

**TRANSFORMATION OF THE IT FUNCTION
AT BRITISH PETROLEUM**

John Cross

British Petroleum PLC

Michael J. Earl

London Business School

Jeffrey L. Sampler

London Business School

M J Earl + 44(0)171 262 5050 email MEarl@lbs.ac.uk

J L Sampler +44(0)171 262 5050 email JSampler@lbs.ac.uk

London Business School, Sussex Place, Regents Park

London NW1 4SA United Kingdom

Fax Number : +44 (0)171 724 7875

Please direct all correspondence to Michael Earl.

20 August 1997

**TRANSFORMATION OF THE IT FUNCTION
AT BRITISH PETROLEUM**

Author Biographies:

Michael J. Earl is Professor of Information Management and Deputy Principal at London Business School. His research interests lie at the intersection of information technology and business strategy and he is currently studying how firms are repositioning themselves for the information age. He is also doing a comparative study of IT and Management in the UK, USA, France and Japan. Previous work has included studies of the role of the Chief Information Officer and he is now currently examining the role of the Chief Knowledge Officer. He is also Visiting Professor at the Stockholm School of Economics. Michael Earl is a noted conference speaker and widely published in academic journals. His latest book “*Information Management: The Organizational Dimension*” is published by Oxford University Press.

Jeffrey L. Sampler is Assistant Professor of Information Management at London Business School. He received his PhD in 1992 from the University of Pittsburgh. His research interests include electronic commerce and the relationship of information technology to knowledge management with its implications for strategy and organizational design. His work has appeared or is forthcoming in such journals as *Accounting, Management and Information Technology, Journal of Management Information Systems, Journal of Management Studies* and *MIS Quarterly*.

Dr. Sampler is currently researching the internet as a driving force in the transformation of many industries. In particular, he studies the development of new small start-up firms and how they are altering the pace of innovation and challenging traditional industry leaders.

At London Business School he is principal researcher for the Center for Research in Information Management and i:LAB, a research center dedicated to understanding the implications of electronic commerce.

John Cross is Head of IT, BP Group, headquartered in England. His articles on IT Outsourcing in BP have been published in *Harvard Business Review*.

TRANSFORMATION OF THE IT FUNCTION AT BRITISH PETROLEUM

ABSTRACT

In 1989 the IT function of the exploration and production division of British Petroleum Company set out to transform itself in response to a severe economic environment and poor internal perceptions of IT performance. This case study traces and analyzes the changes made over six years. The authors derive a model of the transformed IT organization comprising seven components which they suggest can guide IT departments in general as they seek to reform themselves in the late 1990's.

This model is seen to fit well with recent thinking on general management in that the seven components of change can be reclassified into the Bartlett and Ghoshal (1994) framework of Purpose, Process and People. Some suggestions are made on how to apply the model in other organizations.

Keywords: Information Technology; IS Management; Transformation

ISRL Categories: AF04, DA01, DA06, EF03, EG01, EG02, EH01.

TRANSFORMATION OF THE IT FUNCTION AT BRITISH PETROLEUM

"Information is the subject, and the intent is transformation"

- BPX IT Strategy Document

INTRODUCTION

In 1989, the IT function of BP Exploration (BPX), the \$13 billion division of British Petroleum Company that explores for and produces oil and gas, set out to transform itself in response to a severe economic environment and poor internal perceptions of IT performance. In recent memory, oil prices had reached \$30 per barrel, only to collapse to \$14 per barrel. John Browne, CEO of BPX, reacted by setting challenging financial targets and rebuilding a business that could survive prices of \$12 per barrel and also improve margins by 50 cents per barrel. By 1991 these financial targets had been reached.

Between 1986 and 1989, BPX had grown in value by 250%, largely by acquiring Standard Oil, Britoil and Lear Petroleum and leaving them substantially autonomous. In June 1989 John Browne announced that BPX was to be a regional structure run and operated as a global company. He wanted a flatter organization and as a dramatic signal he declared himself to be the only surviving occupant of BPX. A new global management team was to be assembled and the organization had to re-invent and redesign itself.

Browne believed that IT was key to creating a global organization and delivering higher productivity. He also sensed that the IT function was top heavy, pursuing its own agenda and not fully exploiting the IT marketplace. So he selected IT as the first function for transformation and a new General Manager, John Cross, was appointed to lead it.

