'process breaks' was portrayed by respondents as being a negative thing. It was seen as particularly negative with respect to co-ordination. One respondent was critical about the manner in which the process boundaries have been defined. He referred to this as 'the way the cake is cut'.

> "... they're core processes, and they, they theoretically look after a process, but in reality, because of the way the cake is cut ... with many of the processes, they are no better than a functional organisation in that there's a lot of dependencies on other, on other processes" (π, unit 387, 1998).

Thus, what was implied is that there are *many* 'touch-points' or cross-process linkages and that these are contrary to an 'end-to-end' process design. Thus, where process breaks were seen to 'interrupt' the holistic design of a core process, the potential benefit gains of a process focus were seen to be compromised.

Some respondents gave accounts of the day-to-day problems of managing 'across' process boundaries. One respondent commented on the procedure for managing cross-process projects.

"...so in this case you establish [a] steering committee with the different business process owner[s], and well I should say that [the] methodology we apply is to have the agreement of the total [all] BPO [Business Process Owners] concerned by [with] any project to go ahead" (λ, unit 224, 1998).

A consensus approach to decision making for cross-process issues was on the whole expressed by the respondents as that which operated. However, the consensus approach to cross-process decision making was seen by many of the respondents as being *problematic*. This was for several reasons.

Firstly, many of the respondents felt that often *too many* people were involved in these decision processes, and that this caused unnecessary delays. In addition, it was felt by respondents that not everybody who is involved in the decision processes has the appropriate knowledge or experience to influence the process.

Many of the respondents pointed out that part of the cross-process problem lies in the division of responsibilities. Where a process issue crosses process boundaries it also crosses 'responsibility boundaries'

and hence a problem similar to that experienced with functional boundaries arises – 'who is responsible for the link?'.

"...'cause it cuts across, that's where we fall down - is - in all of this because we set up these four process areas, and they don't bloody work. I mean that's what you're trying to map I know. People map it, but no-one talks of, no-one's actually doing anything, and no-one has any *responsibility to engineer those links*" (α, unit 571, 1997, emphasis added).

Thus, although process boundaries can be seen to represent 'responsibility boundaries', problems do arise where processes cross these boundaries. The issue of responsibility is further complicated by the fact that responsibility for sub-processes is in some cases 'surrendered' to another 'process area' in which it may more suitably be performed. This is where the formal process architecture is circumvented.

"...although they own the whole process – in reality they abdicate responsibility for bits of it – so really credit collection is not something they, it's not something they truly understand ... So, they haven't managed to bridge that gap of properly grasping the opportunity to own and understand the whole process and to develop a more effective organisation by making

the overall process transparent to everybody who is involved in it..." (π, unit 95-99, 1998).

This respondent implied that the 'breaks' in responsibility — its distribution beyond the boundaries of the core process — (similar to the touch points mentioned previously) interfere with the end-to-end holistic design of a core process. Because of this, as before, the potential benefit gains of a process focus are seen to be compromised.

A factor quite separate to that of bounded responsibility was also suggested as contributing to difficulties because of process boundaries:

"and yet, instead of being functional specialists, lack an understanding of how they fit into a whole process – are now process specialists [laughs]! ... who don't necessarily see a link between the other different processes! So they're really good at telling you about ITC [install to collection], but they don't really understand how ITC fits into the finance area, and manufacturing area, and logistics area..." (π, unit 82, 1998).

Therefore, in addition to bounded responsibility, the issue of expertise or understanding of a particular process or processes is important in cross-process management. This also relates to the problems that were expressed with the consensual approach to cross-process

decision making — that not all who provide input are 'qualified' to do so. However, another side to the debate was also expressed:

> "No-one will understand the whole process – so they're going to have to have more of a team effort, because someone will understand his process from the – in his expertise because you still need purchasing expertise in there. And you can't expect the salesman – even though it is one process to have the purchasing knowledge. So you'll need people with functional expertise working within the whole process and talking to each other" (μ, unit 335, 1998).

In summary, the interview evidence that relates to 'process boundaries' has highlighted three important areas : 1) the concept of process boundary and how it may be defined, 2) the problems associated with cross-process decision making, and 3) the variety of specialist expertise that exists within different processes.

In the next section, the interview data relating to process commonality is discussed. Commonality refers to whether the *same* bounded sets of processes exist in different parts of the company — for example in different geographical locations (entities).

4.2.2 Process Commonality

The question of whether different parts of Xerox should, do, or can use the same business processes was a frequently recurring issue among respondents. Different 'levels' of process commonality can be perceived. Table 4.2 summarises these levels.

Level	Where
Highest	Cross-OPCO (Global)
Middle	Cross-Entity
Lowest	Within-Entity

Table 4.2 : Levels of Process Commonality.

The 'highest' level was referred to by respondents as 'global processes'. 'Global processes' means having the same business processes on an international, pan-Xerox scale (i.e. across all Xerox operating companies (OPCOs), Xerox Ltd., Xerox Canada, Xerox US, etc.). The most important reason for wanting to adopt global processes was expressed by respondents as being 'for cost reduction' (σ, unit 83, 1998). However, respondents were clear in stating that global processes were not possible (σ, unit 555, 1998), with the exception of the supply chain.

> "We haven't lost interest in process management but couldn't make the 'global solutions' work. However, it does work well on

the Integrated Supply Chain (ISC) because this IS global" (ψ, unit 5, 1997).

What was often stated by respondents was that consistent (global) metrics were needed. The respondents often referred to past experiences of failed attempts to develop global processes. One of these was particularly dominant in their accounts and related to the Market to Collection core process (World-wide MTC as it was known). Many millions of dollars were 'lost' during that failed attempt. Currently the OPCOs have different processes:

"... all the OPCOs have got different processes" (ε, unit 271, 1997).

Some evidence points to a questioning of the appropriateness of applying a process focus to work which is not 'naturally' process oriented. The techniques that are used to manage processes are, it is suggested by respondents, difficult to apply in these (unnatural) contexts. Much of the difficulty lies with the focus on measurement. Not everything is easily measured and applying metrics to intangibles becomes problematic. Questions such as how one can effectively measure — for example — 'customer satisfaction', or 'customer loyalty' arise.

"But should a process approach apply outside areas which are [naturally] process oriented [e.g. Manufacturing]? – good question" (ε, unit 532, 1997), "... maybe the problem's trying to apply techniques which apply to real processes ... and manufacturing is wonderful at making up this – it's natural. It's very much where everything originated" (ε, unit 536, 1997).

It was generally accepted though that process similarity is feasible for similar parts of the business (similarity by business (product) groups) (ι, unit 710, 1998). However, it was noted that because the majority of business, in terms of revenue, had traditionally been in the 'ODP' (Office Document Products – medium sized photocopiers) business group that the existing processes had been designed for that 'business model'. This is at the 'lowest' level of commonality.

"Processes that we have were fairly focused towards ODP – which has been the main state of the business, a core 80 per cent of the business" (ν in δ, unit 38, 1997).

Thus, what was implied by many of the respondents was that similar processes are required for similar business groups, but that existing processes had been designed mainly for ODP. As other business areas were experiencing rapid growth in the late 1990s (e.g. Xerox Channels Group, digital products, and Xerox Document Services

(document consultancy)), the existing (ODP based) processes were becoming less and less appropriate.

Interview evidence is strong in support of the idea that processes *are common within* each of Xerox Ltd.'s geographical divisions, or entities (e.g. Xerox France, Xerox UK, etc.).

"...we share the process with the rest, OK – of the French subsidiaries and companies" (λ, unit 90, 1998).

Table 4.3 summarises the idea of levels of commonality, and the results from interview data.

Level	Where	Commonality
Highest	Cross-OPCO (Global)	ISC only
Middle	Cross-Entity	No
Lowest	Within-Entity	Yes

Table 4.3 : Evidence of Process Commonality.

Figure 4.9 below is a graphical representation showing the commonality of processes within entities and across business groups. The 'different' processes within the entities of a different OPCO are represented using different shading.
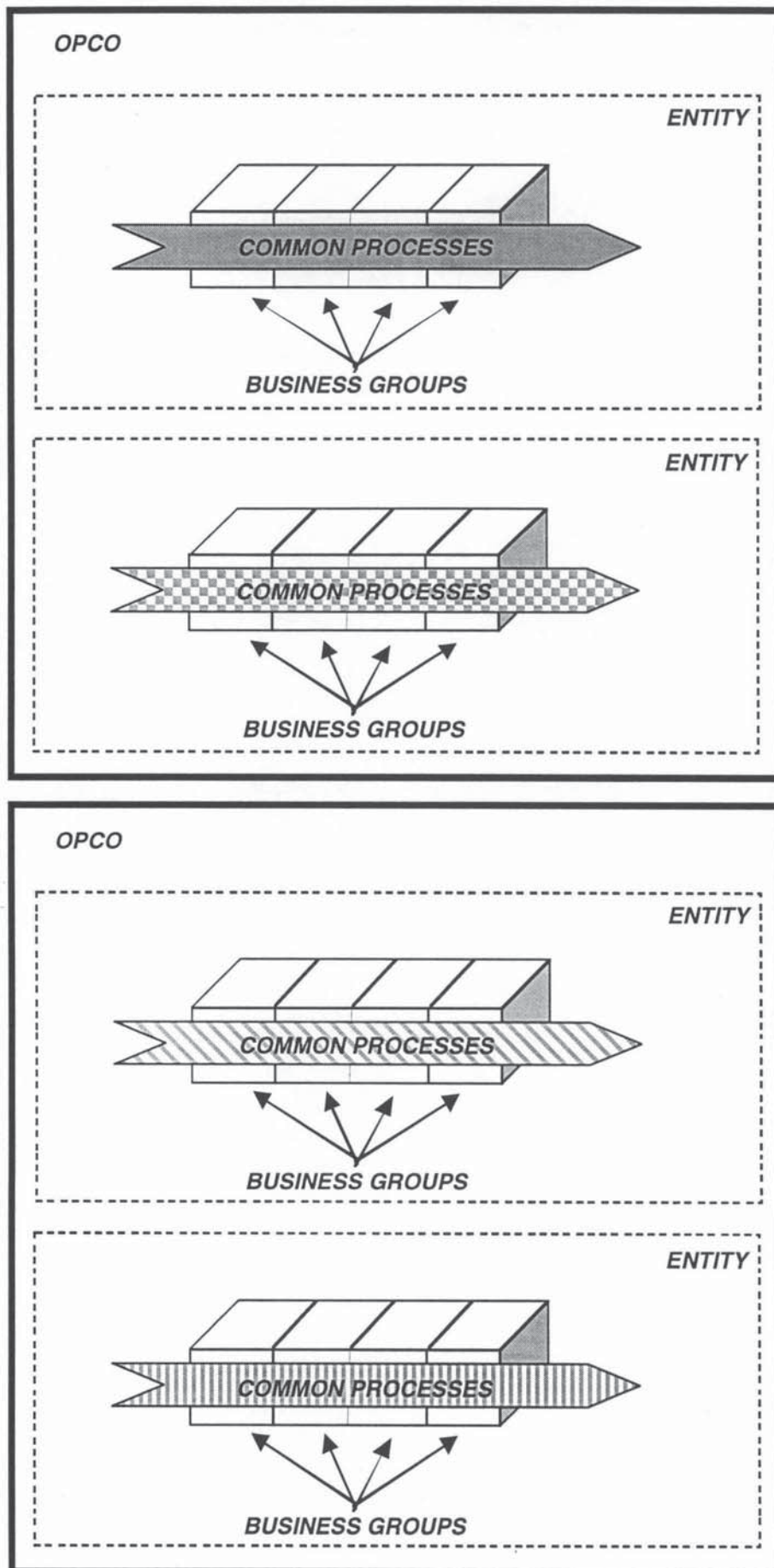
Figure 4.9 : Process commonality among entities.

The majority of the respondents were from Xerox Ltd. headquarters (the centre). They expressed strong views about the 'control' of common processes. The following two quotations are indicative of this:

> "CBUs [Customer Business Units – parts of entities] ... change their own processes – without informing centre" (ζ, unit 820, 1998);

and,

> "[The] Centre has little power to 'force' [the] OPCO to use the 'right' process" (ζ, unit 859, 1997).

However, in 1997 the 'centre' was clear about wanting to move to a cross-entity, 'middle level' of process commonality.

> "We haven't given up a process focus - only the global solutions. We are still working on an MTC [Market to Collection] Rank Xerox process focus..." (ψ, unit 9, 1997).

By 1998 it was clear that Xerox Ltd.'s management ('the centre') were implementing strategic plans to 'create' process commonality across all geographic entities — i.e. a pan-OPCO (XL), middle level of process commonality. This is discussed further in chapter 5.

4.2.3 Process Documentation

In sections 4.1.1 and 4.1.3 the documentary evidence relating to process documentation was discussed. In this section, that which can be learned about process documentation from the interview evidence is presented.

The most prominent issue arising from the interview data relating to process documentation concerns the Xerox Business Process Architecture (cf. section 4.1.1). Many respondents indicated that the XBPA is 'inadequate'. In the main, this was because some processes are either not represented at all, or do not represent 'reality' (what *actually* happens). The following quotations are indicative of these issues:

"... that's not on [the] XBA...." (ξ, unit 369, 1998).

and,

"Let's hope it's with the process in reality, because sometimes they're quite separate..." (δ, unit 16, 1997),... "The written down process is a) pretty out of date and b) it doesn't match all these different routes to market, as I say, the way we do things now-a-days..." (δ, unit 30, 1997).

The 'reasons' for the inadequacies of the XBPA (written down process) as suggested in the previous quotation are congruent with much of the

interviewee data. This is because the XBPA has not been updated systematically and thus, does not reflect the current state of business processes. Similarly, and in line with the findings in section 4.2.2, the XBPA shows processes that 'worked' in an 'ODP world' (suitable in the late 1980s and early 1990s), but that are becoming less and less appropriate for today's customers and markets.

Interestingly, several respondents commented on the origins of the XBPA documentation. Besides being a means to document Xerox processes as part of process management, it was used to sell the concept of the 'document', and its centrality in organisations. Many of the process 'flows' (cf. section 4.1.1) were shown in the original XBPA as 'documents'.

> "He [Peter Rhodes] was a real guru. The reason he built the model was to help selling to these large organisations – and it had 'documents' all over it. You know 'just look at your documents – and let's try and manage your processes. And it was built 'round, in fact the original one that Peter Rhodes had, actually had documents all over it, document symbols." (ε, unit 441, 1997). ..."Yeah, it was all designed to enable them to have a discussion about how Xerox could help them with their documents, and how they could help them improve their processes and save them lots of money... the old bottom line was to sell lots of printers and copiers" (ε, unit 449, 1997).

Although the XBPA was criticised, the value of process documentation was stressed. In particular, process documentation was perceived by respondents as useful where it acted as a means by which processes could be 're-used'.

> "You make sure that you have a very good documentation – usable and re-usable, or you got nothing" (λ, unit 834, 1998).

In addition, process documentation was seen as a means of communication for educating 'outsiders' (cf. section 4.1.2) in 'Xerox' definitions of process. Single processes can be defined in many ways and the documentation was seen as providing a guide to the Xerox way.

> "... the difficulty we have due to the fact that we use a lot of consultant companies – each company has its own methodology, with its own definition of process. And it's often a difficulty when you are working with an external company people – you can speak about process [for] hours and hours. What is important? It's important that you have defined clearly your map of the processes or process etc. to be sure that the company works properly. But when you work with an external company, this external company has defined also what is cost, a definition of what the processes are – and there is sometimes

misunderstanding – due to the fact that we are calling with the same names different things" (κ, unit 696, 1998).

Figure 4.10 below summarises the findings from interview data that relate to process documentation.

PROCESS DOCUMENTATION

- *does not always represent 'reality'*
- *existing documentation less appropriate for today's customers & markets*
- *allows process re-use*
- *for communicating processes*
- *for showing definitions of processes*
- *describes the 'Xerox way'*
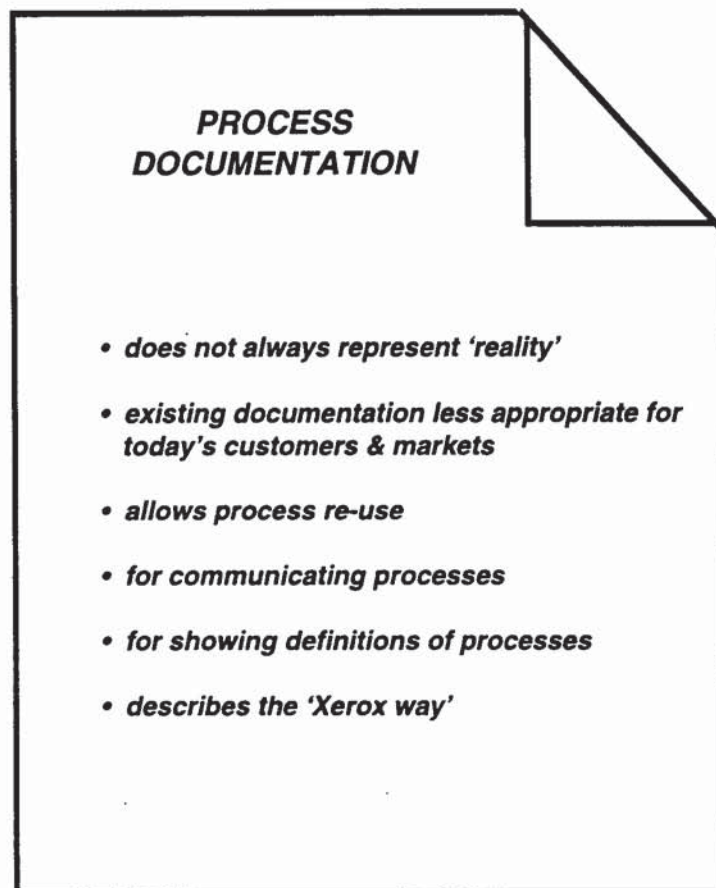
Figure 4.10 : Characteristics of Process Documentation from Interview Evidence.

4.2.4 Process Metrics

This section examines the findings from interview data that relate to 'process metrics'. Metrics were mentioned in 45% of the interviews. Several concepts can be derived from the data.

Further evidence can be found to support the interview evidence that was presented in section 4.2.2 regarding the belief in the necessity of consistent (global) metrics.

"... and you do need the metrics no matter what bloody systems they're running or what processes they're running they have got to produce those standard results" (ζ, unit 931, 1997).

Thus, although metrics are an endemic part of a process, — effectively part of the definition of process, they can also be seen as having characteristics that are independent of the process itself. What is implied is that the performance of different processes can be measured using similar standards. Thus, while 'flexibility' in process was tolerated, metrics were expected by the management at headquarters to remain consistent. Consistent metrics provide a standard means of comparison.

Where there is a change in metrics (or performance targets), if existing processes are unable to deliver the results that are required in terms of the metric in question and its associated performance target, then process change is considered to be necessary. The following quotation was taken from a discussion of the introduction of a new product range.

"And then the question then is, I mean when you get a new product coming along, I mean if the required metrics of the processes required to deliver the product are different from what we currently have then we then get as we are with Lakes and Hadaka [digital ranges of products], involved in working out, you know, how can we adapt our processes or do we have to put new processes in or what do we do in order to accommodate the new requirements [metrics]" (α, unit 349, 1997).

Metrics can exist at different (recursive) 'levels' — both for processes and for the sub-processes that make up that process. The term 'in-process metrics' is used for this.

"Because again a lot of the process metrics that we look at are - you know, length of time that it takes to go from this point in the process, to this point in the process, and if you've therefore got a system that is very menu driven and in terms of time that can be — you know, 30 seconds to navigate to that screen, 20 seconds to navigate back to that one, 10 minutes— 10 seconds to navigate over to that one – your 'in-process metrics' are then..." (v, unit 62, 1998), "... particularly for something like customer service, where you're trying to minimise the amount of time the customer's on the phone – So your in-process metrics are actually important" (v, unit 66, 1998).

In-process metrics are useful for improving both the overall process and for identifying what was referred to as a 'broken process'. A process is effectively broken when the normal process flow is interrupted or stopped and a 'remedial process' needs to be completed before the original process can be resumed.

> "as the thing flows through, and [you] decide where, ...your metrics are and, well firstly where the process is potentially broken and how you can fix it and then how you can improve it in terms of process metrics" (v, unit 574, 1998).

Metrics can be used to measure the breakage. One respondent gave a good example of a customer service process and subsequent breakage. In this case, a customer call to a call centre was 'broken' because the customer's request for a machine repair could not be completed — a part was not available — the call centre operator has to 'say goodbye to the customer' and resume the 'request for repair' process when the part becomes available. In this example, the process breakage can be measured and provides an important type of 'in-process metric'.

> "And if you look at the number of broken calls, then you can look at further metrics — how long is a broken call. OK, we might have a hundred broken calls, but we're dealing with them in, within 2 hours, so that overall it's a 200 hour delay, but it's still

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the customer's not upset. Or, we might have 20 broken calls but we're not dealing with any of them for 3 days, the customer's really pissed off. So it's not just about, you know numbers, it's about what's happening with them as well..." (ν, unit 652, 1998), "... So customer satisfaction, I guess is another metric. ... because you could define, in those terms you could define more than a day as poor customer satisfaction potentially" (ν, unit 654, 1998).

Process metrics are also seen as measures of success (or of potential success). In planning for new processes, minimum requirements in terms of performance measures (expressed as metrics) can be set. The metrics are seen as standards for measuring success and are used to assess process feasibility.

"But everything is clean [clear], everything is, you can understand what the plan will be, what are the main milestones, etc. to achieve the result and what are the metrics to measure it, if it work or not work" (κ, unit 76, 1998).

However, the use of metrics in process management is not 'automatic'. Their use needs to be *managed*. Processes for the management of metrics are included in core process documentation (particularly in

TTM, and cf. figure 4.7). This involves more than just presenting processes in documentation as one respondent pointed out:

"...getting your metrics sorted out doing the process measurement – your results measures and things like that. It's all good process, it's all good stuff but you need, you actually need to change everyone's behaviour first" (ε, unit 514, 1997).

In summary, the following are the main concepts that can be derived from the interview data that relate to process metrics:

- consistent (global) metrics are necessary,
- in-process metrics can be used to measure 'sub-processes',
- metrics can be used to measure process breakage,

and • metrics can be used to measure success or feasibility of new processes.

4.2.5 Quality Management

Quality management or Total Quality Management (TQM) was often suggested by respondents as being *a part* of 'process management'. It was also suggested that TQM precedes process management.

"Xerox has gone in a big way for TQM which sort of pushes you down this process, erm, type [of organisation]" (π, unit 82, 1998)... The push towards – this kind of ... new process world,

was TQM, people getting greater job enrichment from their activities by being part of a process" (π, unit 86, 1998).

It was also suggested that process management is more closely interconnected with 'quality' — it is the *way to implement* quality (σ, unit 43, 1998). Process management which demands measurement through metrics, implies an emphasis on improvement. A continual focus on improvement is the part of TQM which respondents associate with process management.

"... we have also other tools which are related to quality – so measurement of er, metrics of process, process measures, result measures, this kind of thing. So process owners are very more involved in this kind of, you know, measurement" (λ, unit 596, 1998).

On the whole however, respondents were unclear in expressing what 'quality management' actually signified. In addition to a focus on 'improvement by measurement' it was seen to represent the use of various analytical techniques and methods for the effective organisation of work activities. These include the use of 'fishbone diagrams' (to represent cause/effect relationships), 'Ishikawa charts' (to graphically display the status in terms of progress of a project), a process for managing meetings, and a process for solving 'problems'.

The lack of an explicit emphasis on TQM was explained by one respondent who implied that quality management had become internalised.

> "And so, the quality of process is what we now term 'in the line, by the line'. And so it means we don't need specialists everywhere to do it because the normal manager is already coached and versed in it – and it comes up as part of the induction and part of the management development process. So new managers coming through are skilled in it by the time they get to be a manager. So, I'd say that's there which is why its faded from the scene ... *and so now it just happens*" (ρ, unit 1015, 1998, emphasis added)... So it's in the speak, it's in the way that we are already doing things. So, if we have a problem, we'll get 3 or 4 people sitting in a room and we go through the quality problem solving process" (ρ, unit 1045, 1998).

In summary, quality management was seen by respondents as being part of process management although they were unclear about what exactly was meant by TQM. By consolidating the data it appears that quality management at Xerox is the use of a variety of techniques for organising and improving work processes. The difficulty that respondents had in communicating what TQM is, is likely to be due to the fact that it has become internalised, and is thus difficult to distinguish from the 'normal' way of working.

4.2.6 Process Management

This section presents the interview evidence that relates to a process orientation, business processes, and process management in general. From time-to-time respondents spoke about the idea of organising by process as a concept.

Congruent with some of the previous data there were comments by respondents about 'process design'. It was often felt that the process design (XBPA) is 'too theoretical'. Respondents commented that there was not enough input from people *operating* the processes — (e.g. call-centre operators who answer the phone) (σ, unit 149, 1998). This produces problems. For example, when new processes are being implemented they become problematic *in practice* — even though in theory they may be shown to work well. This results in the process needing lots of re-work and subsequently the costs of implementation increase beyond that which is expected.

Some respondents indicated that the manner in which process management was being implemented had been oversimplified. The findings that have highlighted problems with process management at Xerox in the previous parts of this chapter do imply that the organisation of process management is not a simple matter. Key are the concepts of documentation and responsibility — but these are not enough.

"... the fact that we are supposed to be sort of process driven, and it's processes that should drive the company, so all you have to do is document the processes and Bob's your uncle, you make someone responsible for that process, and it's sorted – it doesn't work" (α, unit 631, 1997).

As with quality management, the ideas of process management appear to have become internalised at Xerox — they are now part of everyday life. However, there are problems with the concept of holism. Core processes are not effectively managed in an end-to-end manner. This was shown to be caused by both process and responsibility breaks.

"But here you find that er, people have got over the hump of understanding the process, possibly – maybe not – but they don't see how that fits into the whole" (π, unit 89, 1998).