Six years later, the IT group, known as XIT, had undergone dramatic change (Table 1). The budget had been reduced by 63% and the headcount by almost 90%. Between 1989 and 1992 XIT delivered \$460 million savings to the business "*without any visible loss of value.*"

Table 1. BPX IT Statistics:1989-95

	1989	1992	1995
IT Budget	\$360m	\$170m	\$132m
IT Headcount	1400	390	150
IT Applications	170	110	75
% Desktop MIPs to Mainframe MIPs	20%	85%	99%

More significant, we believe, is the resultant mission and shape of IT evident by end 1995. A transformation has occurred not just in key statistics but in what the IT function is expected to contribute to BPX and how this is achieved. The change is more than one of outsourcing and downsizing as already reported by John Cross (1995). It can be seen to comprise seven elements which we capture in Table 2. This describes an agenda for a transformation of IT departments in general in the second half of the 1990s.

Table 2 : The IT Transformation Agenda

FROM	TO
Systems Provider	Infrastructure Planner
Monopoly Supplier	Mixed Sourcing
Business Standards	Industry Standards
Decentralized Bias	Centralized Topsight
Systems Analysts	Business Consultants
Craftsman	Project Managers
Large Function	Lean Teams

We derived the components of the agenda from a longitudinal study over three years in BPX. We interviewed 40 managers (including representatives of BP's prime vendors), some of whom we met several times to track or clarify events. We also had full access to internal papers and reports. The goals, changes and journey which we examined are seen as transformational by BP. As stated in 1991, *"the mission of XIT is to become the best in class in its support of BPX's goal to be the best upstream company in the world. To do this, we have embarked on a program of change designed to transform IT within BPX."*

THE TRANSFORMED IT ORGANIZATION

Why Transformation?

In recent years, both academics and practitioners have suggested that the way companies organize themselves and do business is outdated. The traditional models of hierarchy, standardized procedures, functions, responsibility centers and performance measurement have all come under attack. The basic premise is that they served corporations well in periods of environmental stability, and might even be adjusted to cope with occasional shocks, but in today's continuously changing environment more flexible and adaptive capabilities are required and radical change necessary. So nothing short of organizational transformation has been advocated and contemporary practices like downsizing, outsourcing, delaying and reengineering have been incorporated into the concept. Recommendations therefore include process redesign (Hammer & Champy, 1993; Davenport, 1993), corporate renewal (Ghoshal & Bartlett, 1996), business rejuvenation (Stopford & Baden-Fuller, 1994), strategic stretch and leverage (Hamel & Prahalad, 1994) and organizational transformation itself (Gouillart & Kelly, 1995).

All of these concepts have been articulated and applied at the organizational level. However, there has been relatively little attention paid to how particular functions or activities may be transforming themselves. In the case of the IT function, recognizing both that businesses are changing and technologies are rapidly evolving, there have been calls for rethinking and reinventing IT practices and management (Ross et al, 1994; Rockart et al., 1996). However, this is not the first time that calls have been made for a shift in IT management principles because of the evolution of technology and business practices.

In the case of the IT function, we suggest that there have been three broad generations of managerial practice. The 1st generation of IT practice involved a function that was concerned with efficiency and cost-savings. Many of the systems developed were directed at the operational level of activity (Anthony, 1965; Gorry and Scott Morton, 1971). The 2nd generation of IT practices evolved during the late 1970s and continued through the late 1980s, and was concerned with managing IT as a strategic resource. The primary aim of this era was to have the IT function aligned with or supporting the business strategy (Henderson and Venkatraman, 1993; King, 1978) or to even use IT systems to gain competitive advantage (McFarlan, 1984; Parsons, 1983; Porter and Millar, 1985; Rackoff, Wiseman and Ullrich, 1985).

Unfortunately, many of the strategic benefits from IT systems proved to be less sustainable than originally predicted (Clemons and Kimbrough, 1986; Emery, 1990), and many organizations emerged from this era with large IT cost structures and an often dubious opinion of IT by senior business management. Because of the doubts raised about IT, this led to managements being guided by principles of cost reduction and tangible benefits. This focal shift introduced a third generation characterized by wide experimentation on the management of the IT function. Outsourcing (Earl, 1991; Loh and Venkatraman, 1992; Lacity and

Hirschheim, 1993) and decentralizing (Boynton, Jacobs, and Zmud, 1992; Rockart, 1988) IT activities were two of the more dominant principles arising during this period. However, to date, there have been few or no studies of whether and how particular organizations have gone about reinventing IT practices and management, and what a transformed IT function might look like.

This case analysis of BPX's efforts seeks to remedy the gap. BPX was one of the pioneers in creating a new organization and new principles to manage IT activities. Indeed, some of the principles discussed in more detail such as outsourcing, partnership arrangements and transformation are increasingly a common element in managerial thinking today. However, we would suggest that BPX was one of the pioneers in developing and applying some of those ideas, as their radical change processes began in 1989. Also the IT change agenda was not in isolation, but was part of a larger corporate change agenda which increased both the complexity of the change process and the necessity of success. We now examine their transformed IT organization through the seven components of Table 2.

From System Provider to Infrastructure Planner

Until recently, it has almost been an implicit assumption that the mission of the IT function was to develop systems. In the early days of computing, there was little application software that could be purchased from third party vendors, and therefore, it was the job of the IT department to develop the applications the business needed. Even in the early days of strategic uses of IT, the outcome of the IT strategic planning process was to determine which systems should be built (King, 1978; Vitale, Ives, and Beath, 1986; Ward, 1987; Henderson and Sifonis, 1988).

In the late 1980s, XIT reflected this philosophy. For example, in 1989 most of the 1400 XIT personnel were engaged in providing and operating systems in a classical mainframe VMS environment. By 1992, 390 personnel remained, working in a distributed, client-server environment, with 85% of computing provided at the desk-top. In three years, the computing base had been re-architected. By 1995, the primary responsibility of the IT function was architecting, planning and overseeing infrastructure. John Browne had called for "*a unified platform so that we can change business practices easily.*" He believed information technology was a linkage technology. However, he observed these infrastructure problems:

1. Acquisitions had created architectural complexity as different companies, functions and regions found ways to interface with each other across different IT platforms.
2. Total IT costs had spiralled in the 1980's as system demands had been met by locally owned computing power in both divisions and functions.
3. Lack of a coherent architecture was beginning to create constraints on the free flow of, and access to, information.

Browne believed that as a result IT had become a straitjacket on organizational change when it was supposed to enable collaboration and flexibility.

In order to reduce architectural complexity, global portfolios of common application systems were agreed to and regional centers of responsibility were identified. For example, eight different simulation systems were reduced to two. Geophysical applications were allocated to London and drilling applications to Aberdeen. "Shrinkwrapped" software replaced in-house development of software for reasons of cost and standardization. IT applications were reduced from 170 to 75 with no apparent complaints by the business. The applications development budget was reduced by 69% in three years.

IT costs were partly reduced through outsourcing (see below), a significant proportion of the savings funded the rearchitecting project. Adoption of distributed computing enabled early rationalization of six data centers into three and then two to align with geographical regions. Work done on Cray Supercomputers was transferred to Sun Workstations and IBM RS6000 machines.

Principles of "Information Management" (Appendix 1) were then formulated to ensure free flow of, and access to, information. The vision in 1991 was "*the right information, of the right quality, available to the right people at the right time.*" Four actions signalled the commitment to this vision. In 1990, a decision, ratified by the Board, was made to build the software environment around Sybase, a relatively new database management product. This overrode local preferences for Oracle, Ingres and other products. A commitment was made to open standards and pioneering moves (see below) were initiated to create oil industry standards to facilitate information sharing and systems portability across BP's external partners. Finally, a unified desk-top strategy, including one electronic mail system, was installed world-wide.

By 1994, XIT had formalized its infrastructure role into overseeing technical integrity and pursuing value creation and cost reduction opportunities through information sharing.

From Monopoly Supplier to Mixed Sourcing

In the late 1980s with greater availability of third party application software and IT facilities management skills, and as business management explored ways of reducing IT costs, many organizations were considering outsourcing some or all of their IT function (Earl, 1991; Loh and Venkatraman, 1992; Lacity and Hirschheim, 1993). The interest in IT outsourcing

increased considerably with the announcement of the very large outsourcing deal by Eastman Kodak and IBM in 1989 (Wall Street Journal, July 26, 1989, p.3). After several similar deals of almost complete outsourcing of the IT function, business practice increasingly shifted to much more of a hybrid model of selected outsourcing (Lacity, Willcocks, and Feeny, 1995, 1996; Earl, 1996). BPX was one of those companies who were an early adopter in considering how to achieve such arrangements. The business principles developed by XIT to guide their decisions on what areas of the IT function to outsource is described below.