In fact, the idea that process management has become internalised was a popular theme among respondents.

"... the process management piece is not there as a separate thing any more. But it's within – by definition within the process generally" (ε, unit 283, 1997).

One respondent implicitly suggested stages of process management development. This fits very well with the previous data on TQM and the stages of organisational development that were implicitly referenced.

"But my impression that quality, process, empowerment, — we're beyond those now – you know we've we're approaching the next level, we've got the Xerox Management Model that addresses that, we're very much into customer first and customer focus, and that's really why. The fundamentals are there in place" (ρ, unit 1073, 1998).

The data reveals an incremental model of process management. The stages are additive as each incorporates and builds upon the previous one. Figure 4.11 depicts these stages.
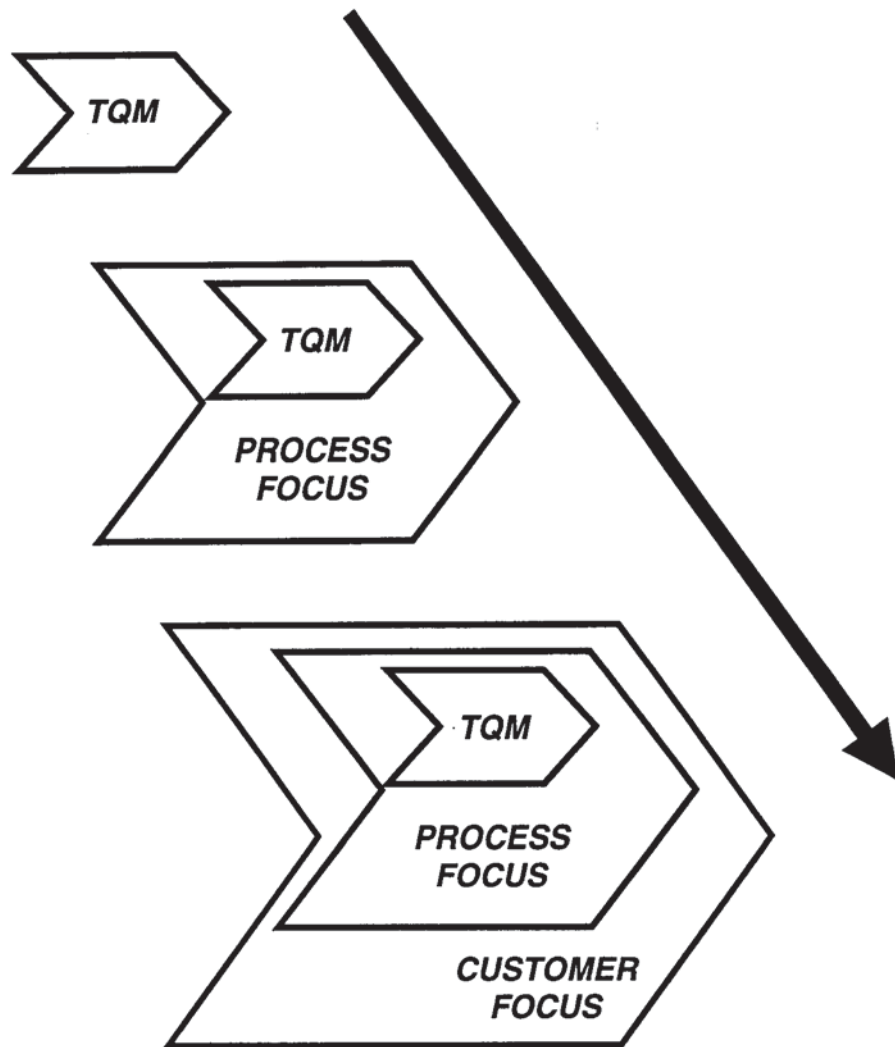
Figure 4.11 : Stages in Process Management Development.

The figure shows the stages that Xerox Ltd. have gone through in implementing process management and a focus on customer needs. Each of the stages provides the foundation for the next. Although the exact timing of each of these stages is difficult to determine, it is clear that Xerox Ltd. have spent in excess of ten years to build 'today's organisation'. Previous evidence pointed to 1988 as being the beginning of the second stage. Clearly, implementing a holistic approach to process management is a lengthy 'process'.

4.2.7 Relationship Analysis : Interview Data

The interview evidence that has been presented above has been 'separated' for clarity of analysis. However, the concepts of process management that arise are in fact interrelated and are best considered as a whole. Each is relatively abstract in isolation.

In analysing the data it was sometimes difficult to 'assign' a unit to a single 'category'. In these cases clear relationships emerge from the data. Figure 4.12 brings together the evidence relating to process management from interview data.
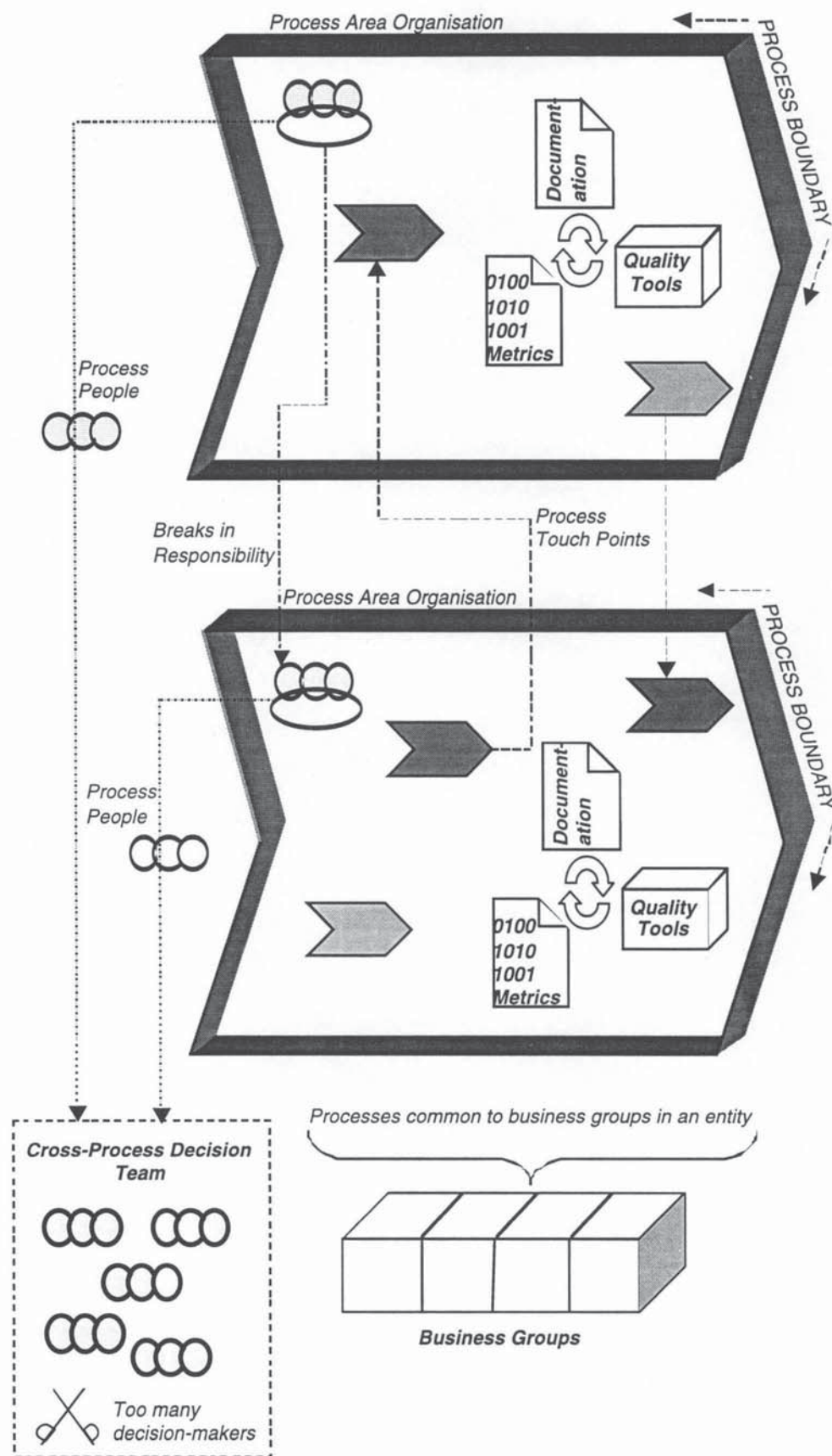
Figure 4.12 : Elements of Process Management and their Relationships.

The figure shows two core processes with their constituent sub-processes. The core processes have boundaries within which a group of process people manage the process as an organisation. Some of the sub-processes link to other sub-processes in the other core process — these are the process touch-points. The groups of process people from each core process have been linked to show abdication of responsibility (responsibility breaks). The diagram also shows people moving from the core processes to a cross-process decision team — toward the bottom of the diagram. In this team the crossed swords represent conflict — too many people are participating in decisions and some may not be qualified to do so. At the bottom right a set of business groups from a single geographic entity are shown. This is to remind us that process commonality exists on an entity wide (lowest level) basis— and not across the entire operating company. Within the core process, three interrelated elements of process management are shown — metrics, documentation and quality tools.

4.3 Process Management : Participant Observation Evidence

The following two sections (4.3.1 – 4.3.2) present research evidence on process management that has been derived from the 'projects' (cf. section 3.3.2) that the author participated in. For these projects, the author 'worked' with Xerox people in the Business Processes and Information Management (BP&IM) group. The aim of the following two

sections is to show that which may be learned about process management from participant observation. The analysis of each project has been structured in two ways — 1) to look at process management vis-à-vis the conducting of the project itself, and 2) vis-à-vis the *content* of the project. This is shown in figure 4.13 below.
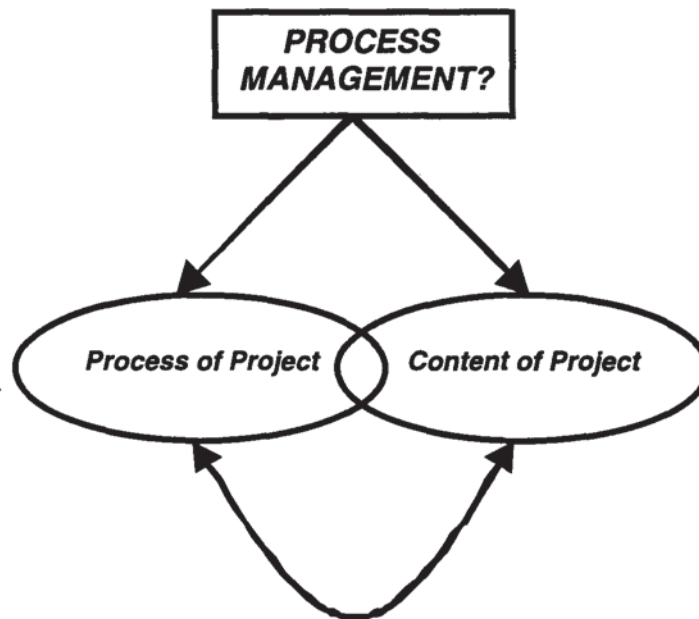
Figure 4.13 : The content and process of projects.

The manner in which the project is conducted (its process) is related to its content and this is why the connecting arrow at the bottom of figure 4.13 is shown. In the sections which follow, content and process have been separated because it is not possible to consider both simultaneously.

Each project dealt with OPCO-wide (Xerox Ltd.-wide) organisation issues. The project that is presented in the following section is that

which the author was initially involved in when he began his fieldwork at the main case site (XL headquarters in Marlow, UK).

4.3.1 Alignment of Information Management Strategy with Business Process Owner's Future Requirements

4.3.1.1 Background to the Project

The general aim of this project was to provide both process owners and business groups with a 'strategic response' to their medium term process and information management needs. In other words, the BP&IM group was to provide 'the business' with a statement of how they plan to *support* Xerox Ltd.'s medium term (in 5-10 years' time) needs.

The project was conducted from a part of BP&IM which is called Business Processes and Solutions Deployment (BP&SD). 'Solutions' is the key word. The project was conducted in a manner which (implicitly) promised process owners and business groups with 'solutions' that would satisfy their projected needs. Solutions usually meant the provision of information systems and associated business processes. In fact, the project was known within the BP&IM group as BSA (Business Solutions Architecture).

The aim of the project from the perspective of the director for BP&IM (who initiated it) was to gain an understanding of business needs so

that BP&IM could organise its activities to support those needs — to align IM (and BP) to support business needs. In an internal memorandum to senior management he wrote:

"... we have documented the key strategies and requirements, as we understand them, which will support the business into the 21st Century, and have identified potential IM enablers" (Rank Xerox, 1997).

The BSA project consisted of five stages — 1) to document business strategies and IM enablers, 2) to prioritise and select key business drivers, 3) to analyse current systems capabilities and identify the gap between that and future needs, 4) to generate strategic options to address the gap, 5) to make a strategic choice and to initiate programmes for implementing solutions. In fact only the first stage of the project was completed. This was mainly due to the fact that its sponsor, the director for BP&IM sadly passed away. Several months later however, the issue of IM strategy was picked up by the acting director for BP&IM who initiated the project that is discussed in chapter five. Thus, what is discussed here is the documentation of business strategy and that which was referred to (in BSA) as 'IM enablers'.

4.3.1.2 Content of the Project

The BSA project focused on 'IM enablers'. Effectively these are activities or solutions that the BP&IM group believed were necessary to perform or to provide so that the business needs (business enablers) that were identified could be supported. In order for the BP&IM group to build an understanding of business needs, senior management were interviewed and strategy documents reviewed. The choice of who to interview for the BSA project and the manner in which the results were presented provides an insight which *reveals the BP&IM view* of 1) who sets strategy or direction, 2) who its customers are, and 3) how XL is 'structured'.

Two main groups of senior management were interviewed. They were categorised under the headings of 'Process', and 'Business Groups'. The process group of interviewees included the core process owners and some of their senior staffs. These people are the usual 'customers' of BP&IM. The other group of interviewees consisted of various heads of the business groups (XL's product groups, cf. appendix 2). It was relatively unusual for BP&IM to approach this latter group directly because they are effectively the customers of the process organisations (core process owners). The picture that emerges is that BP&IM support the process owners who in turn provide support to the business groups. In the BSA project, both groups of management were considered suitable for providing strategic insight. This is shown

in figure 4.14. and is referred by the author to as the 'internal customer chain'.
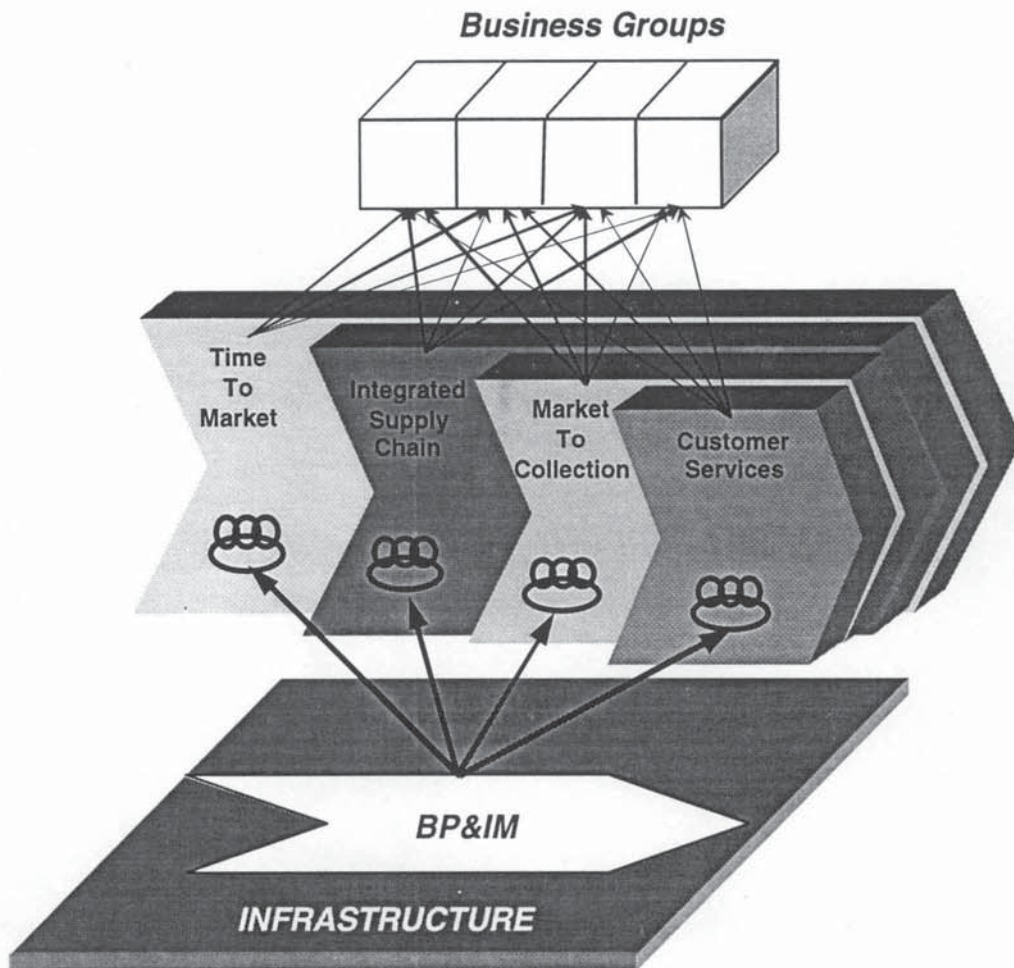
Figure 4.14 : Internal Customer Chain.

The results of the first stage of the project were presented in a document that was distributed to senior management. They were invited to make comments about what they felt needed to be altered or added. This process acted as a way of validating the information that had been assimilated. Essentially, BP&IM were saying to the process owners and business group heads, 'this is what we think you told us

about your strategies, did we get it right?'. The feedback from management was, in general, extremely positive.

The structure of the BSA document itself is interesting. The manner in which the results were structured and presented is of particular interest. The BSA document presented two sets of models — business group models and process area models. For each business group the model that was shown displayed four types of information — 1) a summary of the products, 2) the channels or ways in which the product(s) is(are) sold to customers (e.g. retail, dealer, direct sales, concessionaire etc.), 3) the 'business drivers' (success factors or main characteristics of the business group), and 4) how each core operational process is to provide support.

The process support dominated each model and was shown at the centre. The details were listed on a separate page (one for each model) and alongside each 'business enabler' a corresponding IM enabler was shown. To illustrate, the following table is an extract from one business group model.

Business Enablers	IM Enablers
Pan European Organisation	• Support for central applications to include e.g. price changes reflected across whole of Europe; capability to view orders by country & for whole of Europe etc. • Support for field staff – pull down of own "data"
Short sales & delivery cycle times	• Seamless interface with ISC [Integrated Supply Chain] for reduced lead time

Table 4.4 : Example Business & IM Enablers.

The next step in the BSA project was a plan to compare the IM enablers against current IM capability to identify the 'gap'. Subsequent stages of the project were supposed to develop IM strategy to address the gap.

With respect to process management, the analysis of the content of the BSA project adds little additional insight than that which was gained from the previous analysis of interview data. Some of that interview data was connected to this project. However, what this analysis does is provide *credibility* to the findings thus far (cf. section 3.5). The authors' participant experience as part of the BSA project provided him with an in-depth inside view of XL that has allowed him to present a more credible 'reconstruction' of the state and meaning of process management. BSA provided the author with a good awareness of the relationships between BP&IM, the process organisations, and business groups (see figure 4.14). The extensive focus on process as

a *method of structuring the results* of the project demonstrates the centrality of business process management at XL.

4.3.1.3 Process of the Project

There was no explicit attempt to follow a pre-defined process for conducting the BSA project. However, some aspects that are characteristic of process management at Xerox can be identified — these are documentation and a consensus approach to decision making.

All aspects of the BSA project were carefully documented. This provided a means to track progress and to record what had been done – an audit. The audit has a twofold benefit. It acts as a means by which the outcomes can be checked or validated and it forms the basis of the process that was *created*. If the BSA project was seen to produce 'good results', then the audit provides the basis for reconstructing the BSA process if it needed to be repeated at a later date.

The BSA project clearly demonstrated the consensus approach to cross-process decision making that was discussed in section 4.2.1.1. Input was sought from a wide cross section of the management population and the conclusions that had been drawn were validated with them.

4.3.1.4 Summary

In summary, the BSA project provides an understanding of the BP&IM view regarding who sets strategy or direction, who its customers are, and how XL is 'structured'. The core process organisations were portrayed as central to XL. The BSA process demonstrated the extensive use of documentation and an approach to cross-process decision making.

4.3.2 Selecting a Business Partner

4.3.2.1 Background to the Project

The aim of this project was to select a business partner (firm of consultants) to design and implement a major information system. This information system was to be based around applications software by SAP[4]. The 'SAP system' as it was referred to, was a critical part of the overall IM strategy that BP&IM had by that stage defined (cf. section 5.3). Essentially, the SAP system, which was also referred to as the 'back office' was a centralisation (in one location) of administrative processes (e.g. maintaining customer records, invoicing, maintaining contract records, credit collection, and accounting services etc.). It was to be a centralisation because these processes were performed by each entity for customers within their geographic location. The plan was to have an XL-wide (pan-European) centre at a single location for all these types of processes, for all customers.

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[4] SAP is the general name given to software produced by the German based firm SAP AG.

4.3.2.2 Content of the Project

The SAP partner selection (SPS) project was critical to BP&IM because the SAP system was to form an important cornerstone of the IM strategy. Investment in the SAP system was expected to exceed £10,000,000. The decision made by the SPS team was extremely important to XL.

Six possible candidate firms of consultants were each sent an invitation to tender (ITT). The decision had been made by senior management that 'six' was an ample number of partners to make a selection from. The view taken by management was that more than six would make the selection process too complex.

The SPS team compiled a list of criteria against which they were to judge each of the candidate partners. In all there were thirty-five separate criteria in five categories — company, consultants, experience, on-going support, and project-specific responses. Each member of the SPS team reviewed the proposal documents that had been sent to XL by each firm of consultants in response to the ITT. A score from 1 (low) to 5 (high) was awarded to each candidate against each criterion. Periodically, the SPS team met to compare their 'individual' scores. After lengthy discussion a consensus decision was made regarding the score for each criterion and a 'final' (group) score was given for each candidate partner.

With regards to process management, two of the selection criteria are particularly interesting. Both were part of the 'project specific' section where the 'scores' were given double weight (they were deemed by the SPS team to be twice as important as any of the other criteria). The first was labelled "Methodology to be employed, including [and] specifically for process design". This criterion questioned the 'process' that each candidate had proposed. The aim was also to determine whether the partner's process was compatible with Xerox's 'project management decision process' (TTM). In other words, the SPS team were looking to see whether the candidates' plans for action (processes) would 'work' within the process focussed Xerox method of organising.

The other interesting criterion was labelled "Estimate of critical success factors". The SPS team were looking for a "well argued rational case of what is required to make [the project] successful and *metrics to measure this*" (Xerox Ltd., 1998, emphasis added). As was discussed in earlier parts of this chapter a fundamental element of process management is 'metrics'. In this case the SPS team were looking for possible metrics by which the performance of the partners' processes could be measured. The quotation that was cited in section 4.2.3 is again pertinent:

"... the difficulty we have due to the fact that we use a lot of consultant companies — each company has its own

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methodology, with its own definition of process. And it's often a difficulty when you are working with an external company people – you can speak about process [for] hours and hours. What is important? It's important that you have defined clearly your map of the processes or process etc. to be sure that the company works properly" (κ, unit 696, 1998).

In this case however, Xerox were 'buying' someone else's processes for conducting the SAP project. The SPS team were not able to influence this but wanted to gain an understanding of what those processes were and how Xerox management were to assess their performance. The Xerox TTM process was to be used for managing the SAP project and the partner's 'process' needed to 'fit'.

The SPS team had an extremely specific task to conduct — to make a decision — which was part of the overall IM strategy. This analysis of the content of the SPS project does not contribute much to the understanding of process management that has been developed thus far. The *process* of the SPS project, which is discussed in the following section, is more insightful.

4.3.2.3 Process of the Project

The process of selecting a partner firm was new to the SPS team. Three aspects of this are characteristic of process management at Xerox. Two have been articulated in previous parts of this chapter — documentation and consensus decision making. The third may be referred to as 'information sharing'.

The SPS team documented the processes that they had developed and followed in the course of the project. Essentially, the processes were emergent (were formulated during the course of the project) but the SPS team had clear reasons for documenting them. The overriding reason was to provide a record of how their selection decision was arrived at. The process documentation 'shows' that the process was 'fair' and 'rigorous'. The approach could be demonstrated to an 'outsider' if necessary. The 'partner selection process' (PSP) was documented using the conventions of the XBPA and was written in generic process terms so that it could be *reused* if other selections needed to be made (by the SPS team or others at XL). The PSP is shown in appendix 3.

The selection process, as was stated in the previous section, involved plenary meetings of the SPS team members where consensus decisions were made. In addition to this, the candidates' proposal documents were sent to 'outsiders' (others within XL) for review. Their

results were also taken into account. The following is an extract from a communication between members of the SPS team.

> "Here is *X's* complete assessment. The only difference from our internal BP&IM assessment was to put *'candidate A'* significantly ahead of *'candidate B'*. Otherwise, X has come up with exactly the same sequence, which is *a good support to the process we have followed"* (names have been anonymised, Xerox Ltd., 1998b, emphasis added).

Open information sharing was a fundamental aspect of the SPS project. This is connected to the consensus approach to decision making that predominated because in order for the plenary discussions to be effective all members of the team needed to have all the relevant information. Any new information or documents were systematically distributed to all team members and a shared file-space for the sharing of any electronic documents was set up on the computer network.