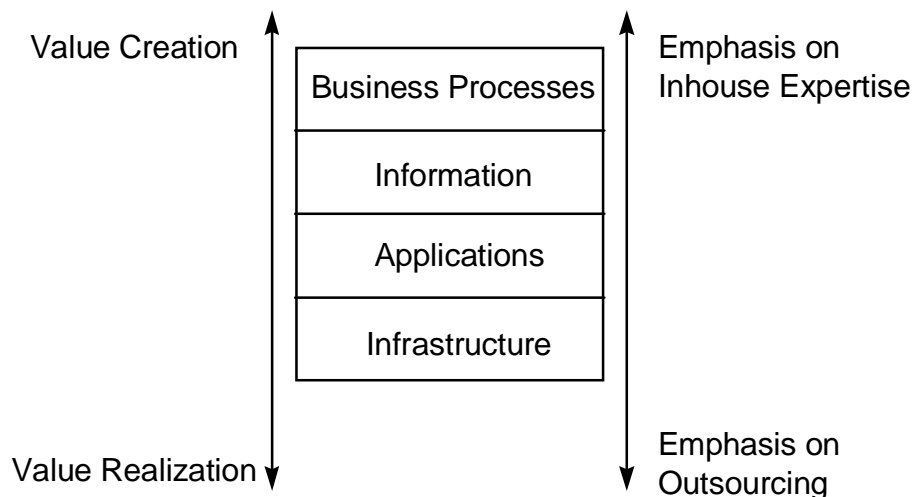
In 1989, XIT was supplying almost all of BPX's services worldwide. *"The belief was that developing and operating our own systems was a source of competitive advantage"* recalled Ian Vann, Technical Director. There were over 50 systems staff in geophysics alone producing customized models. In the operational area, one manager described his job as *"arranging delivery of the next shipment of Digital equipment."* By 1990, however, John Browne was skeptical about technology itself yielding competitive advantage. He observed there is always someone else who *"does it better"*; that the key was in having the skills and attitudes to locate, purchase and integrate technologies relevant to the business; that value accrues from use and that technical advances do not stay secret for very long in collaborative, technological industries. He concluded that *"failure to outsource our commodity information technology will permanently impair the future competitiveness of our business."*

So in 1991, outsourcing of operations, telecommunications, systems development and IT maintenance began as XIT recognized that *"it is not essential that these are carried out in-house."* Some local sites already had experience in facilities management and as contracts came up for renewal, lessons were recorded and a world-wide outsourcing program implemented. The process of selecting three prime vendors (SEMA Group, Syncordia and

SAIC) and integrating them globally has been documented previously by John Cross (1995). Other suppliers have been used to supply specialist services or to cover geographical areas.

A model created by XIT, called "Jacob's Ladder" or the "IT Value Chain" (Figure 1), became important in agreeing the logic of what to outsource and in setting expectations with all potential suppliers. This model was developed to aid BPX in focusing its activities by helping it to understand the areas in which the internal IT function could add value (in terms of additional revenue versus) those activities whose main contribution was cost saving, in which case the marketplace might be more attractive because of the additional potential savings due to economies of scale. For BPX, the model suggests that if BPX outsourced the commodity, industry-generic activities of applications and infrastructure-building to a competitive marketplace, the residual and reskilled IT personnel could help the business create value from information use and sharing and from redesigning and optimizing business processes.

Figure 1: "IT Value Chain"



Early in the outsourcing project, the infrastructure planning described earlier was incorporated. An internal report noted: "BPX's IT strategy is to migrate to a client-server

model which facilitates information management. A challenge is to contain operating costs throughout the transitional period in which our legacy of existing applications, based on central computers and character-cell terminals, must continue to be supported. Our suppliers must be ready and able to participate with us in developing the new computing environment while continually improving the efficiency and quality of service from the old. Within three years, our environment will be based on open systems platforms thus diminishing dependence on proprietary technology."

By 1992, XIT's vendors were being evaluated as partners on metrics of innovativeness, flexibility, openness and risk-sharing as well as on quality, cost and performance improvement. The central XIT team was responsible for creating and evaluating partnership agreements, including the formulation of principles reproduced in Appendix 2. Local IT staff were responsible for ensuring service and cost targets were met.

From Business to Industry Standards

IT managers have long been concerned about coordinating various types of computing and communication equipment. However, throughout most of the research on IT infrastructure, the focus has been directed at creating and managing the *internal* infrastructure (McFarlan, McKenney, and Pyburn, 1983; Weill, Broadbent, and St. Clair, 1995; Weill, Broadbent, Butler, and Soh, 1996). However, in XIT's pursuit of realizing their goal of a "buy, not build" software policy, BPX spearheaded a unique initiative to help create an external software market by being one of the early advocates and founding members of the Petrotechnical Open Software Corporation (POSC). POSC was founded as an international not-for-profit membership organization in October 1990 with 5 founding sponsors: BPX, ELF, Mobil, Texaco, and Chevron. By late 1995, POSC membership had increased to 115. The mission of POSC was to define, develop, and deliver an oil exploration and production

(E&P) industry standard, open systems software integration platform. This effort would initially concentrate on developing a common data model and then focus on application development.

The task of developing a common data model across the E&P industry was complicated for three major reasons: 1) The number of activities involved - geophysics, drilling, and production to name a few. 2) The number of companies involved - often multiple firms were involved in partnership or contractual relationships for any one activity, such as drilling. 3) The extremely long timeframes in the upstream petroleum industry - the typical oil field life cycle from discovery to divestiture is from 50 to 100 years. Conversely, if all the participants could agree on a data model, the rationalization benefits could be immense. By 1995, it was estimated that the common data model spearheaded by POSC had resulted in estimated savings of \$60-\$100 million by reducing the conversion efforts necessary to move data across different functions, business units, and companies. However dramatic these savings were, BPX and other POSC members believe that this was only the necessary first step that will now enable them to work in a very different manner. There are many potential benefits of economies of scale and sharing risk through developing a common set of applications. And as Cross notes, *"Through POSC we realized that value seldom is achieved through developing software, but instead comes from owning information. We now focus on who owns information and where they are located in the industry value chain."*

Over time, POSC participants have become comfortable with the vision of shared applications and a common data view, which enables possibilities for truly collaborative work across the value chain. This has produced many process redesign initiatives that allowed the sharing of specialized knowledge across many firms thereby increasing the value generated from the E&P process. As Jim Hood, XIT consultant, suggests, *"The real advantage in today's IT*

environment is POSC, which has created a common platform for the entire industry to facilitate easy communication. We are now focused on creating an environment to share knowledge, rather than have it locked up in custom software applications."

From Decentralized Bias to Centralized Topsight

Given the significant reductions mandated in XIT's budget, John Cross was initially given total IT authority. This move was strongly backed by John Browne who commented, "*I will never release central management control of IT in BPX.*" This move was made at a time when many writers called for either decentralized (Rockart, 1988) or more hybrid (Boynton, Jacobs, and Zmud, 1992) approaches to IT management that reflected not only the technological shift towards end user computing, but also the increased importance of IT for most business activities. Centralized IT management also contradicted the organizational change trends in BPX itself, namely a delayering of management and the movement of managerial authority down to business managers. Why in such an environment was IT the only centralized asset, and even centralized to the extent that all IT costs could only be approved through the IT organization and policed by the control department?

First, local, IT expenditures tended to be small, but in totality the amount spent on IT was significant. A central, single IT budget helped identify the scale of the problem and opportunities for rationalization and control. It also allowed business-wide project prioritization. Previously, local IT managers worked with individual businesses or functions to determine application needs. While this resulted in localized optimization, it also introduced much overall redundancy, and inhibited developing a single view of what was important to the total business. BPX estimated that under decentralization, 70% of the IT budget was spent on back-office applications. After centralizing IT budget authority, 70% of the IT budget was invested in applications that support business operations, such as exploration, and seismic

data analysis. Second, information was becoming increasingly difficult to manage because data was duplicated and fragmented across many systems. As the business required quicker and easier access to information, the problem became more apparent and important. Reducing the time needed to locate and acquire information would allow BPX to be more efficient. An internal study suggested that a 20% reduction in the time needed to identify and retrieve information would result in annual savings of between \$10 and \$20 million.

These experiences led XIT's senior management team to realize the major benefit of centralized management of IT is not budget authority, but is in setting standards for infrastructure. While some IT resources still remain in the local businesses, it is the job of the top IT management team to provide the global perspective for infrastructure planning and cost control, which we call "top-sight." To facilitate this, XIT has formed a Global IT Council (GITC), composed of senior IT and business asset managers to coordinate the planning and realization of this integrated architecture. Having defined the global architecture plan, regional IT management now has the responsibility for selecting applications meeting local business needs that will "plug and play" into the overall architecture. Increasingly, infrastructure is viewed as the enduring IT resource, while IS applications have a much shorter life-span as they are redesigned or replaced to meet changing business conditions.