4.3.2.4 Summary

To summarise, figure 4.15 is presented below. The figure shows the key aspects of process management which were observed by the author in the SPS project. The top half shows the aspects that relate to the content of the project and the lower half shows aspects relating to

its processes. The three elements of process management that are shown below the SPS team are all interrelated and hence double ended arrows have been used to join them.
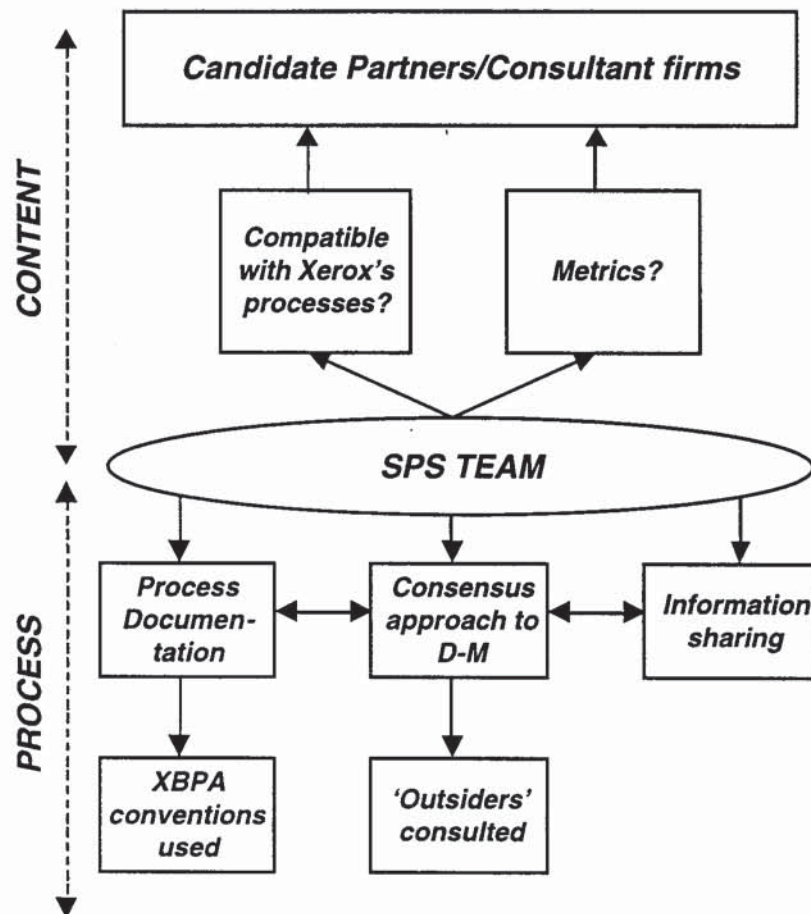
Figure 4.15 : Summary of Process Management Aspects in SPS Project.

4.4 The Xerox Model of Process Management

The aim of this chapter has been to present the research evidence from an analysis of various types of data that will allow the first research objective to be addressed : *to understand what a process-oriented enterprise is, how it is organised and what process management means.* This sets the context for investigating the role of

IM in a process-based organisation which is discussed in the next chapter.

By assimilating the results of the analyses of documentary evidence, interview evidence, and evidence from participant observation, a model of process management at Xerox Ltd. can be articulated. The model provides an understanding of what it is like to manage an organisation with a focus on business processes and a disregard for functional boundaries. Table 4.5 shows the key 'elements' of process management that have been determined thus far. Beside each 'element', the paragraph numbers that relate to the discussion of relevant data for each particular element are shown.

Summary Element	Section Numbers
Process Documentation	4.1.1, 4.1.3, 4.2.3, 4.3.1.3, 4.3.2.3
Process Areas & Boundaries	4.1.1, 4.2.1, 4.2.1.1, 4.3.1.2
Process Owners & Staffs	4.1.2, 4.2.1, 4.3.1.2
Process Responsibilities	4.1.3, 4.2.1.1
Exploitation of Process Metrics	4.1.3, 4.2.4, 4.3.2.2
Process Touch-points	4.2.1.1
Consensus Decision-making	4.2.1.1, 4.3.1.2, 4.3.1.3, 4.3.2.3
Consistent Process Definitions	4.2.2, 4.3.2.2
Process Commonality & Reusability	4.2.2, 4.3.2.2
Quality Tools	4.2.5, 4.2.6

Table 4.5 : The Key Elements of Process Management

Figure 4.16 (below) is a schematic that graphically represents the key 'elements' of process management that are listed in table 4.5. This figure forms part of the general model of process and information management that is presented later in chapter six.
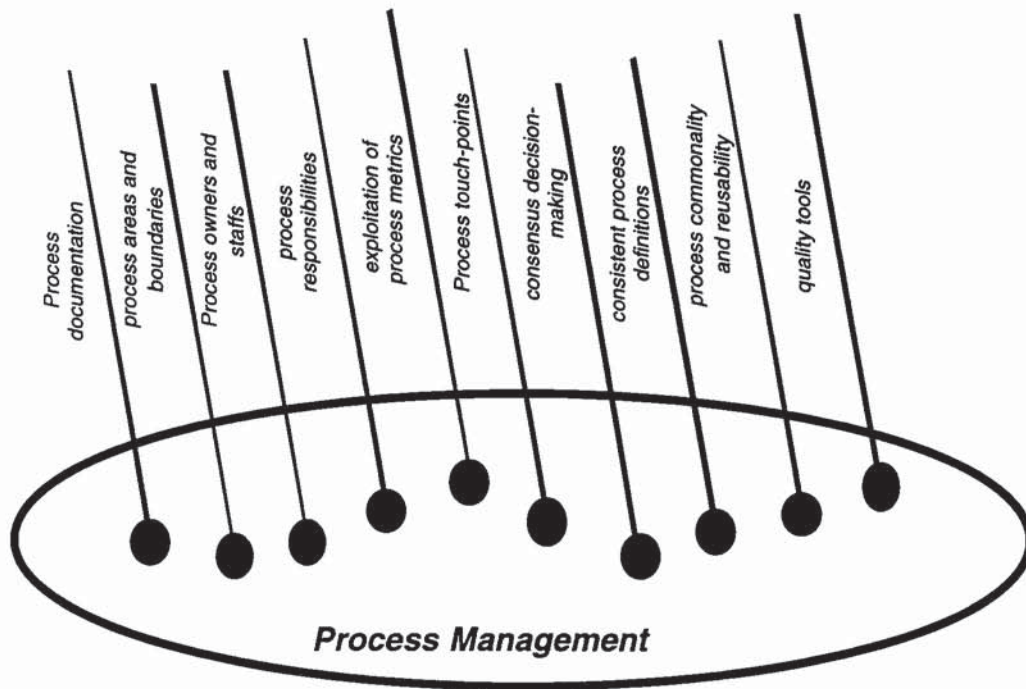
Figure 4.16 : The Key Elements of Process Management.

CHAPTER FIVE :

INFORMATION MANAGEMENT

5.0 Introduction

This chapter presents the research findings in relation to the second objective that was outlined in chapter one — *to investigate the role of the information management (IM) 'process' within the context of a process oriented enterprise.* In chapter two, the differences between academics' and IM practitioners' 'definition' of IM were discussed and this provided a rich understanding of what the IS field(s) entails. This chapter explores Xerox's definition of IM, particularly with respect to and within the context of process management. The 'definition' of IM that has been 'derived' from the data and presented in section 5.4 relates to the Xerox context and represents *the meaning of IM in a process-based organisation, namely Xerox.* The review of the IM literature themes in section 2.1.2 did not reveal any research in IS or IM that claims to refer to process-based organisations in any detail. This chapter contributes to knowledge in this area. It is structured in a similar manner to chapter four and is based around the data collection techniques that were used to conduct the field study (see section 3.3).

The data that were collected during the field work that contribute to an understanding of the state and meaning of IM include references to IM in the past and plans for IM in the future. These help in understanding

IM at 'present' (i.e. at the time of the field work 1997-98). The data 'reveals' that thus far, the Xerox model of (process-based) IM can been seen as having been 'built' in two main stages[1]. Where possible, the results have been separated to show this 'progression' and the sections have been labelled stage one and stage two accordingly. The stages in chronological terms relate to two periods, 1992-96 and 1997-99. Figure 5.0 shows the structure of this chapter and how data relating to each of the 'stages' has been separated for clarity (see the contents page for more detail).
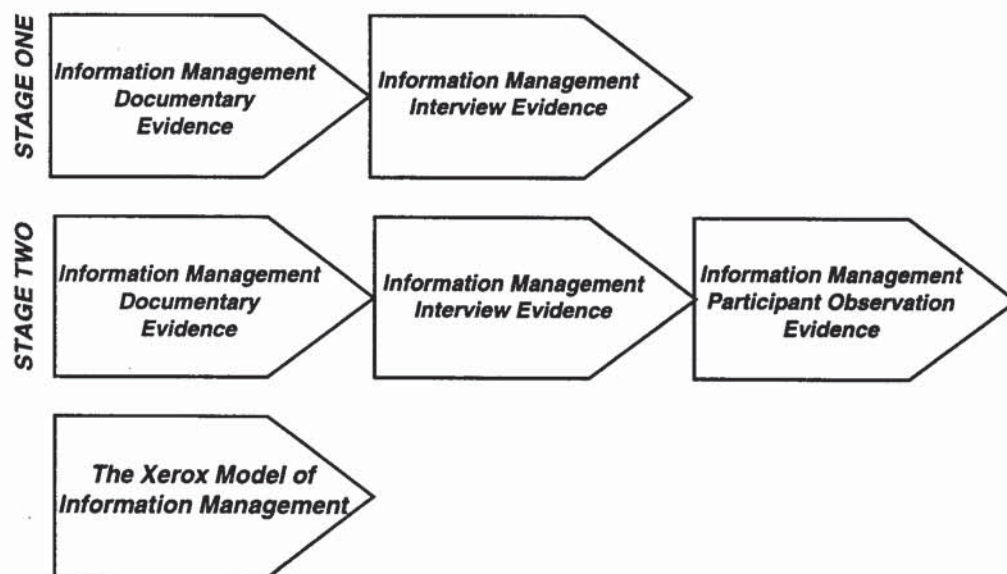
Figure 5.0 : Summary of the Structure of Chapter Five.

5.0.1 Documentary Evidence for IM

Throughout the field work the author collected many documents that help to build an understanding of information management at Xerox

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[1] The two stages have been 'created' by the author to distinguish significantly different contexts and states of IM.

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Ltd.. However, each individual document, (report, project plan, strategy announcement, memorandum, etc.) provides only a snapshot of a particular aspect of IM. IM at Xerox has changed dramatically over recent years and at each point in time the picture is a very complex one.

The documents that relate to IM have been grouped through the analytical process. Three main 'categories' of IM documents have been identified — strategy, structure, and programmes. Table 5.1 shows these and their respective sub-divisions.

IM Document Category	IM Document Sub-category
Strategy	• IM strategy • Core process needs and IM support plans (studies)
Structure	• Organisation • Physical architecture • Data architecture • Process architecture including applications
Programmes	• Business plans • Project (programme) plans • Progress reports (status) • Technical (infrastructure, hardware)

Table 5.1 : IM Document Categories.

Sections 5.1.1 (to 5.1.1.6) and 5.2.1 (to 5.2.1.3) present the results of the analysis of these documents. The objective is to present data that helps to build an understanding of what IM is at Xerox Ltd.

5.0.2 Interview Evidence for IM

The interview evidence for IM has been presented in sections 5.1.2 and 5.2.2 (to section 5.2.2.5). As was explained in section 3.3, the research interviews were semi-structured and qualitative in nature. Some of the interviews were conducted specifically for this research and others were done in the course of the projects that the author participated in at the case site.

Using the same approach as in the previous chapter (cf. section 4.2), the results that are presented in sections 5.1.2 and 5.2.2. have been compiled using the 'constant comparative method' (cf. section 3.6). To reiterate (that which has been explained in chapter 3), this technique involved the identification of 'categories' *from the data* to which more and more evidence was added until they become 'saturated' (nothing new is learned). The saturated category can then be articulated.

The sub-sections of 5.1.2 and 5.2.2 describe the major categories that have been identified from the interview data relating to information management for each of the 'IM stages' respectively. In the process of defining these theoretical categories, relationships arise. These have been used to build the 'model' of IM which is shown in section 5.4.

In order to preserve the anonymity of the respondents the same referencing convention that was used for interview data in the previous

chapter is used here. All interview quotations have been referenced using anonymous codes – a letter of the Greek alphabet, the text unit number allocated by NUD•IST (cf. section 3.7.6) and the year in which the interview took place (e.g. [μ, unit 44, 1998] – represents text unit 44 in interview 'μ' which took place in 1998).

5.0.3 Participant Observation Evidence

Of the three participant observation projects that the author was involved in (cf. section 3.7.2) two were presented in the previous chapter because they provided more information to help build an understanding of process-based management. The third project, 'the planning of IM strategy for the Europe, Africa, and Middle East region' is presented in section 5.3.

5.1 Stage One Information Management

'Stage one IM' describes the original developments in IM at Xerox which were intended to support the new process-based organisation that was being formed. It represents the research evidence that has been collected that relates to IM during the 1992-95 period. The majority of this data is documentary evidence but some references were also made to this 'era' during the research interviews.

5.1.1 Building Process-based IM – Stage One Documentary Evidence

The 1992-95 IM documents focus on six major elements. These are the main 'categories' that 'emerge' from the data.

> (1) Business Processes,
>
> (2) Data and Information,
>
> (3) Applications,
>
> (4) Technology,
>
> (5) Organisation

and   (6) Human Resources.

At a general level, these areas can be considered to constitute Xerox's definition of IM (at least during that period) — i.e. IM is a process that involves the management of each of these six areas. The following six sections (5.1.1.1 – 5.1.1.6) present the results from documentary evidence for each of these categories.

5.1.1.1 Business Processes – Documentary Evidence

In the previous chapter it was shown that the Xerox focus on managing by process began in 1988. The BP&IM 1992-95 strategy document shows that by 1992, there were explicit attempts to bring the process (XBA, see section 4.1.1) and information architectures together. The IM 'vision' in terms of business processes was described in the 1992-95 document as follows:

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

At this stage of IM development at Rank Xerox (RX), the 'aims' were to ensure that the process infrastructure was understood across RX and that it was implemented in a consistent manner. The 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" (ibid., p. 36). It is notable that the *responsibility* for process training and co-ordination is based in the IM group — hence the name BP&IM. It is the *management of business processes* that is co-ordinated by the central BP&IM group – for the entire RX region. This was 'logical' given management's desire to bring process and information architectures together. The following sections — the remaining five 'categories' provide insight into *why* this was the case.

5.1.1.2 Data and Information – Documentary Evidence

In terms of 'data and information' the 1992-95 strategic focus was that the BP&IM group would work towards providing RX 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 harmonising 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 harmonisation 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 5.1). The common data model was to eventually "support the information requirements of the Business Processes (in line with process design priorities)" (ibid. p. 49).

Aston University

Illustration removed for copyright restrictions

Figure 5.1 : Data & Information Strategy 1992-95.

Source : Rank Xerox, 1993b, p. 44.

5.1.1.3 Applications – Documentary Evidence

By 1992 it was recognised that in terms of 'applications' there was a considerable mixture of applications and databases across the operating units that were providing support to the business operations that was of 'varying effectiveness' (Rank Xerox, 1993b). Three key problems were cited with the applications environment at that time. Firstly, the 'time' it took to develop applications was unacceptable to management. Second, the 'cost' that was involved in applications development was also unacceptable to management. Third, there were problems associated with 'adapting applications sufficiently quickly in response to changing business conditions'. The applications

environment was highly fragmented (many different versions of the same application) and this led to increasing support costs. A main objective of the strategy that was presented in 1992 was to reduce IM costs to three per cent of revenue and consolidating the applications architecture was seen by Xerox's management as being critical to meeting this goal. Furthermore, although the applications that were operated throughout the RX 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-RX or global [pan-Xerox] level" (ibid., p. 57). In general however, the main strategic emphasis in terms of applications is the move away from applications that support business functions to 'business process driven applications'. By 1997 (stage two) this 'move' had only been partially achieved. Section 5.2.1.1 provides the next 'piece of the picture'.

5.1.1.4 Technology – Documentary Evidence

In terms of technology, the documented 1992-95 strategic plans identified the high costs of RX's technological diversity. The technological diversity in terms of computing was such that there were more than fifty-five development tools and languages being used and nearly fifteen different network protocols in operation. Centralised computing was suggested in documentary evidence as being a more

efficient manner through which costs could be controlled. In general, the rationalisation of technologies was presented as the way forward during this 'first stage' of IM development. Three critical success factors were identified for the future technology strategy — (1) the co-ordination of technological directions throughout RX, (2) the use of measurable and benchmarked software & hardware tools, and (3) a continuous emphasis on learning about and investment in new technology.

5.1.1.5 Organisation – Documentary Evidence

During the 1992-95 period plans were made for the re-organisation of IM. Documentary evidence shows that 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 as opposed to the local unit level that was being experienced during the early part of 'stage one'. This 'need' was also reflected in the evidence relating to the management of data and information (see section 5.1.1.2). The second reason was presented as a 'request' by senior management for the BP&IM group to lower costs — from 4.5% of revenue, to a benchmark (typical of other high technology industries) figure of 3%. In fact the lowering of costs features highly in much of IM documentary evidence. The third 'reason' for re-organising the IM organisation that can be identified through the documentary evidence is critical to the research in this thesis. It is reflected in the following quotation:

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

This was emphasised in a diagram that was presented in the 1992-95 BP&IM strategy that showed the driving need for change in the IM organisation as being RX's business process focus. The following quotation is indicative.

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

The organisation structure that was proposed in documentation that relates to 'stage one' is similar to that which the author found during his field work. Four types of IM groups were described — they are listed below and illustrated in figure 5.2.

(1) the Central Strategic Group (for policy development and centralised coordination of business process, architectures, and applications development),

(2) the Business Process and Application Solutions Groups (organised to support the core XBA processes, coordinating business process and applications solutions),

(3) Central Support Services Organisation (technology and technical support),

and, (4) Customer Focus Groups (IM groups to support users in the RX entities).
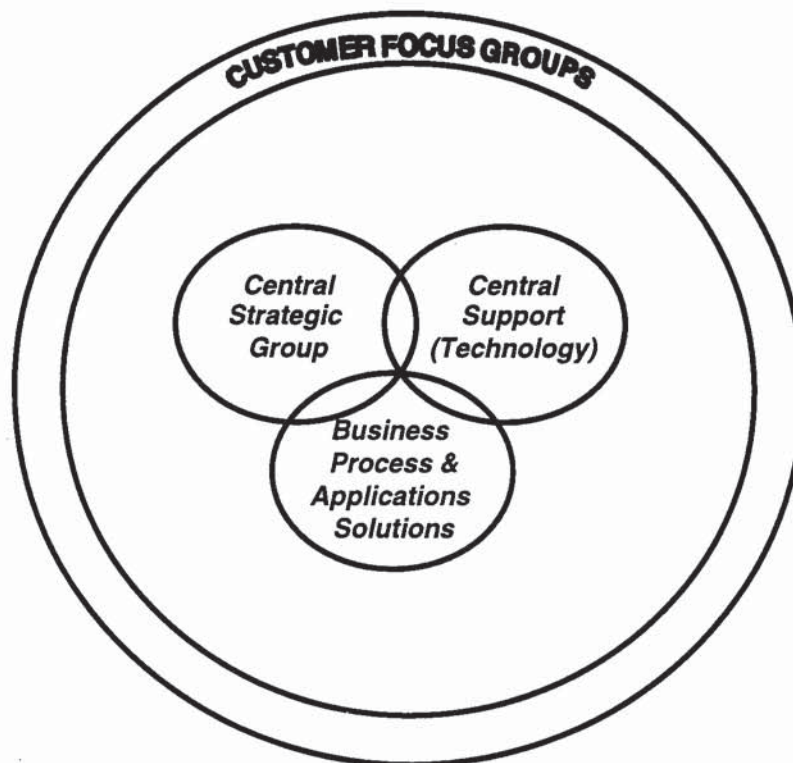
Figure 5.2 : 'Stage One' IM organisation.

5.1.1.6 Human Resources – Documentary Evidence

The fundamental message in this category was that because of changes in the nature of IM (they were referred to as IM trends), the *skills requirements* within the IM group would need to be transformed. The key changes that were addressed are summarised in tables 5.2 and 5.3.

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

Table 5.2 : Change in IM Skills.

Source: Rank Xerox (1993b), p.101.

PAST	FUTURE
Hierarchical organisation	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

Table 5.3 : IM Trends.

Source : Rank Xerox (1993b), p.102.

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 RX. Particularly important is the

recognition (shown in table 5.3) of the company's move away from a hierarchical and functionally oriented organisation. The assumption was that unless the changes detailed in table 5.2 were implemented, the IM group would not be in a position to effectively and efficiently support RX as a process focussed organisation. Of these changes, those that are most important to this research 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*.

5.1.1.7 Stage One IM – Documentary Evidence Summary

In summary, the documents that relate to 'stage one IM – 1992-95' emphasise three things – the management of IM costs, the ways that BP&IM need to change in order to provide improved *support* to RX, and that changes need to take place in IM because of the RX transformation to management by business process. Figure 5.3 is a summary of the key documentary findings thus far.
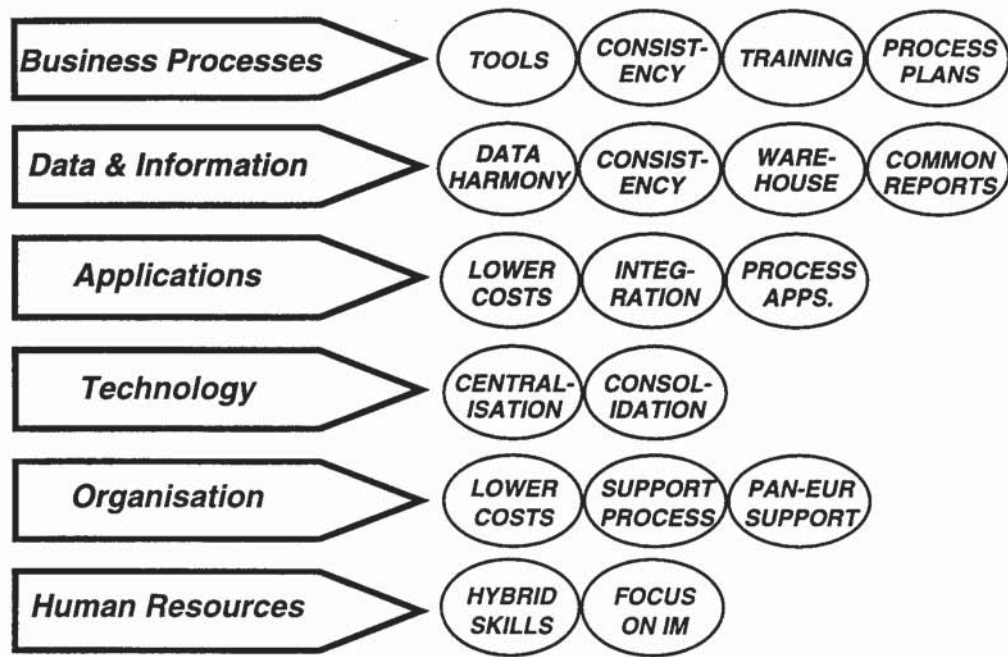
Figure 5.3 : Process-based IM – Stage One.

5.1.2 Building Process-based IM – Stage One Interview Evidence

There is little interview data to provide insight for the period that has been referred to here as 'stage one IM' (1992-1996). Considerable understanding can be built from documentary evidence that has been presented above, however, few respondents referred to this period. A useful exception are the occasional references that respondents made to 'Region A'.

The Region A systems were mentioned by four respondents. Region A is a collection of information systems which are 'common' to all but three of the RX countries. The exceptions are France, Germany and the UK (ζ, 1997). The Region A systems were built to support business functions (customer records, finance, sales and logistics) although by

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1997 there were many versions of the same applications throughout XL. A basic level of IS commonality had been achieved in the ten Region A countries. Evidence from interviews suggests that there were two reasons why it was possible to achieve such widespread co-ordination and extensive implementation of commonality — 1) because the necessary resources were made available, and 2) there was strong leadership and firm management. The following two quotations are representative of this.

> "But at the moment they can always say, 'Well it can't be done because... it's different, and we lose too much and so on. It needs management input. And that's the way it happened successfully in what was Region A. It's the only way it happened. Because the guy who ran it at the time said, 'Don't argue with me. If you want to keep your job you do it!', to his general managers — so they all wanted to do it" (ι, unit 963, 1997).

> "... so they had done a single solution and Rod had money and people who built the Region A solution" (σ, unit 307, 1998).

The bulk of the remainder of interview evidence relating to IM is about IM at the time that the field work was conducted (1997-98) and plans for the future of IM. This is presented in section 5.2.2. Thus far, the documentary evidence relating to stage one IM has largely consisted of

'plans' or intent. The evidence that has been presented as stage two IM shows how successful (or not) these plans had been.

5.2 Stage Two Information Management

Stage two IM describes the state of IM at XL during the 1996 – 1999 period. The majority of the interview data that was collected during the field study provides information that helps build an understanding of IM during this period. During stage two, IM was continually being re-focussed and reorganised so that it could better support the Xerox process model (cf. section 4.4). The following sections (5.2.1 – 5.2.1.3) present the analysis of the documentary evidence for stage two IM.

5.2.1 Building Process-based IM – Stage Two Documentary Evidence

For stage two IM three major categories emerge that are amalgams of the categories from the stage one IM documentary evidence. Figure 5.4 shows the categories from each stage and how they are grouped in stage two.