From Systems Analysts to Business Consultants

The traditional role of the systems analyst has been to bridge the gap between IT capabilities and users' information needs (Sprague, 1987). Much of the IS literature has focused on the latter question - determining the most suitable method for information requirements determination (Davis, 1982). Research has tended to focus on either bottom-up approaches, that concentrated on appropriate techniques to elicit requirements from users (Grudnitski,

1984; Montazemi and Conrath, 1986), or top-down approaches, that linked system needs to the overall strategic plan (El Sawy and Nanus, 1989).

As part of its transformation, XIT has redefined the job of a traditional systems analyst into two areas of concern - "Supply Management" and "Demand Management." The former refers to the more traditional role of an analyst in understanding technological capabilities and how they may be applied to given problems. "Demand Management," however, transcends the analyst's traditional role of determining information requirements, because increasingly analysts are viewed as actively seeking to redesign or optimize business operations, not merely translating existing procedures into technical systems. As part of the XIT transformation, systems analysts are also now required to work with the business to identify business change opportunities, provide project cost-benefit analyses, and develop prioritized systems plans under the label of "Demand Management."

Demand Management therefore includes the following changes in work practices and responsibilities for XIT:

1. Prioritizing information application needs by working with business managers to understand their local needs and balancing these against overall business requirements.
2. Benchmarking global performance standards and integrating best practice into current projects.
3. Redesigning business processes, where appropriate, with the help of business managers.
4. Facilitating the sharing and managing of information and knowledge throughout BPX, especially exploring potential synergies across the BP Group.

This is obviously a very different set of responsibilities from those of a traditional systems analyst. Instead, it is much more like that of a business consultant - one of actively searching for ways to improve the business, not just passively implementing solutions that solve current

business problems. This requires both business and technical knowledge. This view is articulated by John Cross, who suggests "*Part of the IT change agenda has been to redefine the IT competencies that mattered to the business. We must reposition and remotivate a new type of IT professional - one like the British SAS troops - willing to go anywhere and do anything.*"

Such thinking led to definition of a new skill set for IT personnel, spearheaded by Norman Garden, XIT's Global Programs Leader for Organizational Development. The results are reproduced in Appendix 3. The new skill set has an equal balance between business, technical, and people skills. Such a radical change in the skill set of IT staff has been supported by a number of Human Resource initiatives such as skills testing, self-assessment and personal development planning. Also, individuals select support panels to coach them through these development processes.

Garden's view was that, "*The goal is for XIT to be recognized as a model for BP's work practices. Its members will be recognized as capable of working as leaders, implementors, consultants, advisors, coaches, and change agents.*" In such an environment, IT is viewed as part of the "glue" between the different business activities and must initiate and facilitate change. John Cross asserts, "*If you are running a static business, you don't need IT. If your business is changing, then you need an in-house IT consulting organization to help support change.*" XIT is now well along the process of transforming its staff from systems analysts to business consultants. Indeed, the effort must be successful, because they have received two offers from outside firms to buy their consulting practice!

From Craftsmen to Project Managers

Not only has the analysis and design phase of IS changed in BPX, but also the approach to providing solutions to problems has been greatly altered. In the traditional IS organization, once the problem was analyzed and documented, programmers would arrive to develop software applications. Much of the IS research on software development has either focused on project management methodologies (Burns and Dennis, 1985; Lyytinen, 1987) or the tools available to programmers in building applications (Konsynski, 1984-1985). Originally, XIT also reflected this focus. As one BPX staff member remarked, "*We once prided ourselves on bringing in very smart technical people who wanted to focus on building databases.*"

This is no longer the practice in BPX; a radical shift has occurred. XIT personnel no longer approach their job as craftsmen, viewing each job as a unique, customized process. Their task has switched to that of project managers, integrating and coordinating stakeholders involved in providing IT applications and operations. Indeed, John Browne highlights this transition by asserting, "*We don't need programmers, but solution facilitators.*" This perspective is consistent with the broader working practices of BP and the oil industry in general, where working with both partners and contractors is the norm.

XIT is now much more in a coordination role than in an actual software development role. As project managers, XIT brings together the best talents available, either within or external to BPX, to provide best-of-class solutions in a timely manner. To do this, a detailed awareness of critical skills available both within BPX and in the market place is necessary. XIT is responsible for managing the relationship with the external partners and retains ultimate responsibility for task completion, just as in the building construction or oil drilling industries a general contractor is liable for any work subcontracted to other parties.