STAGE ONE

STAGE TWO

Business Processes

Data & Information

Applications

Business Process led
Common Applications

Technology

Technology

Organisation

Human Resources

Centralisation of
BP&IM Control
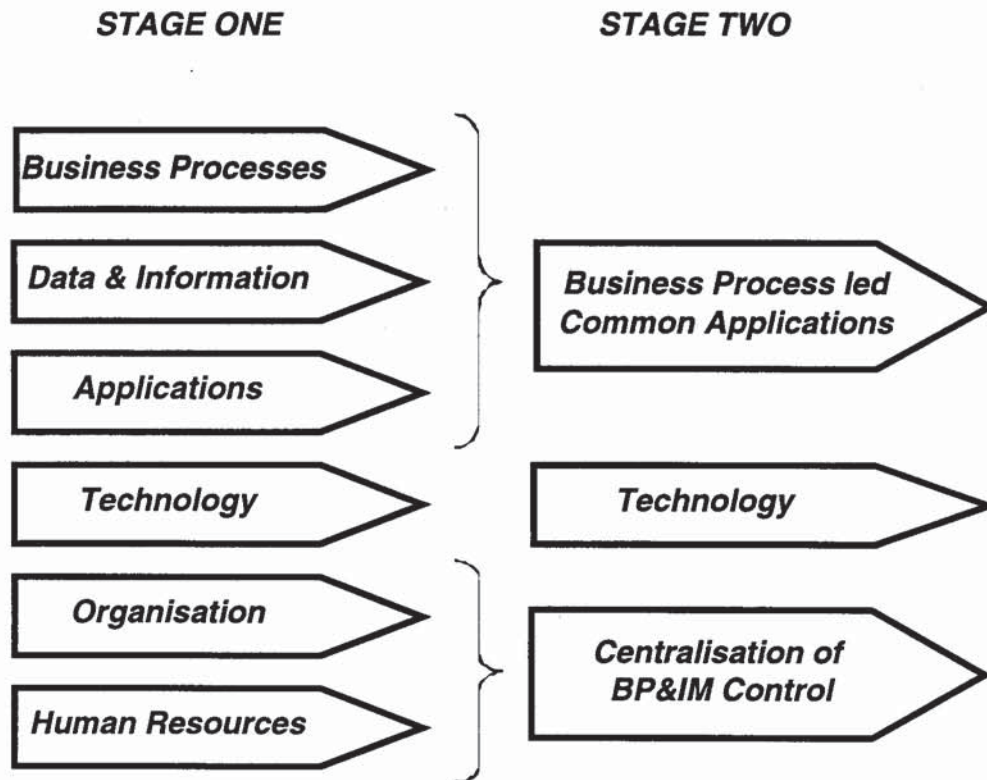
Figure 5.4 : Stage One and Two IM Categories.

5.2.1.1 Business Process Led Common Applications – Documentary Evidence

By 1997 there were more than 1300 applications in operation across XL. The applications in France, Germany, UK, Spain, Central and Eastern Europe, and the Middle East and Africa are considerably different from each other. The remaining countries that were part of the Region A database (cf. section 5.1.2) did in general operate 'common' applications. Because many of the 1300+ applications were used to support business processes that were now represented by the XBA (cf. section 4.1.1) they were classified by process area. Many of the applications had been modified in each location (country, business unit

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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. In one BP&IM document the extent of this fragmentation of 'common' systems was quantified. The applications were sorted by core process area and the 'diversity' shown.

"Across XL...

- 70+ implementations of common CS systems

- 60+ implementations of common MTC systems

- 30+ implementations of common GTR (finance) systems

- 25+ implementations of common ISC systems"

In stage one IM, the XL-wide mixture of applications was considered unsatisfactory (cf. section 5.1.1.3). By 1997, and congruent with the strategic plans that had been documented during stage one, some degree of applications 'commonality' had been achieved. However, the multiple implementations still produced high fragmentation. This high fragmentation of the applications architecture was seen by management to be unsatisfactory. Two major problems were emphasised in documentation and these are highly similar to the problems expressed during stage one — (in)flexibility and (high) cost. In terms of flexibility, implementing any changes to the existing applications on an XL-wide basis is extremely difficult. For example, a change to the CS systems would need to be made to 70+ different but

'common' applications. This was further complicated when in July 1994 RX had 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 XL's IM costs — especially now that a third party was paid to make the changes.

A critical point for IM came in late 1997 when a major process and information management re-organisation was planned. In terms of applications, the strategy that was documented showed a plan to implement a single 'core application' to support each core business process area. The plan was that these core applications would be implemented throughout XL 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 *standardised* throughout the XL region. The core applications were being 'developed' centrally by BP&IM and in close collaboration with the core process owners.

In general a 'package' approach to applications development [sic] was being used by BP&IM. This meant that where possible 'off-the-shelf' software applications were purchased. These were then 'tailored' to meet process needs. The 1992-1995 strategic plans had recommended a package approach 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 Market to Implementation 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 XL (all but the large 3 OPCOs) to support 'telephone selling'. The package was not suitable for a large scale operation such as XL and hence an in-house application with enhancements to satisfy the large trading companies (UK, France, and Germany) was being developed.

More detail with respect to applications is provided from interview evidence in section 5.2.2.3. In the following section documentary evidence regarding technology issues during stage two IM is presented.

5.2.1.2 Technology Consolidation – Documentary Evidence

In central BP&IM a small group of people is responsible for the management of technology and infrastructure throughout XL. As is shown in figure 5.2 (stage one) the plan had been to have such a group

(Central Support – Technology) and during stage two this group was called Technology and Architecture (T&A). As was explained in section 5.2.1.1 Xerox had signed an outsource agreement with EDS. A large part of this agreement was for EDS to manage the implementation and maintenance of the technical infrastructure and computing hardware for XL. The T&A group at the centre were effectively left to manage the T&A strategy and to co-ordinate the EDS contract.

During stage one the diversity of XL's technological infrastructures had been identified and this was presented as unsatisfactory. By 1997 documentary evidence shows that there were 7 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.

"1998 focus is the deployment of Common Systems on a consolidated processing platform" (Xerox Ltd., 1998c).

A major concern for the T&A group was to provide increasing integration between applications, databases, and infrastructures. This was expressed in documentation as 'interoperability'.

> "Interoperability between core process areas and the extended enterprise is a fundamental requirement" (ibid.).

This interoperability was to be achieved through an arbitrating layer of infrastructure (integration layer) which is known at XL as 'message broker'. This is a highly complex application which allows applications that are incompatible with each other to become integrated.

In summary, the T&A emphasis is on continual consolidation and integration of architectures and applications respectively. This consolidation was seen by management as requiring strong centralised control. This is discussed in the following section.

5.2.1.3 Centralisation of BP&IM Control – Documentary Evidence

There is little documentary evidence in this category, but coupled with participant observation data (corridor conversations and those around the photocopier(!)) the author is able to provide important data. The BP&IM strategy presentation which was presented to senior management in late 1997 and early 1998 stressed that BP&IM at the centre would need to "Take Control" (Xerox Ltd., 1997b).

This bold statement to senior management was an implicit admission that the 'centre' did not have control but needed it in order to implement the centralised core process applications strategy that was being proposed. Effectively, control needed to be taken away from IM management in the entities. What was really being taken away was the 'freedom' that the management in the entities had to diverge from central BP&IM plans. This freedom was seen by BP&IM 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 to support business needs. IM costs were shown in BP&IM documentation to be increasing (ibid.). 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 centre.

5.2.2 Building Process-based IM – Stage Two Interview Evidence

The documentary evidence that is presented in the previous sections provided good insight to the documented problems, and IM plans. The interview evidence which is presented in the following sections provides an understanding of respondents' view of IM. Five major 'categories' are presented in separate sections which follow.

5.2.2.1 IM Organisation and Roles

Considerable understanding of IM at Xerox can be gained by considering its organisation and the roles of the people who work there. Organisation charts for BP&IM at XL do exist but they are a very 'sterile' form of information and provide little understanding of what IM people actually do. Throughout XL several IM organisations can be identified. These are shown in figure 5.5 below.
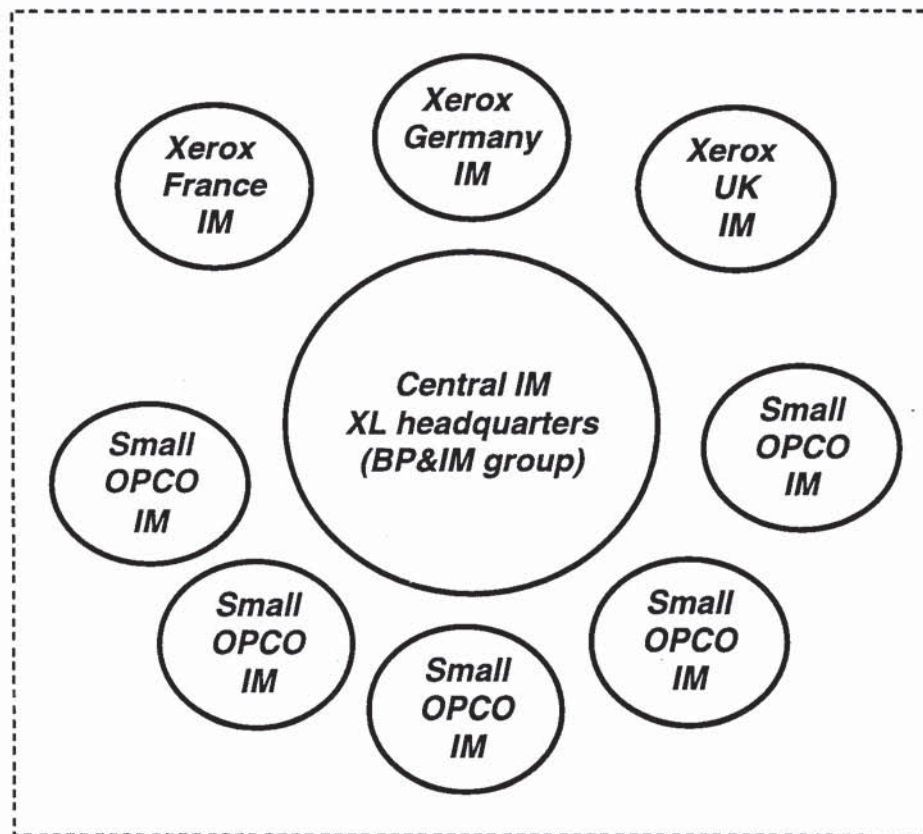
Figure 5.5 : High level IM organisation.

The diagram shows a large central IM group which is surrounded by IM organisations in the trading companies. The majority of this research took place at the central IM group BP&IM. As was explained in chapter

three, some interviews were also conducted in the IM organisations in Xerox France and Xerox UK. Xerox France, UK, and Germany have relatively large IM organisations whereas the smaller OPCOs have few IM staffs.

"They've got a big IM organisation in the UK ... France has got quite a big one..." (ι, unit 201-203, 1997).

An indication of the size of the large IM organisations that are outside of central BP&IM was given by the IM director of one of the OPCOs:

"... IM spend is roughly $30M per year, and we have to have somebody... to clearly manage the cost and the investment" (κ, unit 146, 1998).

Another IM director stated that his IM organisation cost more than three per cent of gross revenue (ρ, 1998). In stage one IM the strategic plans showed that customer focus groups were needed to support local IM needs. These 'peripheral' IM organisations, those in the trading countries qualify as this type of group. In terms of organisation the director of one of the larger OPCO IM organisations commented:

"... you'd see IM provided as an umbrella service to the company" (ρ, unit 123, 1998).

There was strong evidence to suggest that the peripheral IM organisations were closely involved with business process management. In many cases they were also called 'BP&IM'. The following quotations are typical of the comments that IM managers in the peripheral organisations made with respect to their organisation.

"We are totally organised on the – I don't know if you know the Xerox Business Process Architecture?" (λ, unit 184, 1998).

and

"They are not organised by technology, for example, they are really organised by process" (κ, unit 104, 1998).

In general, the three large peripheral IM organisations (France, Germany and UK) were involved in developing systems to suit their own needs whereas the smaller organisations co-operated with IM strategy that was driven by the centre. BP&IM at the centre was where the majority of this research took place.

The structure of BP&IM at the centre is similar to that which was proposed in the documentation from stage one (cf. figure 5.2). Two main groups exist. The T&A group has already been discussed (cf. section 5.2.1.2. The other group, the Business Process & Solutions Deployment (BP&SD) group, is the largest. This is the core of BP&IM at XL. It is organised by core business process area and is managed by

eighteen 'Programme Managers' (see section 5.2.2.2) and the BP&SD manager. The organisation by process area is important because BP&IM primarily provide support to the core process owners (cf. section 4.1.2).

"So we support the process owners and that's by far the prime objective that we have" (ξ, unit 481, 1998).

This substantiates previous evidence regarding the 'internal customer chain' (cf. figure 4.14). The programme managers work closely with process owners and through them with the business groups (the users).

5.2.2.2 Programme Managers

The programme managers each have an area of responsibility which usually includes the management of the (continual) development and implementation of applications to support a process area. The continual development is important and is why these people are *programme* managers and not *project* managers. The programme manager supports process and application throughout its 'life'. The programme managers have complex roles. They work closely with process owners to develop new processes and to implement changes when they are needed (e.g. to support changing business needs). Where new applications are needed the process owner will manage the process of selecting appropriate applications (off-the-shelf) and with the support of

the T&A group choose appropriate technology platforms. The development and implementation of applications is conducted through third parties and the programme manager co-ordinates this. When new applications and the processes they support are ready for implementation the programme manager manages their 'roll-out' through the XL trading companies.

Through interview evidence, five major 'roles' of programme management can be identified. These are shown in figure 5.6.
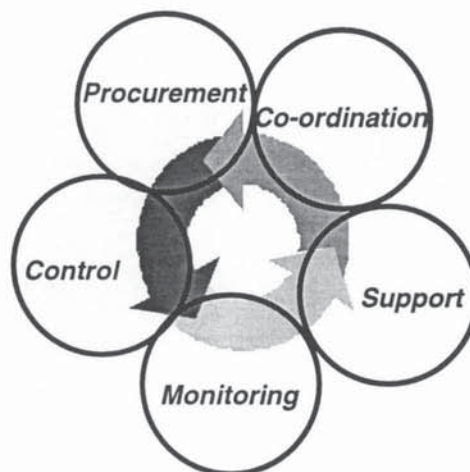
Figure 5.6 : Programme Manager Roles.

One interviewee gave a good summary of the role of the programme manager:

> "... the person that's got overall blanket responsibility for THE
> project whatever it is... a person that's responsible for delivering
> the project in terms of its business case – of doing the annual

reporting, the progress reporting, through to the delivery and the management – reporting the performance — the achievement of the objectives" (ρ, unit 489-499, 1998).

5.2.2.3 Applications

The existing applications portfolio is complex. As was shown in documentary evidence there are in excess of 1300 applications running on several different technical architectures. This medley of applications and technologies is not providing effective support for the process-oriented enterprise.

"... 'process management' at the moment. It's horrible really because we've got such mish-mash and hotchpotch of applications. And it's getting to the point now - for example the DPG thing 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" (ζ, unit 1600-1604, 1997).

There are two main contributors that can be identified from interview evidence that have caused the IM environment which is 'struggling' to support the process model:

    • applications and processes have not evolved in parallel,

and   • 'empowerment' provided flexibility to operating units to diverge

      from centrally co-ordinated models (both IM and PM).

In section 4.2.2 it was shown that there were problems with the process architecture because the documented processes are most suitable for the ODP business model. Similarly, current applications are characteristic of the 'old business model'. They 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. XBS) could not be supported using existing systems (ζ, unit 1623, 1997).

The three largest OPCOs had considerably different applications to each other. The diversity across XL was the reason that management at the centre gave for their problems (time to develop applications and cost of change). But these were also the reasons given by management of the large OPCOs for their becoming divergent, the centre could not support them quickly enough nor cater for all their needs. A circular problem exists. An IM manager in a large OPCO commented:

> "And why these system are not used? Because well, ...we have the experience with FLS for example. We have a stock of 10 change requests, functional change requests, and our stock is of 10 since 3 years... And we know that these 10 change request will never be implemented" (ϕ, unit 405, 1998).

This highlights the problem that central IM cannot deliver with the speed that the OPCOs demand. The other problem, that central IM cannot provide adequately for all the needs that are demanded by the OPCOs is reflected in the following quotation.

"And the problem is here [points to central BP&IM on diagram]. They discuss announcements, strategy and so on, but after, they want to implement something, the first choice is the same system for all people... when all functionalities needed by all countries are covered, but experience indicates that's impossible [laughs] because there's too many countries... And when we want to implement a central system in our existing applications [architecture] we have duplicate functionalities in fact - some are covered by the new system and also are already covered by our existing system. Sometimes, a few number of functionalities are new and some old functionalities are not covered by a new system. And what happens, first we could use ... in fact we use the new system only for new functionalities, maybe not for functionalities already covered by the old system — or we don't use it! [laughs]" (φ, unit 368, 1998).

Essentially the root problem is the fragmentation of applications and processes. Figure 5.7 shows the problem of increasing applications and process fragmentation. The result is that BP&IM at the centre is

rendered ineffective with respect to the large OPCOs (France, Germany, and the UK).
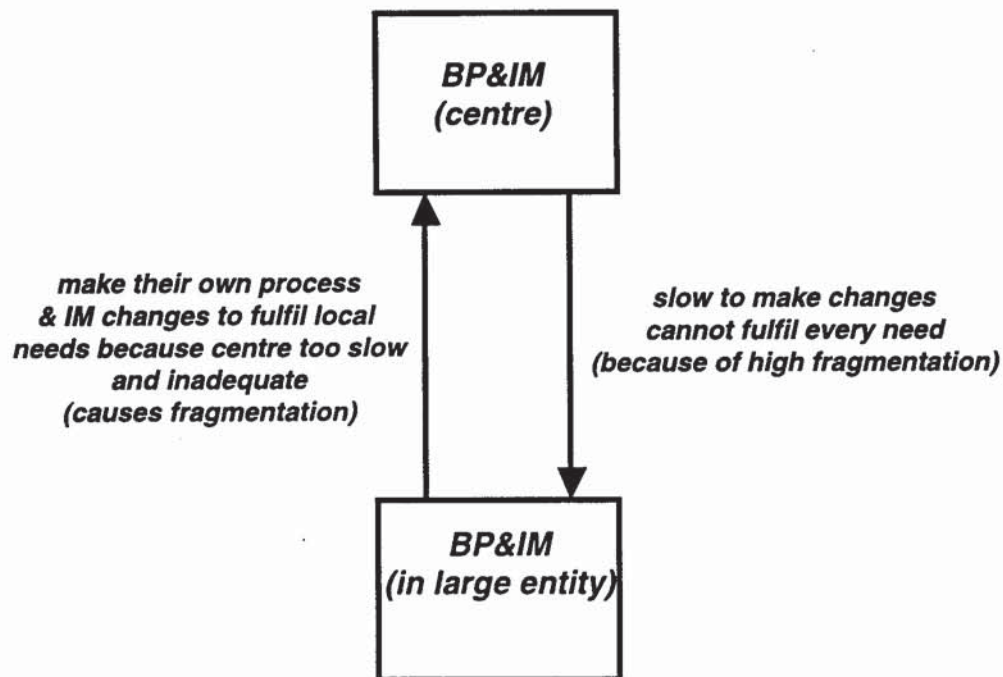
Figure 5.7 : Fragmentation Causes Fragmentation.

The view from the centre is equally 'distressing'. The fragmentation causes increasing complexity and high costs.

> "... problems that we have with this kind of configuration is that it's an upgrading nightmare. It really is. What we tend to do, there's no such thing as a 'vanilla implementation' we've discovered. We first put the system in Belgium back in 19, erm, 1994. And since then, every single country that we've put it into, there have been custom changes. Because even though they work off the same basic systems, most of the time anyway, they

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have got different processes and procedures, short-cutting this, bastardising that..." (ζ, unit 704-710, 1997).

The effect of *allowing* process and application change means that from an enterprise-wide perspective there is little commonality between entities. Chapter four showed that this was true of business processes and the IM results show a similar situation for applications. The business strategy that was presented in 1997 called for *common* processes. BP&IM were responding with common applications support. The status quo needed to change. The intent to do this was reflected in section 5.2.1.3 above – for the centre to 'take control'. One respondent made the following germane comment.

"You can't have empowered – I don't think you can have an empowered organisation that is process-oriented, otherwise you end up with loads of processes. You can have more of an autocratic organisation that drives a common process – then I think it might work" (ν, unit 378, 1998).

And this is precisely what had happened at Xerox. Freedom to diverge from a centrally co-ordinated 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. Management in 1997 wanted to change this.

> "... they have big problems here in Marlow [central BP&IM] because, you know, a lot of this is kind of 'fluffy empowerment' kind of thing and our role is not to direct it's to support. Well abolish it. NO — there are certain things that are so important that you DO direct. You do say, 'I want TeleMagic - And I don't care, you're going to do it' – they won't do it as if by magic!" (ζ, unit 1516-1521, 1997).

5.2.2.4 Operational Approach to Management

It was suggested by several respondents that managing with a process focus 'promotes' an operational approach to management. The common approach in IM at XL is to look at answering the problem of 'how can systems/applications support the operations' (ν, 1998). This is an *operational* approach to IM. Management information and enterprise-wide information is secondary.

The *package* approach to systems development which is used at XL involves the evaluation of off-the-shelf applications. In doing this, 'flexible' applications are investigated — those that allow process variation. The focus is not to look at the 'outputs' that can be produced by the application, but *to ask 'Can the system do what XL want it to do*

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— 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 is totally on the 'operation' at process level — on the *way of doing things.* The 'data' in the system is 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, is lost. The benefit of this approach is that IM is 'close to the business':

> "...because here, because it's so process driven, it's far more business-oriented, we seem to get much closer to the business process and the people who are operating the process, and understanding what it's all about, and then looking for a system to support it" (v, unit 76, 1998).

Consequently IM understands *why* things are done the way they are, rather than building what 'IM thinks is best'. This operational approach to IM is seen at XL as being a more pragmatic approach to systems development that is quicker than traditional data centred methods. The loss of enterprise-wide data is caused by each process area 'requiring' their *own* data. Each have different definitions for many of the same things (e.g. customer).

A good example to illustrate the problem was given by the programme manager who was responsible for the Customer Services (CS) core process and systems. The following is a summary of her account:

> In a business process driven organisation a problem may arise with customer queries. These can be different. There might be a query on the payment of the customer's account, or to do with equipment that has been ordered but that has not arrived, or maybe a CS query about what's happening to the status of their previously logged service problem, or there might be a query on their order (production order). Each one of these touches a different core process, Market to Collection, Governance to Results (finance), CS, or Integrated Supply Chain. There are 4 different queries, and 4 process areas — potentially 4 different systems. Usually systems have been provided for process areas but to the customer it's one query. Do they phone four different people? Do they phone one person? Does the query get logged and managed in one system that feeds off the other four? Or does it get logged and managed in each one? Or there may have been a problem such as a mistake on an invoice making the customer very angry. Then the next day the same customer calls for service, we need to speak to the customer carefully – but now they're talking to a whole different department, unaware of the previous query.

The centralisation of IM was proposed by central BP&IM in their 1997 strategy to 'solve' many of the problems regarding fragmented process and applications architectures.

> "... and our strategy is to migrate to a common, centralised, applications base from which we will be able to provide better support to the business" (ι, unit 389, 1997).

5.2.2.5 Centralisation of IM

The future (plans) for business processes and information management can be characterised by the following keywords: centralisation, consolidation, simplification, rationalisation, commonality, and consistency. The centralisation of applications and processes in separate pan-European organisations were planned to achieve strategic goals — lower costs, and increased productivity and customer satisfaction. Centralisation was considered to be the key to supporting the process model of organisation — a model that includes enterprise-wide process commonality.

> "Whereas if you've got a centralised driven organisation, you can bring this model in very easily because then IM and the business just work together and deal with users in one process – it's one process improvement – it's not many" (v, unit 368, 1998).

Enterprise-wide management information which was considered by management to be critical for implementing long term corporate strategy was to be gained through the centralisation of IM. Business processes that do not require direct engagement with the (end) customer were to be centralised in pan-European centres. For example, 'back-office' processes for the entire XL region (e.g. invoicing, credit collection etc.) were being centralised in a single centre in Dublin, Ireland. This was to be achieved through the core applications strategy (cf. section 5.2.2.3). In section 5.3, data with respect to the authors' participant observation in the formulation of BP&IM strategy for the XL region is presented.

5.3 Information Management : Participant Observation Evidence

The results in this section are presented in the same format as the participant observation data in chapter four. Data relating to the process and content of the project are presented (as far as is possible) in separate sections. The project that is described is the authors' involvement in BP&IM's formulation of strategy for the entire XL region (Europe, the Middle-East and Africa).

5.3.1 Content of the Project

Much of the content of this project has already been presented in parts of the previous sections of this chapter. The project team consisted of five members of management, and included the director of BP&IM.

Essentially however, the project aimed to document BP&IM's 1997-2005 strategy. In late 1997 and early 1998 the BP&IM director presented the strategy to senior management from the parent US company (Core Enterprise Team (CET)).

The key content of the strategy which was 'ratified' by management of the CET is summarised in the following:

- consolidation of process and applications and architectures

- single core process systems

- applications adaptations by operating units not to be allowed

- centre to take control

- centralisation to create 'IM critical mass'

and, • XL is seen by the CET as distinctly separate from the rest of Xerox and can thus formulate 'separate' strategic plans.

Several strategic targets were defined by the strategy team and these were largely in 'response' to supporting business strategy and the BP&IM's customers' needs which were revealed from a previous project (cf. section 4.3.1). In summary the 'targets' were to:

- lower costs

- respond faster to business needs

- provide IM flexibility

- focus on a 'Business Information' view

• streamline the IM organisation (internal processes)

and   • provide common XL-wide solutions (applications).

A fundamental part of the strategy formulation was to plan the implementation of the restructuring of IM – the centralisation of applications, data and processes. This was to be coupled with major business change and reorganisation that was to be announced (the centralisation of all but customer facing processes). IM strategy was fundamental to supporting business strategy. The 'new' business processes were to be inextricably linked with information systems – the core applications.

5.3.2 Process of the Project

The process relied heavily on plenary meetings between the strategy team members. Brainstorming techniques were used to generate solution ideas and tasks were allocated for team members to work on individually between meetings. Activities were thoroughly documented and the general aim was to produce a strategy document that could be published to the rest of XL.

The project followed the initial processes of the Time to Market core process. This process is essentially a product development and delivery process and in this case the product was the IM solutions (applications). The initial phases of the process are to define 'vision', this is followed by

the identification of customers and markets and the plans to support them.

BP&IM presented a two pronged rationale in support of their strategic objectives. The strategy was based on revealing the current (1997) IM problems and presenting a plan that would alleviate these and support XL's business objectives at the same time. The analysis of business objectives had been structured around the business groups and core business processes (see section 4.3.1). Consequently, the strategy was organised around the core business processes — applications to support processes.

5.4 The Xerox Model of Information Management

The Xerox model of IM is an evolving model. In an internal memorandum one IM manager commented:

> "probably more importantly than cost(!!), it [IM] *provides critical support for our current business processes*, and yet must still evolve at a tremendous rate to meet the ever increasing demands of business and market place complexity and change".

Table 5.4 shows the key 'elements' of information management that have been determined thus far. Beside each 'element', the paragraph

numbers that relate to the discussion of relevant data for each particular element are shown.

Summary Element (Information Management)	Section Numbers
IM Close to Business	5.1.1.1, 5.2.2.5, 5.3.1
Diverse Data Models	5.1.1.2, 5.2.2.5
Fragmented Applications Architecture	5.1.1.3, 5.2.1.1, 5.2.2.3
Fragmented Physical Architecture/infrastructure	5.1.1.4, 5.2.1.2
IM Organised by Process Area	5.1.1.5, 5.2.1.1, 5.2.2.2, 5.3.1
System 'Commonality' Among Smaller Entities	5.1.2, 5.2.1.1, 5.2.2.3
'Empowered' Peripheral IM Organisations	5.2.1.3, 5.2.2.1, 5.2.2.3
IM Close to Process Owners	5.2.2.1, 5.2.2.2
Operational Approach to IM	5.2.2.4

Table 5.4 : The Key Elements of Information Management

Figure 5.8 (below) is a schematic that graphically represents the key elements of information management that are listed in table 5.4. It represents the state of IM in 1998. In general this model of IM provides unsatisfactory support for the Xerox model of process management and hence considerable IM change was planned in 1997.
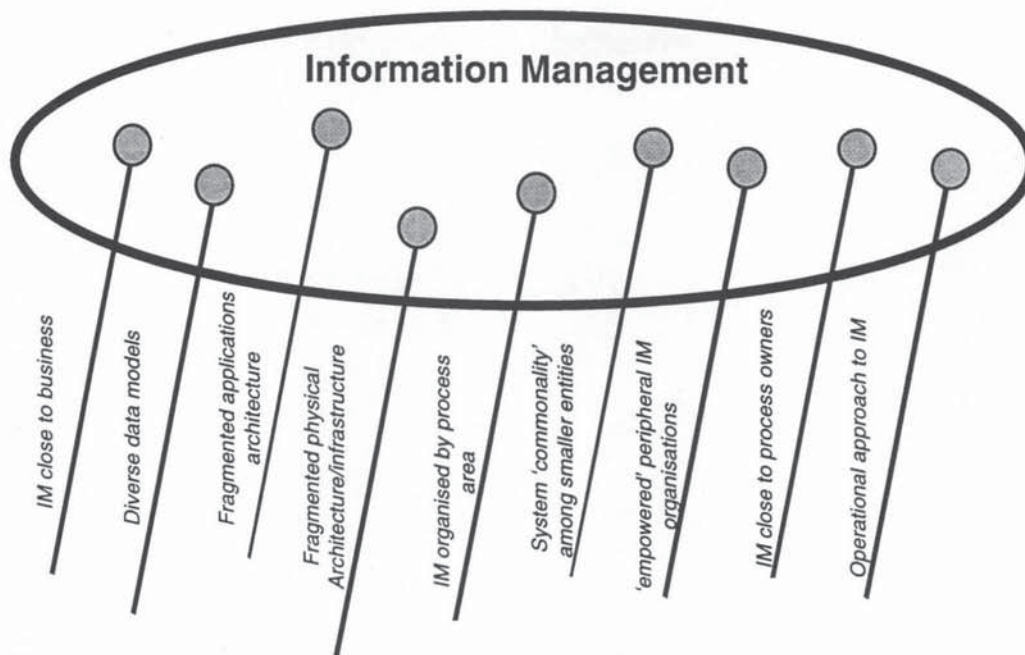
Figure 5.8 : The Xerox Model of IM in 1998.

CHAPTER SIX:

INFORMATION FOR PROCESS MANAGEMENT

6.0 Introduction

This chapter draws together the research data that has been presented in the previous two chapters to consider the third research objective — to understand the relationship (if any) between process and information management. The chapter has been structured to first look at the relationship from a process management perspective and then from that of information management. The two 'smaller' theoretical areas that were discussed in chapter two are then 'revisited' in the light of the results. Figure 6.0 summarises the structure of this chapter.
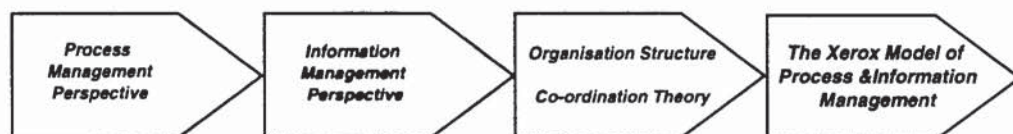
Figure 6.0 : Summary of the Structure of Chapter Six.

6.1 Process Perspective

Chapter four concluded by presenting the Xerox model of process management. This is shown again in figure 6.1 below.
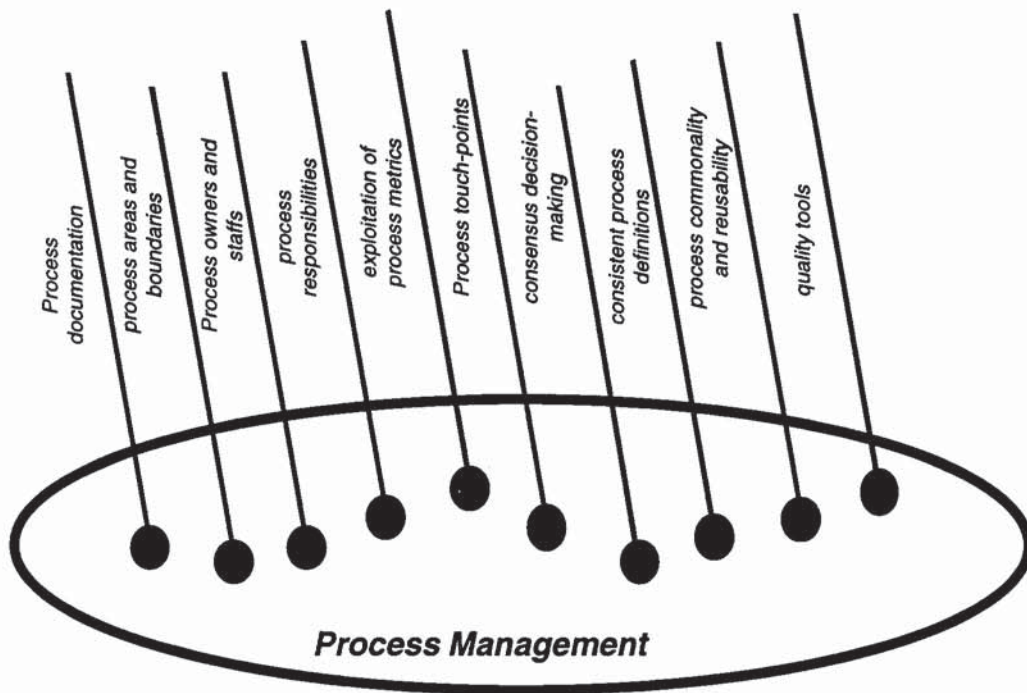
Figure 6.1 : The Xerox Model of Process Management.

The model depicts the elements of process management that are prominent in the Xerox context. It is an example of a well developed process model. As with any model of this type, it is a static representation of a particular perspective at a particular point in time. In this case it is the view of process management from the perspective of some members of Xerox management, mostly members of the BP&IM group. It is a model of *their* understanding of process management *at the time* that the field study was conducted (1997-1998, cf. section 3.3.2). Through the analysis of different types of research data it was shown that the process model is one which has 'evolved' (cf. figure 4.11). The model which is depicted in figure 6.1 is one which has taken Xerox approximately ten years to 'build' (cf. section 4.2.6 and figure 4.11). It is by no means considered by the Xerox management who

informed this study to be an 'ideal' state for process management and this research highlights some of its problems and Xerox's plans for its development. The following section considers the Xerox understanding of the meaning of process (which will be referred to as the Xerox definition of process).

6.1.1 Xerox Definition of Process

The Xerox definition of process has been formalised in a manner that has resulted in a shared understanding of process amongst Xerox's management. In other words the Xerox concept of process has been *internalised* at the management level (cf. section 4.2.6). This was achieved through the use of consistent (XL-wide) techniques for representing and modelling processes and through appropriate management training (cf. section 4.1.1). The Xerox definition of process is one which includes the following elements:

- inputs

- outputs

- in-process tasks (sub-processes)

- customer focus

- metrics

- performance goals

and, • inter-process flows.

The process of actually delineating individual processes causes process boundaries to be formed. These boundaries were shown to be problematic (cf. 4.2.1.1). It is conceivable that an organisation could be modelled at the lowest level of process detail to show the smallest tasks and their interrelationships, but this would not produce the benefits that are intended with organising through a process approach. Taylor (1911) attempted to optimise organisations at the individual task level and this has proved to be inefficient in many cases (cf. section 2.2.1). The process approach is beneficial when the boundaries are *correctly* defined. Functional boundaries are still process boundaries, but they cause *interruptions* in an end-to-end, holistic or entire process from the point of view when considering the focus on *customer*. The ('correct') process boundary is that which connects the 'flows' from the customer and back to the customer (however defined).

The problem was referred to in chapter four as 'the way the cake is cut' (cf. section 4.2.1.1). This remains a critical question – 'how *do you* cut the cake?' – or *'how should process boundaries be defined?'*. The main benefit in defining process boundaries is to be able to 'measure' in terms of process metrics the performance of the process and hence be able to optimise it or improve it — to manage the entire process as opposed to a functional part of it. But the question remains as to where boundaries should be drawn. It is complicated by the fact that there are many types of different customer. The research data revealed that the

Xerox process model is one that was defined for ODP customers. That was suitable for a large percentage – (80% cf. section 4.2.2) of Xerox business but this is no longer the case. When process and customer (that the process was defined for) no longer match, then the benefits of operating a process model are undermined. The formal, documented process, is now unlikely to be same as the process which is 'performed' in reality. The process which is operated in reality becomes dependent on other processes – many 'touch-points' arise. The corollary is that because of the many dependencies, the process model becomes difficult to co-ordinate. As with functional management, the process flow crosses responsibility boundaries (cf. section 4.2.1.1). This is the case at Xerox. The definitions of process boundaries need either to be flexible or to be many. Xerox has opted for the many approach and has divided the company into separate business groups (cf. appendix two). However, this is not a perfect solution. Some customers' 'needs' span these group boundaries. The end-to-end processes are again interrupted. That which needs to be explored is the 'flexible definition of process boundaries' (cf. section 7.3.2). With a 'flexible approach', both the management and measurement of process also need to be flexible. However, irrespective of the approach taken, it is clear that the process model needs to be updated to *match* customer requirements. Figure 6.2 shows that in the Xerox case, the process model has 'drifted' and needs to be realigned with customer needs.
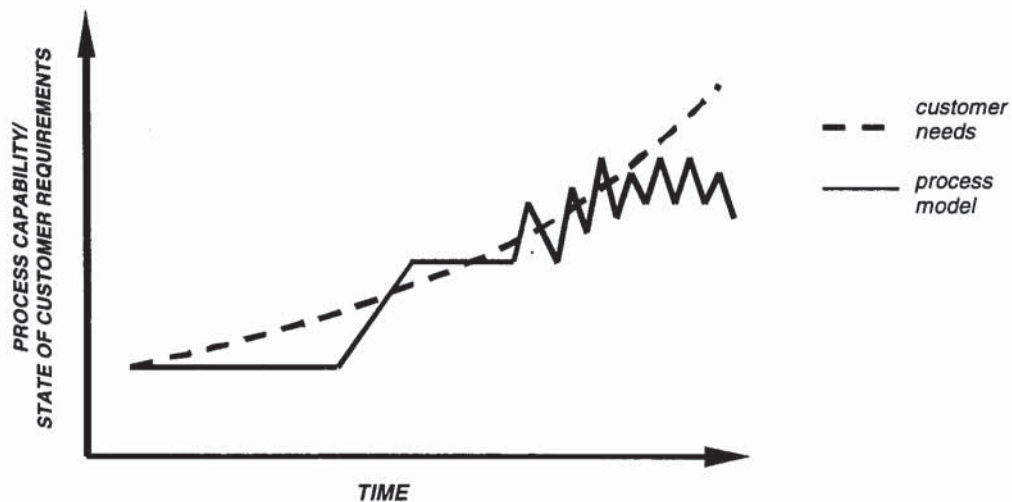
Figure 6.2 : Matching Process and Customer.

The first part of the 'process model. curve' is horizontal. This represents the pre-1988 functional organisation 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 organisation 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 re-engineering and the implementation of a process focus the diagram shows the curves converging again. The new process organisation 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 internalised 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. This point 'describes' the state of Xerox at the time of this research.

6.1.2 Xerox Extent of Process Focus and Commonality

In chapter two Talwar's (1994) 're-engineering spectrum' was presented to illustrate the extent of process focus that may be implemented by a firm and to argue that there are few examples in the literature of firms that had taken a 'holistic' approach to process management (cf. section 2.2.3). Having presented the research data in respect of this study of Xerox Ltd. Talwar's framework can be built upon (figure 6.3 below). Through the analysis of documentary evidence it was shown that Xerox began with process improvement in 1988 (cf. section 4.0) and that this rapidly spread 'up' Talwar's spectrum, through process re-engineering, to transformation (c. 1993).
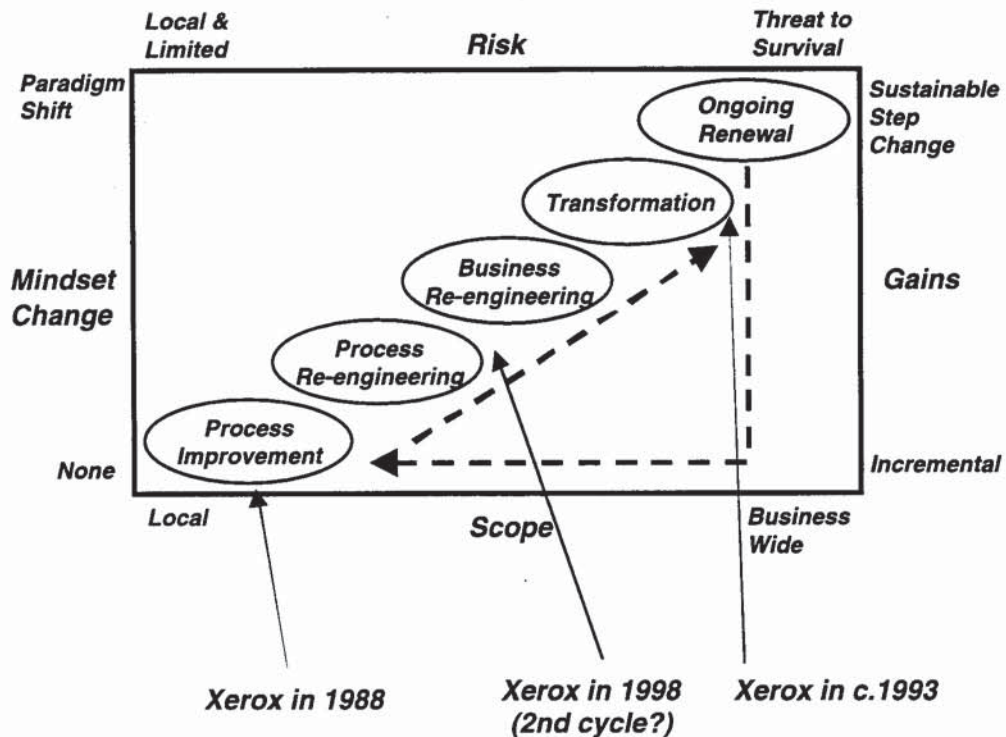
Figure 6.3 : The Cycle of Process Evolution.

Based on Talwar (1994), p.43.

Talwar does not present his framework as an incremental model, but the Xerox evidence shows that in *building* a holistic process enterprise, these *can* be seen as 'stages'. However, it is unclear as to what 'ongoing renewal' represents. In the Xerox case, a second cycle through the spectrum can be observed to be in progress (between 1993 and 1998, with plans through 2000). In parallel, two distinct phases of IM development can be observed (stage one IM and stage two IM, cf. section 5.0). The second cycle through Talwar's framework and stage two IM are intertwined. It was shown that *because* of uncoordinated local process improvements and IM modifications (activity to the lower left of Talwar's spectrum), the holistic process model became

fragmented, both in terms of processes and IM (cf. sections 4.2.2 and 5.2.1.1). This and a rapidly changing business environment has *forced* Xerox to 'move up' Talwar's spectrum for a second time.
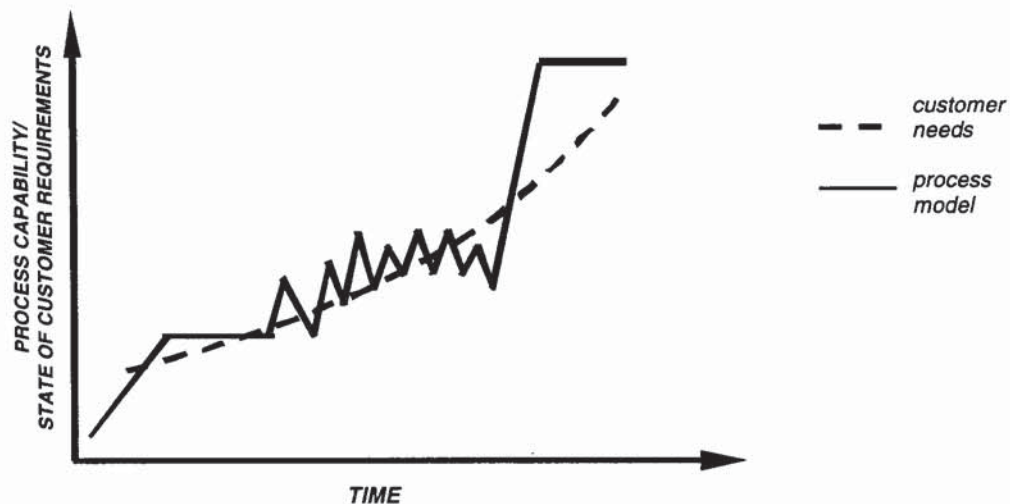
Figure 6.4 : Second Cycle of Re-engineering.

Reconsidering the model of process and customer requirements (figure 6.4) the second cycle through Talwar's model can be shown to move the process curve from that of fluctuation to a position above the customer curve. The second cycle of re-engineering through to transformation (re)creates a process model that is capable of exceeding customer requirements. In this second cycle however, IM and specifically enterprise-wide applications, are being used as the *structuring and co-ordinating mechanism* to re-engineer the process model. This is expanded upon in section 6.2.1. Xerox are currently (1999) implementing this 'realignment' of the process model. The

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centralisation of process management and information management are critical to achieving this (cf. section 6.1.4).

6.1.3 Enterprise Metrics

The research data showed that metrics can be defined and used at different 'levels' (cf. section 4.2.4). The term 'in-process metrics' was introduced and shown to refer to metrics at the level of the sub-process. The centralisation of process and information management that was discussed in the previous section will be beneficial from the perspective of operating a process model because it will enable the implementation of *enterprise metrics.* Metrics were shown to form a central part of Xerox management's definition of process but as measurement units they were shown to be independent of a process itself. Thus, apart from their usefulness in optimising a particular process – and this was shown to be important in the re-engineering literature – metrics provide *management information* that in the context of process management can be used for planning and control. Metrics allow management to *monitor the performance* of the process organisation and when they are standardised can provide *comparative management information.* Moreover, standardised metrics can be combined to provide enterprise-wide management information or enterprise metrics. It was clear from the research data that *global* metrics are considered by Xerox management to be necessary. A good example was given by one of the Core Process Owners.

"... and DELL is the company everyone, I guess is trying to emulate. They also have managed to achieve cash-to-cash in less than one day. In some areas it's actually, it's as good as minus four days, so they're getting the money from the customer before they pay the supplier. ... *And where are we on cash to cash? We don't even measure it.* And if we did measure it, it would be at well over 100 days. As I say, so DELL are less than one day, the next best are Compaq which are 25 days. These are the companies that are going to succeed. These are the sort of things that ought to be captured ... and then you have to respond to that, you see, with your Value Chain Strategy, I mean how would you, I mean what strategies would you put in place? *What IM strategies do you have in place or do you need to put in place to be able to deliver cash-to cash in one day?"* (α, 1997, emphasis added).

Two key themes are represented in this quote – (1) that enterprise-wide metrics are necessary and (2) that they can be explicitly linked with IM. It was shown in figure 4.4 that the manageable elements of processes are people, tasks, information, and technology. In the Xerox model of IM, 'IM' encompasses the management of technology and information in ways that *support* the people operating the processes in their execution of the process tasks (cf. section 6.2). The process model

relies on the capabilities of IM for operationalising process metrics. In the quotation above, the 'expectation' of IM was even higher than this because the implication is that IM should deliver process support that *enables* performance targets in terms of metrics to be met. This is highly characteristic of business expectations of IM at XL.

One of the main ways in which BP&IM respond to these business demands is through the approach that they take to developing applications. In section 5.2.1.1 it was shown that at Xerox this is referred to as a 'package approach'. The point is that by using this approach proprietary applications packages are 'assessed' *vis-à-vis* process capabilities and metrics. The current focus is on evaluating packages by examining *in-process metrics* and the approach is very much *operational* (cf. section 5.2.2.4). The centralisation of the management of the process model will allow Xerox management to implement enterprise-wide metrics because of the increased process commonality and consistency. Thus the development approach may include enterprise-wide metric criteria – i.e. does the system/application perform well with respect to supporting a larger process (higher !evel) given the appropriate metric – the centralisation of the model making it possible to measure this.

Whilst metrics are normally measured, collected, collated, and reported to management by and through Information Systems, the Xerox case

shows that unless the process model is adequately co-ordinated, enterprise metrics are difficult to implement. The Xerox 'solution' to this is to improve the co-ordination of the process model through a centralisation of its management and *concurrent* development of IM that supports it. This is included in that which is planned in stage two IM (cf. section 5.2.2.5).

6.1.4 Organisation and Process Centralisation

A centralisation of the management of the process model is one of the main themes arising from this research. However, although it is shown as 'desirable' by management or 'required' by them, it is also something that has *become feasible*. A number of factors contribute to the feasibility of the centralisation of the process model. Some of these factors are external and provide the appropriate 'environment' for such a change to take place and others are internal and provide the right 'conditions' in which centralisation can work. Three external factors are notable. They are:

- pan-European customers,

- a rise in the homogeneity of customer requirements,

and, • a fall in the cost of operating a pan-European business
infrastructure.

The pan-Europeanisation of a large part of the customer base was identified as an important factor during the research that was undertaken at Xerox by BP&IM in attempting to match IM with BPOs

future needs (cf. section 4.3.1). The key point is that a number of significant customers, typically multinational firms, are demanding pan-European contracts. These firms want a single point of contact to cover the entire European region and they want a single contract and a single invoice. These types of customer needs are better served by a centralised process model. At Xerox it has proved difficult to co-ordinate pan-European customer needs from multiple locations and more importantly, from a Xerox management perspective, it is extremely difficult to quantify the profitability of such a contract unless it is managed from one place. This is currently the situation with some contracts and Xerox management consider this to be unacceptable.

The rise in the homogeneity of customer requirements is another factor that was identified during the IM/BPO alignment project (ibid.). It is also a common factor that is often cited in Strategic Management texts that discuss factors contributing to the rise in corporate globalisation (see for example, Pitts & Lei, 1996, pp. 182-183). Essentially it refers to the fact that customer needs, in this case at least with respect to Xerox's industry, are converging around the globe. Customers' expectations and the manner in which they wish to conduct business with Xerox are becoming more and more similar regardless of geography. Thus, it is becoming feasible for customers to be 'serviced' using a single process model.

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 amongst 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 centralised model. Currently, IM capabilities such as overnight batch processing of data across national boundaries do not provide the consistency or speed of data and its interchange that is needed to drive a centralised operation. The technology strategy in stage two IM plans to rectify this.

Three internal factors which provide appropriate conditions for centralisation to take place are notable. They are:

- the sophisticated technological capabilities of IM,

- business simplification,

and • management's desire for operating units to concentrate on sales processes.

The sophisticated capabilities of IM have already been mentioned as part of the external factors. This is because the capabilities arise in the environment and are *harnessed* by the T&A group for use within the

Xerox technology strategy. A further example is the connection of disparate systems which is to be facilitated through what is called 'message broker' technology (cf. section 5.2.1.2). In general however, it is the ability of IM systems to 'collapse' time and space constraints that is most beneficial to operating on a centralised basis.