XIT also has the responsibility of ensuring the quality of products and services received. If BPX is to achieve a true partnership with primary outsourcers, there can be no "finger-pointing" and attempts to "pass the blame" to outside parties. Instead, an open and trusting dialogue must be maintained to achieve resolution of any problems that may arise, rather than looking for a scapegoat.

Finally, as project managers, XIT seeks to learn from each engagement through post-project evaluations. These examine the performance of all parties involved in the project - both XIT's role as a facilitator and an honest assessment of the contribution of the other parties involved. In addition, an overall assessment of critical skills needed in the project is developed. These procedures aid the design of future projects by highlighting:

1. key skills that must be further developed internally,
2. which internal staff or external firms should be involved in such future activities

As an additional measure of preparing for new projects, XIT continues developing a good market knowledge of new firms in the IT industry who may be suitable future partners.

This approach to providing IT solutions is best described by John Browne who states, *"The ability to understand the needs of the business and then bring together the different items of technology and technical knowledge which can meet those needs is a demanding and very creative skill. Those who have that skill are likely to be experts in their own fields, of course, but they are also people with a wide understanding and knowledge of many other fields of scientific and technical endeavors as well. To put the necessary pieces together, they have to look to many different sources outside the company, as well as understanding what can*

and should be done internally. They have to be capable of recognizing and transferring best practise from one project to another. They have to feel secure in a working environment which applauds and rewards an open-minded approach - an environment which recognizes the worth of work which other people do. And they need the widest possible range of open and creative relationships with all the other parts of the industry where technical advances are being made."

From Large Function to Lean Team

As both the importance and complexity of the IT function increased, this led to the creation of many specialized jobs. Moreover, as roles became more specialized and many IT functions became larger, this led to the introduction of many support staff, such as accountants, marketers, and planners, to internally coordinate IT activities and integrate them with the business (Earl, 1989). Unfortunately, the development and maintenance of such large functions was no longer consistent with BPX's transformation into a lean, dynamic organization.

For example, after acquiring Britoil and Standard Oil, John Browne expected a 40% reduction in BPX's cost base from rationalization. On appointing John Cross as General Manager of IT, *"the rules of the game were clear"*. These included a directive to delayer the IT organization, to reduce his direct reports from 22 to 8 and to stop recruitment. 650 IT staff were released in the first year and \$100 million cut from the budget. Interestingly, this tranche of downsizing was carried out before IT services were outsourced. It was a product of rationalization and those who left generally found IT posts in other organizations. Outsourcing then released another 250 employees, 80% of whom were re-employed by the three outsourcing partners. Subsequently another 150 IT staff left BP to develop their careers elsewhere. These were people who *"did not like the new roles required of them or who found*

they did not possess all the competences required.” Table 1 shows the effect of 6 years' rationalization.

Such downsizing obviously presents challenges and will rarely be entirely smooth. A full-time human resource manager was employed by John Cross to plan, design and oversee the exercise. At the outset a two day workshop was attended by all IT staff with the aim of identifying future competencies and assessing current skills. An external consultant was employed to conduct individual evaluations and apply psychometric tests. This event “*acted as a heatsink for much of the anger and anxiety that existed.*” John Cross concedes that some very good staff left and “*you don't know how valuable they might have been - but we have been able to refresh our capabilities in the market-place, in particular recruiting senior staff from the large consultancies.*” Equally, those who managed the outsourcing stage have reflected that BPX ended up dealing with former employees, who, despite acting for a new organization and becoming suppliers, found it difficult to change their behavior.

An early strategy document emphasized three aspects of the new lean XIT. The function became global “*to reduce duplication, complexity and cost through a process of integration across BPX.*” It was designed to be “*an organization fit for purpose....small in size, broad in scope and highly focused on business needs.*” Finally, responsibilities between the central team and local units were clearly delineated. The former existed to pursue global initiatives leveraging cost and quality advantages by integration and sharing of best practice. The latter were charged with formulating information strategies and delivering consultancy and services to meet local business needs.