There are several important aspects relating to the internal business simplification factor. In general business simplification at XL is being achieved through the increased use of information technologies (Wolstenholme, 1999). Effectively this implies increased automation with manual (human intervention) processes being reduced or eliminated. This implies a higher complexity and level of integration of supporting applications. In physical terms, the business models are being simplified by operating business processes in and from fewer locations. Stage two IM plans include the implementation of a pan-European business support centre. At Xerox this is called the 'central back-office'. The back-office will effectively centralise non-customer facing processes that are mostly administrative and financial (cf. section 5.3.1). The stage two plans also include centralised and pan-European customer service and telesales centres. The centralisation of business centres are made possible with the support of centralised IM capabilities. With business simplification through centralisation Xerox can offer single points of contact for sales and service that are supported by strong applications integration and the provision of

enterprise-wide data (e.g. consistent customer records). Process and applications changes can be made only once and in one place. This ensures consistent, common, accurate, and controllable data and process models. It is also more cost effective. Xerox Ltd. currently operate a central manufacturing and distribution centre at Venray in the Netherlands.

With the centralisation of non-customer facing processes the operating units are left to concentrate on the sales processes. Thus far, processes such as credit collection, invoicing, customer record management, contract management etc. are 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, amongst other things, the fall in telecommunications costs) support this arrangement of processes — both customer facing units and senior management at the centre can be provided with up-to-date information.

6.1.5 Responsibility and Decision Making Processes

The research data (cf. section 4.2.1.1) showed that process boundaries also 'create' responsibility boundaries. Both were expressed by the respondents as being problematic. By taking a centralised approach to process management, the cross-process linkages (touch-points) and breaks in responsibility can be managed in a co-ordinated manner. With

parts of the process model that are also centralised with respect to their operation, such as the centralised back-office (cf. section 6.1.4), these 'breaks' will be reduced as they will occur only *once* — at the central location. This will also contribute to simplification in managing such problems.

The applications design for stage two IM is one which has explicitly addressed the integration of the core systems applications in support of the centralised process model. In order to do this the BP&IM group identified the major process touch-points and at the time of this research were working toward resolving any resultant interruptions in process *flow*. In section 4.2.1.1 process interruptions were seen to undermine the holistic process model. The stage two IM strategy emphasises process integration and commonality. The explicit analysis of process touch-points had not been previously conducted and in itself (the analysis) represents major progress in managing the process model. The XBPA model (cf. section 4.1.1) was useful in conducting the touch-point analysis. It provided a basis for understanding current process integration and a standardised means of communication (process modelling).

The consensus approach to cross-process decision making was also a strong theme arising from the research data (cf. section 4.2.1.1). It is not clear from the data how this might be resolved in the future. The

centralisation of the management of the process model will reduce the number of decision-makers which might alleviate the 'too many decision-makers' problem that was cited (ibid.). In addition to this, the reduction of duplicated processes through the setting up of centralised business centres (back-office, service & telesales; cf. section 6.1.4) will simultaneously reduce the number of cross-process decisions that need to be made. Moreover, the increased process commonality will mean that there will be less complexity in cross-process decision making due to the reduction in local exemption and variety in the process model (cf. section 4.2.2). However, it is clear from the research data that the process of cross-process decision making needs to be optimised.

6.1.6 Process Perspective Summary

From a process perspective the process model was shown to be related to the IM model in seven ways. These are summarised below.

- IM to structure and co-ordinate the realignment of the process model,
- IM to provide the possibility for the implementation of enterprise metrics,
- IM to support processes in ways that meet performance targets,
- IM capabilities to enable the centralisation of the process model,
- IM to facilitate business simplification,
- IM to provide real-time and up-to-date operational *and* management information,

and, • IM integration will reduce responsibility conflict management.

The seven factors indicate that the future process model is one which is closely related to IM, and in many cases *dependent* on it. These are not the only ways in which the models are associated, but they are those which are most prominent in the research data. The following section examines the relationship between process and information management from an information management perspective. A different set of factors are identified.

6.2 Information Management Perspective

Chapter five concluded by presenting the Xerox model of information management. This is shown again as figure 6.5 below.
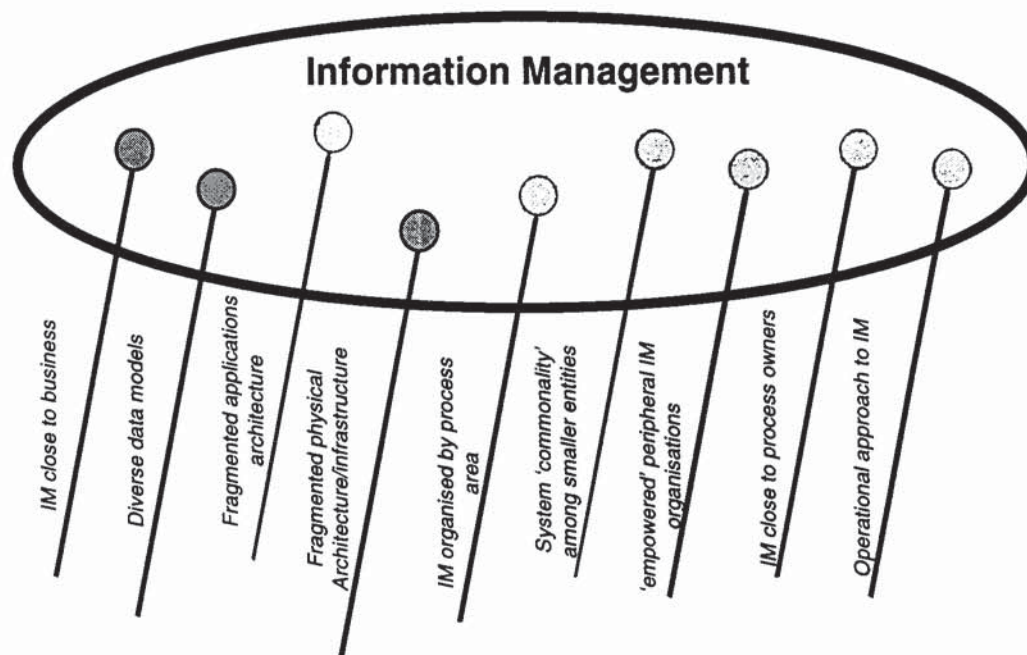
Figure 6.5 : The Xerox Model of Information Management.

The model depicts the elements of information management that are prominent in the Xerox context. It is an example of a model that is designed to *support* process-based organisation. As with the model of process management (figure 6.1), it is a static representation of a particular perspective at a particular point in time. In this case it is the view of information management from the perspective of some members Xerox management, mostly members of the BP&IM group. It is a model of *their* understanding of Information Management at the time that the field study was undertaken (1997 – 1998, cf. section

3.3.2). Through the analysis of different types of research data, it was shown that the Xerox model of IM is one which has 'evolved', and during this time two distinct 'stages' have been identified (cf. section 5.0). The following subsections of this part of the chapter (section 6.2) are an attempt to bring together the research findings that may help to build an understanding of the ways that IM and PM are related (objective three, cf. section 1.5) — but in this case *from the perspective of IM.*

In fact, the separation of PM from IM and vice versa, which the author has attempted to do in order to present chapters 4 and 5 and sections 6.1 and 6.2 of this chapter has been extremely difficult to achieve. This is because at Xerox the two are very closely related. The author has separated them for clarity of analysis — because everything cannot be discussed at once.

There are two fundamental areas, from an IM perspective, of the dependence between the PM and IM models. These are discussed in the following two sections.

6.2.1 Applications, Data, and Information

Since the early stages of the development of the process model at Xerox, IM plans clearly showed an intent to *support* and receive *direction from* the business model. This was clearly the case both

during stage one IM development (cf. section 5.1.1.1) and stage two (cf. section 5.2.1.1). The activities of the BP&IM group are clearly 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 (cf. figure 6.2) which shows the changes in customer needs and in the process model.
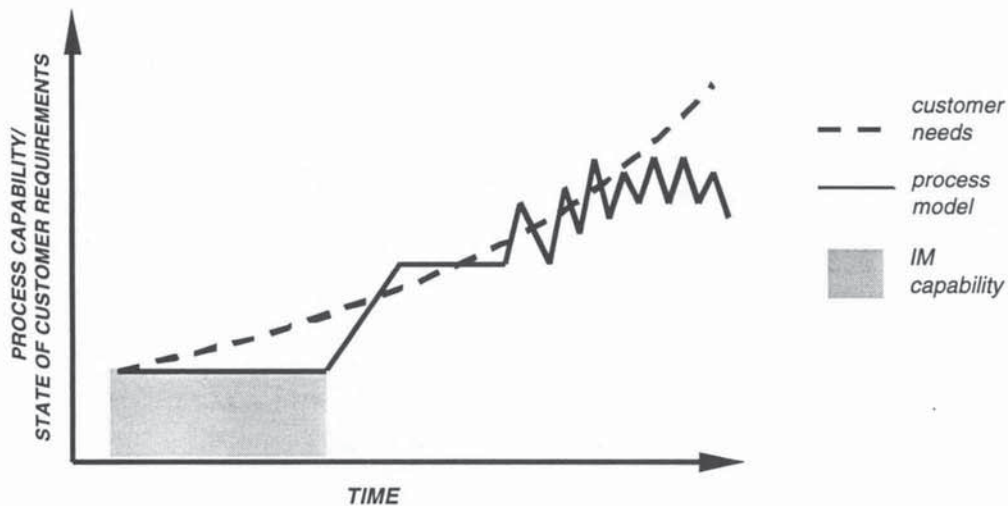
Figure 6.6 : Pre-Stage One IM Capability.

The shaded area which has been added to the diagram represents the *limits of IM capability*. In figure 6.6 this is shown to 'reach' the level of being able to support pre-1988 functionally-oriented Xerox. Although the data is not clear in showing the characteristics of IM at this time, figure 6.7 (below) gives a general indication of how it is likely to have been.

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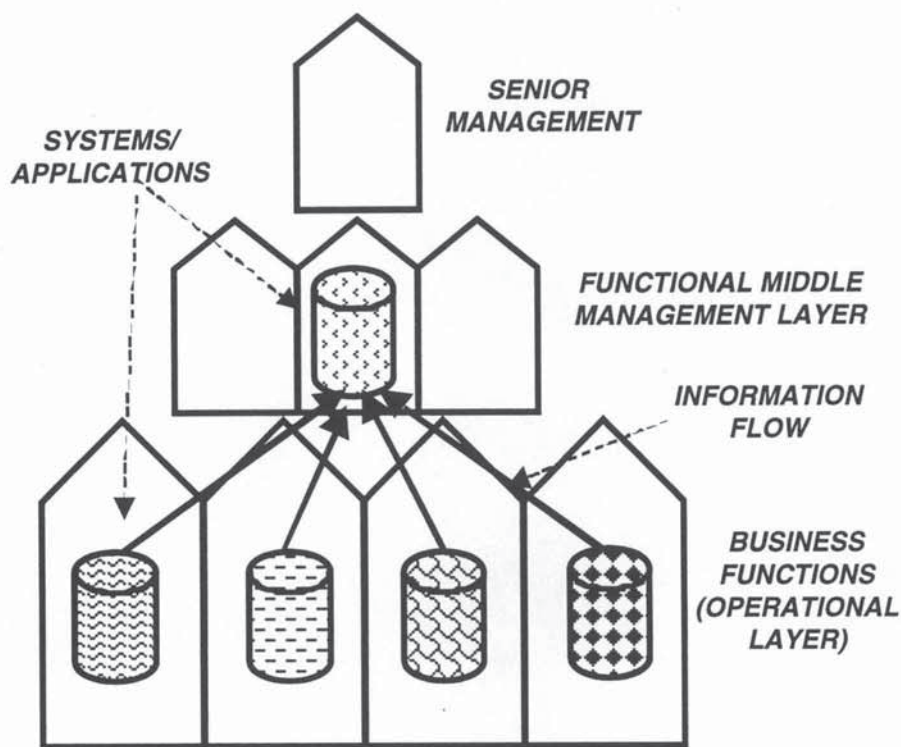
Figure 6.7: Pre-Stage One IM.

Figure 6.7 represents the hierarchically arranged functional organisation and shows how IM supported it. What is shown are disintegrated applications and systems supporting each operational functional area. The systems do not on the whole communicate with each other, because with the functional model this is 'unnecessary' — so links are not shown. These operational systems do 'pass data' to a system in the middle 'management layer'. Some consolidation of information is made possible here but the information flow is strictly one way — *from* the operational systems. IM support for senior management is lacking. Middle management act as a 'filter' passing 'reports' about the organisation's operations to the senior level. This is a simplified model based on the little that can be understood from the data about functional

IM at Xerox. More detail cannot be provided because it is not available in the data. However, that which is important to understand for this research are the IM developments *after* the beginning of Xerox's focus on managing by process. This was shown to have been in 1988 (cf. section 4.1). In support of the new process organisation efforts were made by BP&IM to create a suite of *integrated* applications based on the 'new' processes. These applications are known as 'Region A systems' (cf. section 5.1.2). The Region A systems were an attempt by BP&IM to move from functional applications to process applications (cf. table 5.3). With the Region A development (stage one IM), the IM capability at Xerox can be shown to shift up to support the evolving process capability (figure 6.8).
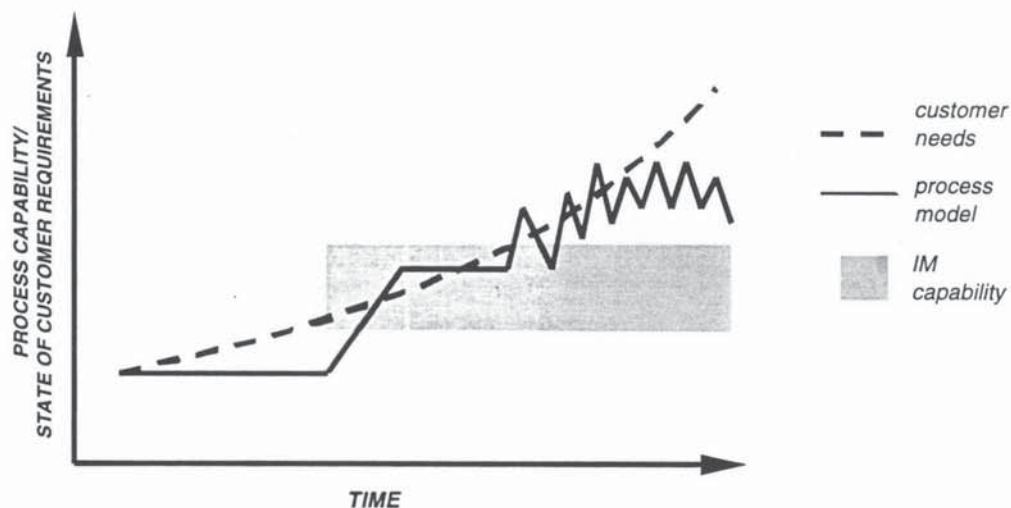
Figure 6.8 : 'Region A' IM Capability.

However, as was shown, not all of RX adopted the Region A systems and disparate attempts to support the process model were also developed in each of the three large operating companies — Xerox

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France, Xerox UK, and Xerox Germany (cf. section 5.2.2.1). This is represented in figure 6.9 below.
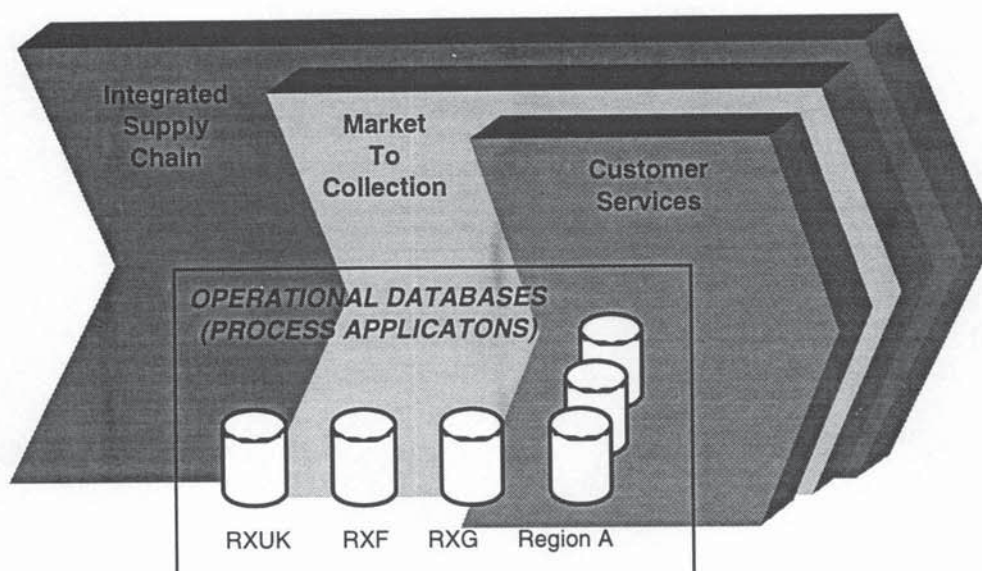
Figure 6.9 : Disintegrated IM Support for the Process Model.[1]

Thus, BP&IM at the centre were unable to achieve XL-wide process integration and support for the process model. Problems of cost and applications development time were shown to have exacerbated the problems that BP&IM at the centre had in co-ordinating support for the process model (cf. section 5.2.2.3).

By 1997, IM support for the process model was becoming less effective and more costly. This was shown to be due to the high fragmentation of *both* the process and applications models (ibid.). Plans to realign the process model to match customer needs were 'matched' by IM plans to support the 'updated' process model. This was presented in chapter five

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[1] The Time to Market (TTM) core process is not shown on this diagram because it had not been fully implemented at RXL at this time. IM support for TTM did not exist.

as stage two IM. Diagrammatically, this can be shown as a shift in IM capability 'up' and matching the shift in process capability (figure 6.10).
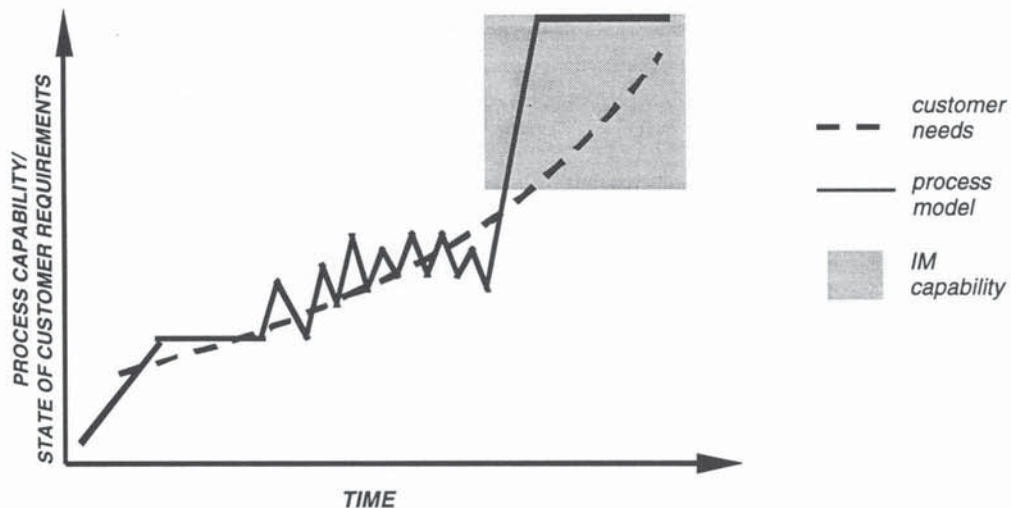
Figure 6.10 : Stage Two IM Capability.

However, the stage two IM applications were being explicitly designed to support new processes (second cycle through Talwar's model, cf. section 6.1.2). Effectively however, the new core applications (cf. section 5.2.1.1) were being developed *as the process itself.* In other words, the application and its technological platform fulfil at least three of the manageable elements of process — tasks, technology and information (cf. figure 4.4 and section 4.1.2). People, the fourth manageable element of process, are either the applications users or due to increased automation and process integration, not required. Increasingly, *the process is the application.*

From the process perspective the lack of enterprise-wide data has retarded XL's ability to implement enterprise metrics (cf. section 6.1.3). The IM development approach was focused on supporting business operations and this resulted in an applications infrastructure without the ability to provide *management information* (cf. section 5.2.2.4). The applications infrastructure in stage two IM is being built in a way that will rectify the problems identified with operating the process model. Through tight integration and consistency in the applications architecture, together with a common and consistent data model, 'true' end-to-end process support is planned. The centralised process model (cf. section 6.1.4) is to be *created* through the implementation of business process led common applications (cf. section 5.2.1.1). Process touch-points will be integrated *within* applications where possible. The applications infrastructure is to provide 'seamless' process support.
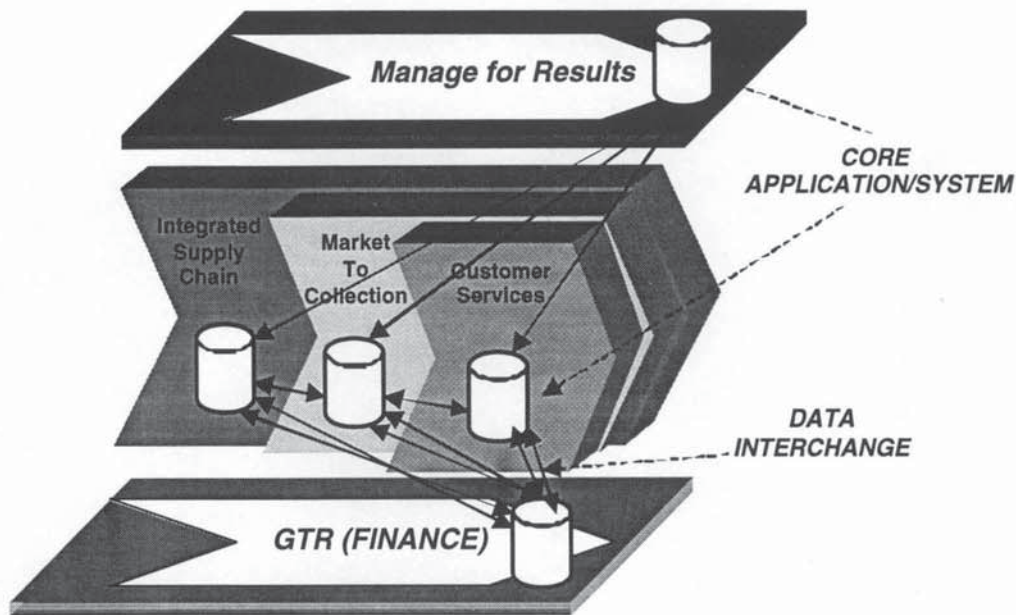
Figure 6.11 : Stage two IM Process and IM Integration.[2]

Figure 6.11 represents the manner in which PM and IM are to be arranged as a result the development of the core process applications. It is a simplification for illustrative purposes. The figure represents a core application in each core process with integrated information flows to and from each other. In the GTR (Governance to Results) process, enterprise-wide data is to be managed and up-to-date common information is to become available for all processes (e.g. contract information, customer information). Effectively, this holistic integration of processes and their supporting applications will create a 'live' applications supported version of the (updated) XBPA. This level of sophistication in both process and information models was not previously possible. Key to making it possible is the supporting technology and this is discussed in the following section.

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[2] The Time to Market (TTM) core process is not shown in this diagram because the IM implications are negligible.

6.2.2 Information Technology

In addition to the careful development of applications in support of the process model, the XL technical infrastructure and the possibilities that it provides, make the process model possible. The Region A IM capability was typical of IM during the early 1990s. The architecture is inflexible and has become known as the 'legacy' database systems. The applications were appropriate and designed for the 'old' processes (ODP model, cf. section 4.2.2) and were those that were possible using database and mainframe computing technologies that were available.

By 1998 the XL technological infrastructure had changed considerably and the capabilities were such that the implementation of an integrated applications supported enterprise-wide process was possible. In summary (from documentary evidence) this infrastructure consisted of:

- 14,000 PCs

- 1500 printers

- 310 file and mail servers

- 250 applications servers

- 1 Internet firewall server

- 10+ Intranet servers

and   • 260 LANs – common in each location with any to any point communications possibility.

The centralisation of the process and IM models will involve a consolidation of some of this technology, (particularly the applications servers). However, the key point is that without this technological capability the process model would be impossible to implement. Thus it can be seen that 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 was being initiated at the time that the field study for this research was taking 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. This technology *makes this model possible*. It would not be possible to organise in this way without it. It would not be possible to organise information on such a large scale with the integration and speed that is necessary for the process model to *work* without the enabling technology.

However, the centralisation strategy that is being employed in order to implement the updated process model means that many processes will be located (managed and operated) in one physical place. The fact that repetition and duplication will be reduced means that the process model will be technologically easier to support.

6.2.3 Information Management Perspective Summary

From an information management perspective the process and information management models were shown to be related in five main ways. These are summarised below:

- IM planning is based on business process management direction,

- the IM group (BP&IM) is organised by process area,

- integrated applications development is based on a 'new' process model,

- applications and processes are converging (process is the application),

and, • enabling technologies to make the process model possible.

The five factors indicate that the future IM model is one which is closely related to PM. IM is *totally organised* to support PM and it can thus be seen as a particular type of IM. These are not the only ways that the models are associated, but from the perspective of IM, these are the relationships that are most prominent in the research data.

The following sections consider the remaining areas of literature that were considered in chapter two — organisation structure and co-ordination theory. In the final section the IM and PM models are brought together to show the Xerox model of Process and Information Management.

6.3 Organisation Structure

Stage one IM provided 'crude' support for the developing process model. By stage two, as has been discussed above, IM and PM were being developed *together*. The process oriented holistic enterprise (POHE) with end-to-end process integration and enterprise metrics was at the time of this study becoming a reality. The 'new' organisational form was being made possible by the careful planning of new applications and through the adoption of new technologies. This confirms Earl's early (1989) recognition that IT can enable new ways of managing and organising (cf. also Sampler, 1996, and section 2.1.5) but there are many examples in the literature to show this. What is new here is that this is an example of the possibility of a POHE — and as was discussed in chapter two this is lacking from the literature. Similarly, it was shown that the organisation studies literature does not recognise the possibility of organising as a POHE. This study provides a detailed example and shows that given the appropriate IM support, it *is* a possibility.

6.4 Co-ordination Theory

Co-ordination is critical to the management of the process model. The holistic approach demands centralised control so that process dependencies can be managed and 'conflict' resolved. Malone and Crowston's (1994) focus on dependencies (cf. section 2.3.1) is well founded — this research also shows that these can be most

problematic (cf. section 4.2.1.1). However, in the Xerox case co-ordination was made difficult because of the proliferation of locations performing similar processes (in each operating unit) and the flexibility that operating company management were given to diverge from a central model (cf. for example section 5.2.2.3). The duplication of locations where processes are performed is in part being changed — non-customer facing processes are being centralised (cf. section 5.2.1.3). Flexibility to diverge from the process model is to be restricted (cf. section 5.2.2.5). This research shows that the issue of co-ordination on an enterprise-wide scale requires more than mechanisms for the definition of dependencies. Co-ordination is as much a political process as it is a 'technical' problem (cf. section 5.1.2). The Xerox case shows that the complex integration of dependencies *can be* facilitated by IS. The Xerox case shows that the operation of a process model on a large scale (XL-wide) is best co-ordinated by a centralised group (cf. section 5.2.2.5).

6.5 The Xerox Model of Process and Information Management

This chapter brought together the research data that was presented in chapters 4 and 5 to help develop an understanding of how process and information management are related at Xerox. The model of process management was shown to depend heavily on IM. Similarly, the model of IM at Xerox was shown to be totally focused around supporting (and creating) the process model. The two models can be seen as mutually

dependent — one cannot exist without the other. This can be referred to as the *duality concept of process and information management.*

Table 6.1 shows a summary of the key relationships between the process and information management models that were presented in this chapter. Alongside each key relationship, the section number in which the discussion of the data that contributes to an understanding of the relationship is indicated.

Relationship	Section Number
IM to structure and co-ordinate the realignment of the process model	6.1.2
IM to provide the possibility for the implementation of enterprise metrics	6.1.3
IM to support processes in ways that meet performance targets	6.1.3
IM capabilities to enable the centralisation of the process model	6.1.4
IM to facilitate business simplification	6.1.4
IM to provide real-time and up-to-date operational *and* management information,	6.1.4
IM integration will reduce responsibility conflict management.	6.1.5
IM planning is based on business process management direction	6.2.1
The IM group (BP&IM) is organised by process area	6.2.1
Integrated applications development is based on a 'new' process model	6.2.1
Applications and processes are converging (process is the application)	6.2.1
Enabling technologies to make the process model possible	6.2.2

Table 6.1 : Key Relationships Between Process and Information Management.

The *duality concept of process and information management* can be represented diagrammatically by bringing the process and information management models 'together'. Figure 6.12 represents the interaction of the elements of both the PM model and the IM model.
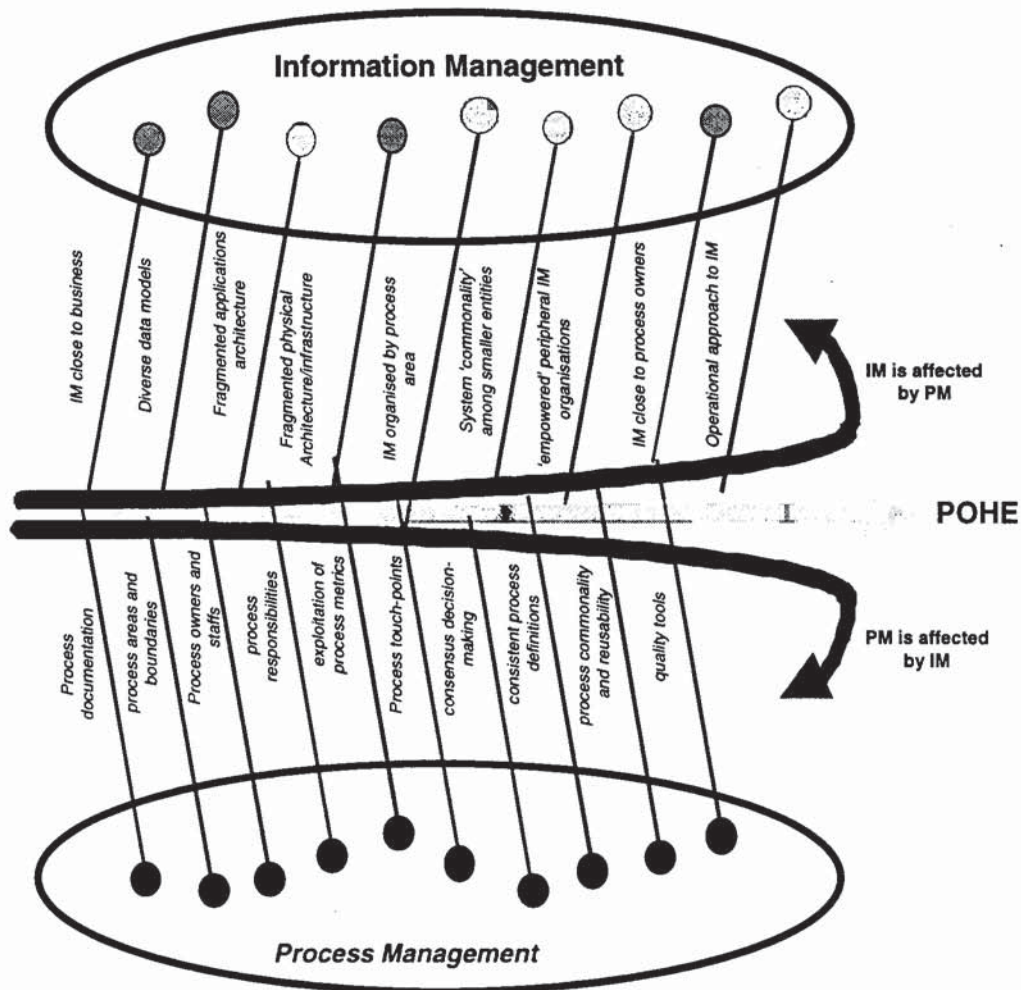
Figure 6.12 : The Duality Concept of Process and Information Management.

Each affects the other and *together* they *create the nervous system of the process oriented holistic enterprise* (POHE). Both models were shown to be 'evolving'. Over time, they have been brought closer and closer together to the point where it has become difficult to distinguish one from the other (e.g. the processes are the applications). The continuing development of the IM model is shaping the limits of what is possible in terms of a process model. The process model is being developed to capitalise on Xerox's IM capabilities.

CHAPTER SEVEN : CONCLUSIONS

7.0 Introduction

This chapter consists of three main sections. The first section (7.1) summarises the major findings of this research. In the second section (7.2) the problems with this research are discussed — these are essentially methodological issues. The third main section (7.3) provides a discussion of the possible avenues that may be pursued for additional research. Figure 7.0 diagrammatically summarises the structure of this chapter.
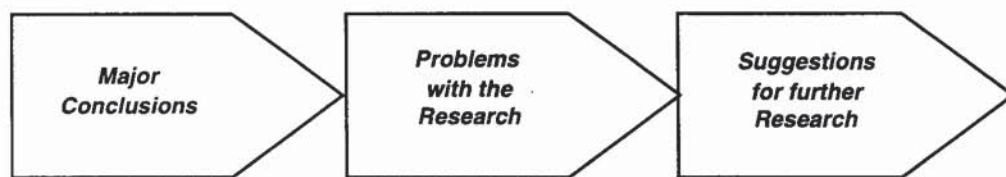
Figure 7.0 : Summary of the Structure of Chapter Seven.

7.1 Summary of Major Findings

In this section the major findings of the research are reiterated and presented in a single place. The implications of these findings are also discussed and 'advice' for managers who wish to organise by focussing on business processes is presented. The findings are grouped around the three major research objectives that were initially presented in section 1.2. As discussed in chapter three, a postpositive study such as this one, does not 'produce' nomothetic statements that can be used as the basis for prediction and control. With postpositive research, idiographic statements that can provide *verstehen* (understanding or meaning experienced in situations) are provided. The findings that have been presented in this thesis and that are summarised in this section provide a *depth* of understanding about the phenomena that have been studied. They provide verstehen in respect of the three research objectives — the areas under investigation.

7.1.1 The Process Oriented Holistic Enterprise

The first major objective of the research was to understand what a process-oriented enterprise is (how it is organised and what process management means). This was the focus of chapter four. The main findings — the idiographic statements — are presented below. The implications of each statement are discussed alongside it but it should be noted that these can only be *valid* in contexts similar to that of Xerox's. It is for the reader to decide the level of 'fit', and thus the extent of correspondence between the Xerox context and that which he or she may have in mind. Ten major idiographic statements have been identified in respect of the first objective. They are listed in the order that they arise in chapter four.

---

1.   *It has taken Xerox Ltd. in excess of ten years to 'build' an advanced process-based organisation.*

The implications of this statement are many. Senior management in organisations who believe that their context is similar to that of Xerox's and who wish to reorganise to manage by process *in a holistic manner* (such as Xerox) should not expect to achieve a quick transformation. A long-term commitment from senior management is required with a firm vision and a commitment to provide resources on a long-term basis. The 'quick-fix' approach to managing by process that some of the BPR literature and more recently the Enterprise Resource Planning (ERP)

literature alludes to is unlikely to produce successful results in contexts similar to that of Xerox's if the intention is to manage by process to the same extent as Xerox do. (cf. section 4.1).

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2.   *A document that depicts the process model (XBPA) in a standardised manner is critical in managing the process-based organisation.*

The implications of this statement are that that the effective management of a holistic process model that is similar to Xerox's can be greatly supported by a system of standardised documentation. It is the explicit depiction of processes that provides a clear means for their management. Management of organisations who wish to manage by process need either to adopt a similar model or to decide upon an alternative. This requires foresight, planning, and a system of communication. It is not sufficient for the 'information blueprint' to be invisibly embedded in a firm's information systems. (cf. sections 4.1.1 & 4.2.3).

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3.   *There are three main types of 'process people' who are involved in managing the process organisation (Process Owners, Area Sponsors, and Process Analysts).*

Organisations with contexts similar to that of Xerox's who wish to manage by process need to understand the new process roles that are

required. A process organisation needs people to conduct these process management roles – irrespective of the manner in which they are allocated. Senior management need to be willing to 'create' the necessary process organisations to support the business. Process-based applications (e.g. ERP systems) without process management people to maintain both the processes and the cross-process linkages may be destined for failure. The Xerox data suggests that these people are integral to managing by process. (cf. sections 4.1.2 & 4.2.1).

4.	*There are four key manageable elements of processes (people, tasks, information, and technology).*

The implication of this finding is that in order to effectively manage a process-based organisation all four manageable elements of processes need to be recognised. Explicit management attention needs to be devoted to each manageable element. An approach to the management of a process organisation that focuses on only the tasks or the technology for example, may fail if other manageable elements have been ignored that are important to the process. The recognition of the four manageable elements provides a framework or a basis upon which processes can be managed. (cf. section 4.1.2).

> 5. *'Organisations' of process people exist at different 'levels' of the process organisation to manage the process areas.*

This statement is closely related to statement three above. Process people who can be perceived as operating process organisations need to exist at different 'levels' of the process organisation. These levels were shown in the Xerox case to resemble senior, middle, and operations management layers of traditional organisations. In creating process-based organisations, management need to be aware of these analogous management layers and to provide for their 'creation'. These people are responsible for the processes of process improvement and for the management of inter-process linkages and decision making. The Xerox case implies that without them, the process-based organisation is unlikely to succeed. (cf. section 4.1.2).

> 6. *Clear process responsibility is necessary.*

Without clear process responsibility, the explicit management of processes as referred to in statement four is difficult to achieve. Who is to focus on the manageable elements of processes?, for example. Key benefits of managing a process-focussed organisation were shown in the Xerox case to derive from the management of processes *vis-à-vis* process metrics and performance targets. Unless someone is clearly responsible for this, then the benefits of managing by process may

begin to evaporate or may never be achieved. Furthermore, without clear process responsibility, the management of cross-process issues becomes virtually impossible. The importance of managing the cross-process issues was discussed with the previous two statements. Process responsibility is critical to the effective management of a process-based organisation such as Xerox. (cf. sections 4.1.3 & 4.2.1.1).

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7. *Cross process linkages need special attention and careful management.*

The management of a process-based organisation implies complex integration of business processes. Groups of business processes (core processes) that were also referred to as process areas often depend on other processes from other process areas. Cross-process linkages were shown to require careful management and the process people that were discussed in statement five are instrumental in negotiating and co-ordinating these linkages. Managers of process-based organisations need to pay particular attention to the management of these cross-process linkages because as has been shown in the Xerox case they are likely to cross responsibility boundaries. In the Xerox case it was shown that the most effective way to manage such linkages is from a central (single) point in the organisation. The co-ordinating staffs at this central point act as arbitrators. (cf. section 4.2.1.1).

> 8.   *The consensus approach to cross process decision-making is problematic.*

In the Xerox case it was shown that cross-process decision making was conducted using a consensus approach. This was shown to be problematic. The implications are at least twofold. Firstly Xerox management need to attend to this and improve the Xerox process for cross-process decision making. Statement six indicates the importance of the management of cross-process linkages. Cross-process decision making that deals with linkages or other inter-process issues, is equally critical to the success of the process organisation. Secondly, managers of other organisations who wish to adopt a similar model of organisation to Xerox's need to consider what their process for cross-process decision making will be. This is an area that certainly warrants further research. (cf. section 4.2.1.1).

> 9.   *Commonality and consistency of process definition(s) is desirable.*

The commonality and consistency of business processes across Xerox was shown in this research to be desirable by senior Xerox management. By achieving pan-Xerox process commonality senior management hope to obtain enterprise-wide data, to be able to better co-ordinate the process model, to better support customer needs, and

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to lower the costs in managing and maintaining the process-based organisation. In this case both internal and external factors were shown to make this level of process commonality possible and in terms of organisation it is to be achieved by the centralisation of the management of the process model. Managers of organisations who wish to manage by process need to decide upon the level of process commonality that they a) can achieve, b) need to achieve, and c) would like to achieve. The level of commonality is a strategic issue and needs to be considered carefully by strategic managers. (cf. section 4.2.2).

10.	*The management of consistent (global) metrics is essential.*

Although the discussion of the previous statement indicates that different degrees of process commonality may be suitable for different strategic goals, or may be more or less appropriate in different contexts — the consistency of metrics is shown in the Xerox case to be essential. Inconsistent and irreconcilable metrics undermine the control and management — the whole essence — of managing a process model. Without consistent metrics, process improvement is difficult to implement. Although as shown in the discussion of the previous statement there can be varying degrees of processes commonality, process metrics were shown to have independent qualities from that of the processes themselves. Thus, it is possible to operate a system of consistent metrics without consistent processes.

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The result is the measurement of different ways of doing the same thing. This is still critical for the management of a process-based organisation such as Xerox and other managers wanting to organise in a similar manner need to decide upon their system(s) of process metrics. (cf. section 4.2.2).

It should be noted that whilst figure 4.16 shows 'quality tools' as an element of process management, this has not been represented as an idiographic statement. This is because although the use of quality tools at Xerox was prominent (as observed in the course of participant observation), the data from the other data collection techniques is considered by the author to be too weak (lack of 'triangulation') to allow for the generation of an idiographic statement.

7.1.1.1 Objective One Summary

The ten idiographic statements that have been presented above have contributed to an understanding of the first research objective. In summary, the following statement can be made:

> The **process-oriented holistic enterprise** is an organisation that requires a long-term management commitment to its development. It depends on the careful management of people, tasks, information and technology. A complex integration of business processes is required and this can be managed through the use of consistent documentation techniques, clarity in the definition of process responsibilities and management attention to the issues of cross-process decision making. The management of consistent global metrics and the centralisation of the management of the process model are critical to its success.

7.1.2 Information Management in Process-based Organisation

The second major objective of the research was to investigate the role of the information management process within the context of a process-oriented enterprise. This was the focus of chapter five. The main findings — the idiographic statements — are presented below. The implications of each statement are discussed, but as with the idiographic statements that were presented in the previous section, it should be noted that these statements are only *valid* in the Xerox context and may only be transferable to contexts that are similar. The degree of similarity can only be determined by the reader who understands the context that he or she has in mind and based on the information given in this thesis. Thirteen idiographic statements have been identified and they are presented in the order that they arise in chapter five.

11.	*Process and information architectures are converging.*

In the Xerox case it was shown that the process and information architectures are converging, and in many instances, to the extent that they can no longer be distinguished. Processes are increasingly becoming embedded in information systems which are in turn providing the possibility for new processes to be performed. Thus, it is becoming imperative in the process-based organisation that the

information management process is well understood and properly managed. The successful management of the IM process is critical to the success of the process organisation. Managers wanting to manage a process-based organisation need to ensure that the IM group is represented at the highest levels of management. The IM process is critical to the support of the process organisation. (cf. section 5.1.1.1).

| 12. | *The management of the co-ordination of the business process model is best carried out by a central IM group.* |

Given the first statement above, in the Xerox case it was logical that business processes are co-ordinated by the IM group. In the Xerox case, many IM organisations can be identified but it was shown that the effective *co-ordination* of the process model is best conducted from a central location. Centralised core IM systems were shown to be instrumental in achieving effective co-ordination of the process model. Managers need to carefully consider the configuration of their IM organisations and assess the adequacy of support that it can provide to a process-based organisation. (cf. section 5.1.1.1).

| 13. | *Consistent and integrated data are required.* |

Effective management of a process-based organisation requires consistent and integrated data. Provisions need to be made to manage the IM process in a manner that can support this need. In the

Xerox case it was shown that data models had become fragmented and that this was unsatisfactory with respect to managing the process model. The Xerox solution to this from an IM perspective is to centralise the management of data models. Managers wanting to manage by process should devise an explicit strategy with respect to managing enterprise data. Xerox has 'learned this the hard way' and has incurred subsequent costs (both tangible and intangible) in needing to consolidate a fragmented environment. (cf. section 5.1.1.2).

14.	*The nature of applications needs to shift from 'functional support' to 'business process driven'.*

IM in a process-based organisation needs to be able to provide business process driven applications. This affects the manner in which applications are developed, the nature of the applications themselves, and the manner in which the applications architecture is configured. The seamless integration of applications to provide a holistic process driven information architecture is required to support the holistic process model. This cannot be achieved without careful information systems planning — managers must be willing to devote the necessary resources to this process and must recognise the long time frame that may be required to build such an information architecture (as well as the costs). (cf. section 5.1.1.3).

> 15. *The IM organisation needs a central strategic group, central technology management, and central process and applications support/development.*

In the Xerox case it has been shown that the effective management of the process organisation is best supported by the centralised *management* of IM activity. As the statement specifies, this involves centralised IM strategy making, technology planning, and support for process management and applications development. In the Xerox case it was shown that the flexibility given to IM managers in different operating locations to modify applications and processes was counter-productive for Xerox as a whole. Managers wishing to organise using a process focus need to set clear policy with respect to any modifications of central IM plans. (cf. section 5.1.1.5).

> 16. *Key IM skills changes are needed, — a move from a technical to a business orientation and a refocus from software and data to the management of information.*

The human resources (HR) that are needed for the management of IM in a process-based organisation such as Xerox were shown to require the types of skills that are summarised in the statement above. Business and managerial skills are predominately demanded. The 'programme managers' at Xerox who make up the majority of HR in IM at the centre were shown to posses five 'managerial' roles. Managers

who plan to organise by process need to consider the skills profiles of their proposed IM people. The Xerox case implies that a technical and software focus will not suffice. IM people at Xerox act as negotiators, brokers, arbitrators, co-ordinators etc. These skills are not usually borne out of a technical focus. A strategy for acquiring or developing the required skills is needed. (cf. section 5.1.1.6).

> 17. *The co-ordination and extensive implementation of process and applications commonality depends on the availability of resources and strong (IM) leadership and management.*

In the Xerox case it was shown that commonality of process and applications architectures was possible in a multinational environment provided that the required resources were made available and that strong leadership and management existed. Managers need to be willing to provide the correct environment for commonality to exist — if it is what they choose in managing a process-based model. (cf. section 5.1.2).

> 18. *A fragmented applications architecture causes inflexibility and high costs (in the context of a process-based organisation).*

In the Xerox case it was shown that a consolidated applications architecture was required to provide IM that supports the process-based organisation at 'benchmark' costs. The Xerox data also shows

that the consolidation of the applications architecture can help to produce IM flexibility. The decisions that managers need to make in respect of the previous (seventeenth) statement are also connected with these issues of cost and flexibility. The question of commonality becomes increasingly significant in the management of a process-based organisation (such as Xerox). (cf. section 5.2.1.1).

> 19. *A package approach to systems development is a rapid and cost effective means of satisfying internal customer (IM) needs.*

In managing the information architecture, Xerox management have made an explicit policy decision to develop applications using a package approach. The main alternative is to develop bespoke in-house applications. In terms of the speed of development, in the Xerox case, the bespoke method has proved to be too slow and the resulting support that can be provided to the process organisation by the IM process can be seen to lag behind the requirements of the process model. This has the effect of rendering the process model inadequate vis-à-vis customer requirements. Managers need to be explicit in making this decision if the process model is to receive effective IM support. The package approach is not a panacea but provided that packages can be modified to fit critical processes (but not extensive modification), then the approach can, as in the Xerox case, be made to work. (cf. section 5.2.1.1).

> 20. *Technological interoperability between process areas and the extended enterprise is fundamental to operating a process model.*

The complex integration of business processes across the entire organisation is characteristic of the process-based enterprise (POHE). In the Xerox case this was shown to be made possible by, among other things, Xerox's technological capabilities. Central to this is the technological interoperability between process areas. Technological planning of IM interoperability in a process-based organisation needs careful attention if the complex integration of processes and the systems that support them is to succeed. Managers need a strategy for making this work. Left to chance, it is unlikely that inter-process technological interoperability can succeed and the process model will be undermined and unsuccessful. In the Xerox case, the centralisation of this type of planning was shown to be a suitable solution. (cf. section 5.2.1.2).

> 21. *The central control of applications is needed to avoid their fragmentation.*

Linked to the previous statement, it was shown that in the Xerox case applications that were not centrally controlled became fragmented. This was shown to be counter-productive from the perspective of co-ordinating a process-based model and it was also shown to place

upward cost pressures on the IM process. The Xerox solution to this is to centralise both the development and control (in terms of modification) of the applications portfolio. Managers need to consider the trade-off between local variation and corporate-wide applications commonality. In the Xerox case, management have decided that common applications may best support a common process model and that this is sufficient (necessary) to support customer needs. (cf. section 5.2.1.3).

22.	*The focus on managing by process produces an 'operational' approach to IM.*

At Xerox the business process focus of the IM process was shown to produce an operational approach. What are compromised are the strategic and management information possibilities of IM. Enterprise-wide data are lost and the consolidation of information for management decision making becomes secondary to supporting the processes and operations. The centralisation of the management of the process model and the control and development of the applications is producing an environment in which these problems may be alleviated. Particularly important to Xerox's management is the ability to implement enterprise metrics, and this is becoming possible by standardising the data models as part of the centralisation action. Managers hoping to adopt process-focussed approaches should consider the issues of strategic and enterprise-wide information. If

these types of information are deemed to be important, strategies for incorporating a management information approach to IM need to be developed. (cf. section 5.2.2.4).

> 23. *An operational approach to IM is business focused and business led.*

Despite the problems cited with the operational approach in the previous statement, the majority of benefit that accrues from this approach is the fact that the Xerox (operational) IM process is business focussed and business led. This results in IM producing what the business wants and not what IM thinks is best. At Xerox this is linked to the funding of the IM process — IM resources are provided by the business. The Xerox case shows that with respect to the support of a process model, the business led operational approach is successful. The business focus should be maintained. (cf. section 5.2.2.4).

7.1.2.1 Objective Two Summary

The thirteen idiographic statements (11-23) that have been presented above have contributed to an understanding of the second research objective. In summary the following statement can be made:

The role of the information management process within the context of a process-oriented enterprise is to provide flexible and cost-effective applications, technological, and process support to the business. This is best achieved through a centralisation of the management of IM and of the process model. A business-led approach combined with the consolidation of applications, information, process, and data architectures is central to providing effective business and process-focussed support.

7.1.3 The Relationship Between Process and Information Management

The third research objective brings the findings of the previous objectives together in order to understand the relationship between process and information management. This was the focus of chapter six. The main findings — the idiographic statements — are presented below. In some cases the statements appear to be repetitive with respect to earlier statements. This is because these relationship statements are functions of the previous statements which have been 'artificially' separated for analysis. In reality in the Xerox case, it is difficult to talk of one (PM or IM) without the other.

From a process perspective the process model was shown to be related to the IM model in seven ways. The seven idiographic statements (24-30) follow.

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24. *IM can be used to structure and co-ordinate a realignment of the process model.*

In the Xerox case, IM has not only been used to support the process model, but is now used to *create* aspects of it. Statements 11 and 34 are both connected with this. The applications and IM structures are being aligned to closely resemble the process model. Simultaneously, the new IM developments are being used to co-ordinate and enable

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developments in the process model. The mutually creating dynamics of PM and IM are demonstrated in the Xerox case. Managers need to be aware that the relationship between PM and IM is one of mutual creation. A focus on only one 'side' of this relationship is to leave the other to 'chance'. (cf. section 6.1.2).

> 25. *IM can provide the possibility for the implementation of enterprise metrics.*

One of the main benefits of operating a POHE is that it can be managed as a *holistic* entity. This arises from the complex integration of enterprise-wide information and processes and in the Xerox case IM is providing the possibility for this to happen. Enterprise metrics were shown to be critical for senior management in operating the holistic enterprise and it was shown that various aspects of IM capability and organisation could provide this. If managers of a similar model to that of Xerox's also consider enterprise metrics to be critical, then they need to consider how to organise IM to 'produce' that capability. In the Xerox case it is something that has needed careful planning and management – It has not been coincidental to operating the process model. (cf. section 6.1.3).

> 26. *IM should support processes in ways that meet performance targets.*

In the Xerox case it was shown that one of the expectations of the 'business' of IM is that it should provide support for the process model in ways that allow performance targets to be met. This places the IM process high on the list of the organisations' critical success enablers. The convergence of IM and the process model (cf. statements 11, 24, and 34) would indicate that this is a well founded expectation. In similar contexts, managers should recognise this and thus ensure that the IM process is well managed and resourced. In short, the IM process is critically important to the management of the POHE. (cf. section 6.1.3).

> 27. *IM capabilities can enable the centralisation of the process model.*

Statement 12 indicated that the management of the process model is best centralised. In the Xerox case it was also shown that non-customer facing processes were being centralised, and that this was made possible through IM capabilities. This enables many of the other goals – e.g. consistent data and applications. Managers need to consider whether the correct conditions exist for a centralisation of the process model, and to balance the benefits and drawbacks of

pursuing such a strategy. The Xerox case shows that centralisation is both possible and enabling. (cf. section 6.1.4).

28. *IM can facilitate business simplification.*

In the Xerox case it was shown that innovation in the process model, specifically 'business simplification' can be enabled by the capabilities of IM. Particular ways of operating processes and certain processes themselves are dependent on the application of IM capabilities. Consequently, managers need to be cautious in fostering a purely business-led approach because there is a danger that process innovation through that which IM can offer will be lost. In the Xerox case, IM and the business have a close relationship and this risk is reduced. (cf. section 6.1.4).

29. *IM can provide real-time and up-to-date operational **and** management information.*

The Xerox case shows that if the IM process is carefully managed it is possible to create an information infrastructure that supports a POHE and provides both operational and management information. The tendency in operating a process-focus was shown to produce an operations approach to IM. Managers who plan to manage by process need to consider whether their information infrastructure will produce the types of information that they require. In the Xerox case

management information was not consequential — the operational focus was. (cf. section 6.1.4).

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30.   *IM integration will reduce responsibility conflict management.*

A consolidation of the process model that is enabled by IM capabilities will reduce the number of decision makers in cross-process issues and will in general reduce the number of people who are responsible for a particular process area. Conflict management will be confined between fewer people. In the Xerox case, cross-process decision making was shown to be problematic (cf. statement 7). IM is helping to reduce this. As was stated with statement 7, further research in this area is needed. Managers need to be aware of the capacity for IM to produce or reduce the level of human intervention and decision-making in the organisation. This is particularly pertinent in the POHE because of the complex integration of processes on a holistic level. (cf. section 6.1.5).

The seven idiographic statements above (24-30) indicate that the future process model is one which is closely related to IM, and in many cases *dependent* on it. From an information management perspective the process and information management models were shown to be related in five main ways. The five idiographic statements (31-35) are presented below:

> 31. *IM planning is based on business process management*
>
> *direction.*

In the Xerox case, the processes that make up the POHE are customer focussed and their management with respect to metrics reflect this. IM planning is organised to support this, and as has been discussed with statement 23, this extends to areas such as funding for IM — the major source is from the business process managers. In the Xerox case this is an effective approach to the management of IM but managers need to be cautious not to lose out on business opportunities that can be IM initiated (cf. statement 28). Corporate-wide strategic input is also needed for the implementation of, for example, enterprise metrics. Managers need to be aware that a purely business-led focus may produce some undesirable losses such as those mentioned here. (cf. section 6.2.1).

> 32. *The IM group (BP&IM) is organised by process area.*

Managers of a POHE need to consider very carefully the manner in which IM is to be organised (or reorganised). The Xerox case shows that IM and PM are so closely related that the consequence is that the IM group becomes organised by process area. This is not coincidental and needs to be managed. Managers wishing to adopt a similar model to that of Xerox need to consider how they might need to reorganise their IM group. Although this research cannot show this, it is unlikely

that functionally organised IM can adequately support a process model. (cf. section 6.2.1).

> 33. *Integrated applications development is based on a process model.*

Connected with statement 14, in the Xerox case applications development is planned on a holistic approach that incorporates complex integration. This complex integration was shown to be based on the process model where in the Xerox case process links are becoming applications links. This emphasises the convergence of IM and PM and managers need to ensure that process people and IM people are brought together. (cf. section 6.2.1).

> 34. *Applications and processes are converging (process is the application) cf. statement 11.*

As an extension of the previous statement and related to statement 11, in many cases at Xerox, the process is now the application. Where processes can be automated, all manageable elements of process can be handled by applications. Management need to be aware that although a process can become embedded in an application, its management may still be required. A process for managing *embedded* processes should exist. (cf. section 6.2.1).

35. *Enabling technologies make the process management possible.*

In the Xerox case it is clear that the POHE would be impossible without the enabling technologies and capabilities of IM. Managers wishing to embrace a process model as their means of organising must recognise the considerable enabling capabilities of technology and IM and should plan to develop a suitable IM strategy. (cf. section 6.2.2).

The five statements (31-35) show that the planned Xerox IM model is one which is closely related to PM. IM is *totally organised* to support PM and it can thus be seen as a particular type of IM — *process-oriented information management.*

7.1.3.1 Objective Three Summary

The twelve idiographic statements (24-35) that have been presented above have contributed to an understanding of the third research objective. In summary the following statement can be made:

In a POHE, process and information management are inextricably linked. The model of process management depends heavily on IM, whilst the model of IM is totally focused around supporting and creating the process model. The two models are mutually creating — one cannot exist without the other. There is a duality concept of process and information management.

7.2 Problems with the Research

This section provides a discussion of the problems associated with this research. In general the problems relate to different aspects of methodology and whilst they can not always be overcome, their identification is nonetheless important.

7.2.1 An Epistemological Issue

The first problem is related to epistemology. A social context such as an organisation is dynamic. When research is presented in documentary format (this thesis) it is by definition static. The researcher faces the dilemma in researching evolving phenomena as to which point he or she 'freezes' the data for analysis. A positivist assumption at the level of epistemology is that what is true at one time and in one place may also be true at another time and in another place (cf. section 3.1). This is clearly not the case with dynamic subjects. The practical implication is that if the results of this study are to be used to inform managerial action, then the case site must be revisited and adjustments to the results should be considered in respect of any changes that have taken place since the field study. This would be a complex task to achieve but a simple strategy would be to begin with the idiographic statements and ask respondents to revalidate them or suggest modifications where needed.

7.2.2 Credibility & Transferability

It is difficult to demonstrate credibility of the research findings in the written thesis (this document). Credibility (cf. section 3.5) is where the research findings are deemed to be adequate representations of the respondents' multiple constructions — i.e. they are credible to the respondents themselves. This has been achieved by the author continually 'checking' his understanding of respondents' accounts with them. This was done both during interviews and at other opportune times during the research. For example, the model of mutually creating PM and IM (cf. figure 6.12) was shown to respondents and their comments noted. In all cases respondents positively confirmed it to be 'right'. The point here is that credibility is difficult to show in a written version of research findings but in practical terms participant observation is an excellent means for the researcher to gain confidence that his or her reconstructions are credible. Findings are continually tested through the process of developing understanding — in conversation and by observation.

Transferability which refers to the applicability of the research findings in another context is difficult to judge. As was discussed in section 3.5, the researcher cannot make such a judgement unless he or she has considerable knowledge of the other context. The problem that arises is in justifying the outcome of the research. The question which poses the greatest threat can be made from a positivist perspective — 'If the research findings are not generalisable, then what is their use?' There

are many answers to this and they stem from differing perspectives. Firstly, and perhaps obviously (?), the results are generalisable to the case in question. Thus, they are in this case of use to Xerox people.

Secondly, the results provide verstehen — they provide understanding of the nature of phenomena that are not represented in the literature. This may be particularly useful to people who work in or are interested in other process oriented holistic organisations. Moreover, people in organisations that would like to become process-oriented may be interested in these results. Thirdly, the results could be used as hypotheses to be 'tested' in multiple cases, and this would imply a paradigm shift (cf. section 7.3.4).

7.2.3 Researcher Bias

The problem of researcher bias also needs to be considered. The postpositive perspective does not purport to produce results that are free of bias but quite the contrary — they are laden with the bias of the respondents and they are inevitably biased by *at least* the researcher's selectivity in making choices such as whom to interview, and when to stop collecting data. Although bias is unavoidable, techniques such as member checking to produce credibility (as described above) help to reduce any negative consequences. In this research the author took as much guidance from the case site as to what was relevant, whom to interview etc. — so as to minimise bias

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through researcher selectivity. The author wanted to discover the respondents' meaning and understanding of the phenomena in question. The unstructured qualitative interview was appropriate. The decision that the researcher needs to make regarding when to stop collecting data can be dependent on the researcher deciding if 'nothing new is being learned'. When multiple sources of data are exhausted and nothing new is discovered — a type of triangulation — then the researcher can be certain that spurious bias is not prominent in the data. However, it must be recognised that bias at the level of the entire unit of analysis (the entire case) would not be 'detected' or eliminated using these techniques. Given the diversity of data in this research it is extremely unlikely that this is the case with Xerox.

7.2.4 Data Handling

With qualitative research such as this, managing the vast quantity of data is problematic. In this research the author has found the NUD•IST software to be invaluable as it allows quick retrieval of data and an effective means for indexing and sorting it in multiple ways. What has been particularly difficult is the presentation of participant observation data. In practice the author has found his participant observation data the most difficult to convey in the thesis. Documentary and interview data are in contrast relatively easy to manage. It is difficult to show how valuable the participant observation has been in producing the results. The participant observation is critical because it trains and conditions

the researcher to produce the research instrument (the trained researcher) that is able to 'measure' and 'collect' the 'right' data — and to understand it. The participant observation is one of the most valuable aspects of the research, however the author has found it to be the most difficult to present.

This is not an exhaustive discussion of problems, but it is an overview of the most prominent that the author has encountered. The next section considers how this research can be used as a basis for further work.

7.3 Suggestions for Further Research

In the course of this research the author has identified several avenues for further research. Four such possibilities are considered below.

7.3.1 Decision Making

One of the findings of the research is that Xerox use a consensus approach to cross process decision making. This was shown to be problematic. A possibility for further research is to investigate the process of cross-process decision making with the intention of developing ways to optimise it and to eliminate some of the associated problems. An action research project could be initiated to address this problem — i.e. there is an explicit intention that the research will change that which is being researched, in this case improve the process. Connected to this issue is the centralisation strategy that Xerox are implementing with respect to the information and process models. It was implied in this thesis that this will reduce cross-process problems and this is mainly because the number of instances of cross-process issues will be reduced. Further research could explore if this is actually realised (as the data suggests) or if further problems are created.

7.3.2 Flexible Processes

In this research process boundaries were shown to be problematic. The research data showed that boundaries need either to be many or flexible. In the Xerox case they are many. The flexible approach to the definition of process boundaries and measurement could be explored. The research problem would be to assess the viability of a dynamic process model with respect to boundary definition and end-to-end measurement. The process model would not only be a complex integration of processes but also a continually changing one. The Xerox data indicates that this is what happens in reality but that measurement systems (metrics) and process representation (XBPA) and support (IM) do not 'keep-up'. Hence the need to periodically update the models. Further research could explore the possibility of dynamic measurement systems, process representation and support. The application of modern technologies may provide the key to such an approach and research could consider how that could be done.

7.3.3 Extending the Ethnography

This thesis can also be seen as part of a long ethnographic study of Xerox's organisational transformation(s). As was discussed in chapter two, Davenport & Short (1990) began the 'ethnography', followed by Bounds and Hewitt in 1995. Although the previous research is not as in-depth as this study, together they produce a valuable ethnography. Further research could contribute to this by looking at the outcomes of

the Xerox plans that were discussed in this thesis. At the point that data collection for this research ended (1998) major change had been planned (e.g. the centralisation of the process model). Further research could examine the consequences and nature of the changes that have since taken place. It would be interesting to see whether the proposed benefits were realised and whether a stage three IM has been planned or can be identified.

7.3.4 Other POHEs

A comparative study that looks at similar phenomena in other POHEs would be interesting. From the perspective of a positivist paradigm it would be interesting to compare the elements of process and information management from different cases to determine whether a generic model is possible. The majority of the thirty-five idiographic statements can be used to 'generate' such hypotheses for subsequent 'positivistic' testing. The following is a list of nineteen salient hypotheses drawn from the idiographic statements.

H1: A process oriented holistic enterprise (POHE) is best created incrementally and over the long term. (Based on idiographic statement 1).

H2: A POHE can not be effectively managed without the use of documentation. (Based on idiographic statement 2).

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H3: In a POHE, cross-process linkages can not be effectively managed from more than a single (central) point in the organization. (Based on idiographic statement 6).

H4: Effective cross-process decision making is not possible unless there is a clear and suitable process for cross-process decision making. (Based on idiographic statement 7).

H5: Processes can not be effectively managed without the assignment of clear process responsibility(ies). (Based on idiographic statement 8).

H6: Enterprise-wide process commonality can not be effectively managed unless the management of the process model is centralised. (Based on idiographic statement 9).

H7: Effective process improvement is dependent on the existence of consistent (global) metrics. (Based on idiographic statement 10).

H8: Management of the business process model in a POHE is best coordinated by a central IM group. (Based on idiographic statement 12).

H9: In a POHE, applications must be seamlessly integrated for the POHE to operate effectively. (Based on idiographic statement 14).

H10: A POHE is successful when technological interoperability between process areas and the extended enterprise is centrally planned. (Based on idiographic statement 20).

H11: IM is critical in the structuring a POHE. (Based on idiographic statement 24).

H12: IM is critical in coordinating a POHE. (Based on idiographic statement 24).

H13: Enterprise metrics are critical in the effective management of a POHE. (Based on idiographic statement 25).

H14: IM provides the means by which processes can be centralised in a POHE. (Based on idiographic statement 27).

H15: Careful management of the IM process in a POHE can provide an information infrastructure that produces both operational and management information. (Based on idiographic statement 29).

H16: By increasing the level of process integration through IM, responsibility conflict management can be reduced. (Based on idiographic statement 30).

H17: Effective IM planning in a POHE is based on business process management direction. (Based on idiographic statement 31).

H18: For the IM process in a POHE to operate effectively, the IM group must be organized by process area. (Based on idiographic statement 32).

H19: Where processes can be automated, then all manageable elements of the process can be handled by applications. (Based on idiographic statement 34).

Essentially these hypotheses may be considered to be 'null hypotheses' that may be tested in multiple cases. The outcome of such work would initially be to support or not support the null hypotheses. By bringing together a proven (from a positivist perspective) set of hypotheses, a generalisable model of process and information management can be created.

A particularly interesting avenue for research would be to look at the different approaches that firms can take in building a process-based enterprise and to determine what the consequences of the different approaches are. Specifically relevant at the moment are firms who are implementing ERP systems and are thus forced to adopt a process orientation. This is the reverse of what Xerox did. Xerox had first developed the process model and *then* brought IM in to support it. Research to assess the consequences of building POHEs in different ways could be beneficial to future organisational architects.

7.4 Epilogue

"The concept of processes really isn't that new. Effective managers have long known that you manage by processes – they're an essential tool for getting things done. What's different now is the enabling technology. Today's information systems allow you to do things that weren't possible in the past, such as accessing information simultaneously from multiple locations and diverse functional groups. With that ability, you can enjoy the efficiency of a process orientation without losing the responsiveness of a divisional organisation. The less developed information systems that supported command-and-control structures couldn't do that. In fact, those structures – which can probably be traced back to the church and to the military as far back as Caesar – persisted precisely because for many years they were the *only* way to manage large, complex organisations" (Allaire in Garvin, 1995, p. 79, original emphasis).

$$\mathbf{X}^{[1]}$$

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[1] The Digi-X is a registered trade mark of Xerox Corporation.

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Appendix 1

LIST OF ACRONYMS

AS	Area Sponsor
AU	Aston University
BP&IM	Business Processes and Information
BP&SD	Business Processes and Solutions Deployment
BPO	Business Process Owner
BPR	Business Process Reengineering
BSA	Business Solutions Architecture
CBU	Customer Business Unit
CEO	Chief Executive Officer
CET	Core Enterprise Team
CLAM	Central Logistics and Asset Management
CRIM	Centre for Research in Information Management
CT	Co-ordination Theory
EDS	Electronic Data Systems plc
EMEA	Europe, Middle-East, and Africa
ESRC	Economic and Social Research Council
EWG	Empowered Work Groups (software application)
HCI	Human Computer Interface
HR	Human Resources
IM	Information Management
ITC	Install to Collection
ITT	Invitation to Tender

N	A researcher who conducts research based on a 'Naturalistic' perspective.
OPCO	Operating Company
PA	Process Analyst
PABA	Process Area Business Analyst
PM	Process Management
PO	Process Owner
POHE	Process Oriented Holistic Enterprise
PSP	Partner Selection Process
RX	Rank Xerox Ltd.
SIM	Society for Information Management
SISP	Strategic Information Systems Planning
SPS	SAP Partner Selection
T&A	Technology and Architecture
TTM	Time to Market
TQM	Total Quality Management
UCS	AT&T Universal Card
UK	United Kingdom
USA	United States of America
XBA†	Xerox Business Process Architecture
XBPA†	Xerox Business Process Architecture
XL	Xerox Limited
XMM	Xerox Management Model

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† these acronyms have been used interchangeably by Xerox people

Appendix 2

Xerox 'Structures'

The manner in which Xerox Ltd. is 'put together' can be understood by considering geographic scope, business (or product) groups, and core business processes. In terms of geography, Xerox Ltd. which trades in Europe, the Middle East and Africa is one of Xerox Corporation's operating companies (OPCO). A separate OPCO trades in the USA, another for Canada, another for South America, and one for Australasia.

The Xerox Ltd. OPCO is sub-divided into companies which are called 'entities'. There are seven main entities. The United Kingdom, France, and Germany have large markets and are considered as separate entities. Northern Europe, Central and Eastern Europe, Southern Europe, and the Middle East and Africa form the remaining four entities (Muir, 1997).

Each entity has general managers who report to the managing director of the XL OPCO. Together they are known as the 'core enterprise team'. Each of the geographic entities consists of one or more 'customer business units' (CBUs). These are customer facing sales and marketing units. The CBUs are located such that they maximise proximity to XLs marketplace. Figure A2.1 shows the allocation of the main entities and CBUs.

Figure A2.1 : Xerox Ltd. Operating Company – Entities and Customer Business Units.

Source : Internal Xerox Customer Service Document

Xerox has a diverse range of products which are aimed at different market segments. In order to cope with the different demands and complexities of each segment four business groups were set up. The ultimate base for each of the business groups is in the US Xerox OPCO at what is known as 'Corporate Headquarters'. There are representatives (managers) for each of the groups in each of the other OPCOs, including XL. These managers are responsible for the business groups' operations in each entity within their OPCO. The main business groups are (1) the office document product group, ODP (e.g. medium sized copiers); (2) the production systems group, PSG (e.g. reprographics copiers); (3) the Xerox Channels group, XCG (e.g. desktop copiers & facsimile machines); (4) Xerox Document Services,

XDS (e.g. document outsourcing and consultancy); and (5) Document Supplies Group, DSG (e.g. paper, toner etc).

In terms of process management, the business is 'supported' by the process owners of the core business processes. There are six process areas (see figure 4.2). These are, Market to Collection (MTC), Customer Service (CS), Integrated Supply Chain (ISC), Time to Market (TTM), Manage for Results, and Infrastructure. The major processes are the MTC, CS, and ISC processes. These and TTM are known as the 'operational core processes'. Responsibility for each process rests with its 'process owner'. As has been stated, this person is responsible for providing support to each of the business groups.

Manage for Results is concerned with setting the business direction and guides the process of strategic contracting within the enterprise. It has an integrating and co-ordinating role. It is holistic in nature because it affects all parts of the firm. All units develop strategic plans, create contracts for resource use, stipulate expected costs, plan commitments & requirements etc. This core process acts largely as a governing mechanism.

The Infrastructure process enables and supports all activities of the firm. This process provides accounting, human resource management, information management, legal services and a few other subsidiary

services to the entire OPCO. In practice however, the 'customers' of the Infrastructure process are the other process owners. They in turn have as their customers, the managers of the Business Groups.

Understanding markets and customers, identifying customers, communicating with customers, selling to customers, and fulfilling customer orders are all processes provided by the MTC core process. This core business process is the most prominent to the 'end-customer'. It manages the firms' relationship with its customers and is thus of utmost importance.

The CS core process provides a variety of services to the end customer. These include consultancy, machine support, repair, training, software support, network support etc. CS provides services to all the business groups and is key in maintaining customer relationships and hence is a long term source of revenue. It is a complex core process because of the diversity of customer attributes and needs among the various business groups.

The ISC process includes the supply of raw materials for manufacture, the operation of JIT systems, and the maintenance of supplier relationships. The ISC process is holistic but also global in nature. Supply and manufacture is managed on an international scale. The main distribution centre for the XL OPCO is in the Netherlands at

Venray. This provides a central 'hub' for the entire geographic area of XL.

The TTM process provides product development, design and manufacture for all the business groups. As the products of each group are relatively distinct, the TTM process is quite specific for each group – although the products do share many of the core technologies.

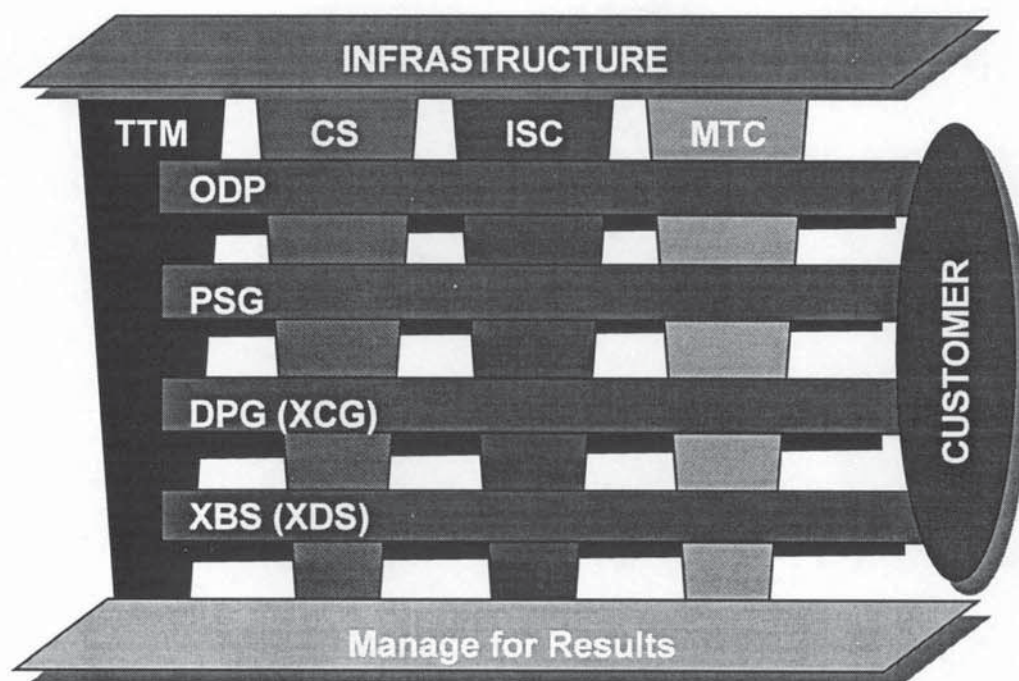Figure A2.2 shows how the core processes and business groups fit together.

Figure A2.2 : Core Processes and Business Groups.

This model of core processes and business groups is repeated within each entity. The TTM process is also shown as 'running through' each

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business group. This is because the products are developed using TTM

and it can therefore be perceived as part of the group itself.

Appendix 3

Partner Selection Process

Pages removed for copyright restrictions.

Appendix 4

Idiographic Statements

1. It has taken Xerox Ltd. in excess of ten years to 'build' an advanced process-based organisation.

2. A document that depicts the process model (XBPA) in a standardised manner is critical in managing the process-based organisation.

3. There are three main types of 'process people' who are involved in managing the process organisation (Process Owners, Area Sponsors, and Process Analysts).

4. There are four key manageable elements of processes (people, tasks, information, and technology).

5. 'Organisations' of process people exist at different 'levels' of the process organisation to manage the process areas.

6. Clear process responsibility is necessary.

7. Cross process linkages need special attention and careful management.

8. The consensus approach to cross process decision-making is problematic.

9. Commonality and consistency of process definition(s) is desirable.

10. The management of consistent (global) metrics is essential.

11. Process and information architectures are converging.

12. The management of the co-ordination of the business process model is best carried out by a central IM group.

13. Consistent and integrated data are required.

14. The nature of applications needs to shift from 'functional support' to 'business process driven'.

15. The IM organisation needs a central strategic group, central technology management, and central process and applications support/development.

16. Key IM skills changes that are needed, — a move from a technical to a business orientation and a refocus from software and data to the management of information.

17. The co-ordination and extensive implementation of process and applications commonality depends on the availability of resources and strong (IM) leadership and management.

18. A fragmented applications architecture causes inflexibility and high costs (in the context of a process-based organisation).

19. A package approach to systems development is a rapid and cost effective means of satisfying internal customer (IM) needs.

20. Technological interoperability between process areas and the extended enterprise is fundamental to operating a process model.

21. The central control of applications is needed to avoid their fragmentation.

22. The focus on managing by process produces an 'operational' approach to IM.

23. An operational approach to IM is business focused and business led.

24. IM can be used to structure and co-ordinate a realignment of the process model.

25. IM can provide the possibility for the implementation of enterprise metrics.

26. IM should support processes in ways that meet performance targets.

27. IM capabilities can enable the centralisation of the process model.

28. IM can facilitate business simplification.

29. IM can provide real-time and up-to-date operational *and* management information.

30. IM integration will reduce responsibility conflict management.

31. IM planning is based on business process management direction.

32. The IM group (BP&IM) is organised by process area.

33. Integrated applications development is based on a process model.

34. Applications and processes are converging (process is the application) c.f. statement 11.

35. Enabling technologies make the process management possible.