The team orientation of XIT comprised eight elements. Staff were moved around the world to create global not local loyalties. A teambuilding and teamworking program was introduced by

John Cross stressing the use of multifunctional teams and diluting the functional focus. He abolished the title of "manager" and all members of his global unit became "partners". Their role was to be mentors and coaches to local IT staff rather than executives or experts. All XIT staff were expected to form multilevel affinity groups in which they worked and learned together. At the local level, the senior IT professional was expected to be a member of the local management team. In the new skill set (see earlier) for IT staff, consulting skills and teamwork complemented technical competencies. In conjunction with these changes, IT personnel increasingly became responsible for their own career management. Parts of XIT even experimented with letting IT staff choose their own manager, which would enable them to select the individual they believed could help them most augment their skill mix in order to best facilitate career advancement. Indeed, employees increasingly became responsible for their long-term employability, and those that succeeded became very sought after within XIT. To evaluate the overall effectiveness of these efforts, once a year the global management team met to think about the shape, form and performance of the new IT organization.

Two propositions in particular drove the team orientation. The first was that IT knowledge increasingly was spread throughout the organization and was no longer located exclusively in the IT function. The second was that effective IT management required a high degree of both technical and business expertise.

The transition from large function to lean team paralleled developments in the organization at large. Former BP Chief Executive, Robert Horton, had introduced **OPEN**, a program of Networking, Empowerment and Teamworking. Browne advocated teamwork in BPX and Cross followed suit. Indeed, one executive observed "*Browne and Cross built a close relationship based on track record and credibility and they went on the journey of transformation thereafter step by step*". Recently writers have been advocating relationship-

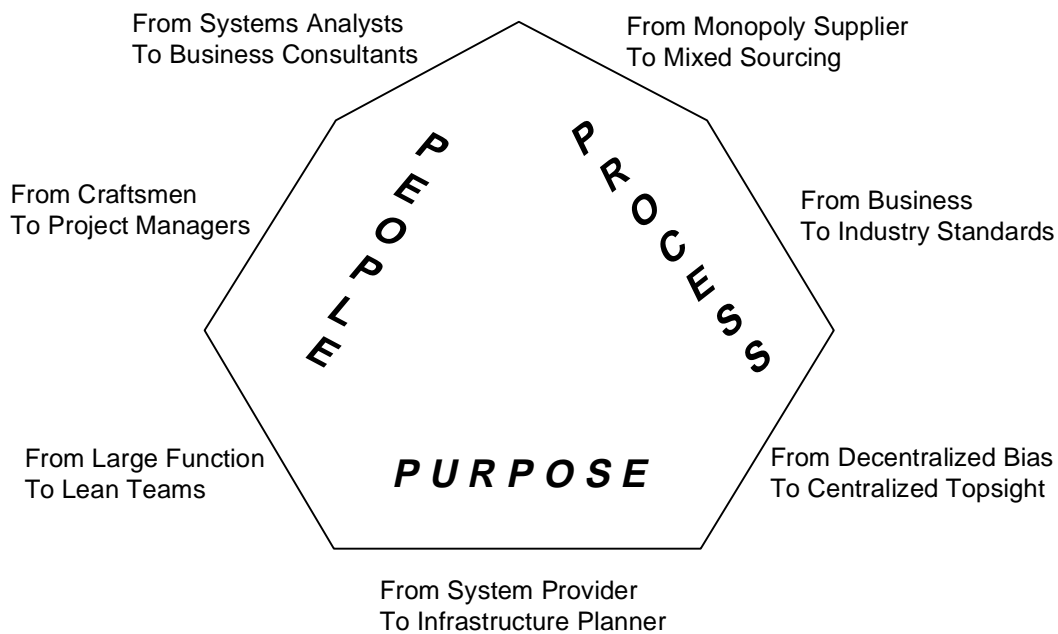
building and teamwork as critical in IT management (Feeny et. al 1992; Earl & Feeny, 1994; Ross, et. al., 1994) and here the relationship between CIO and CEO perhaps ensured both the momentum and support for a team approach.

PURPOSE, PROCESS, AND PEOPLE

As noted earlier, the objective of corporate transformation is to develop an organization that is much more dynamic, flexible, and organic than the original organization, and thus more adaptive on an ongoing basis to a changing environment. In BPX, XIT became the barometer of change for the rest of the organization, because of the frequency with which it was impacted by changes in the oil and IT industries. IT was used extensively throughout BPX, so that changing any part of the organization would ultimately result in the need for IT changes.

A traditional way of describing and analyzing organizations is to use the dimensions of strategy, structure and systems. However, in today's turbulent environment writers have questioned the appropriateness of these constructs. Bartlett and Ghoshal (1994, 1995) proposed a more organic framework of Purpose, Process and People. We suggest that in retrospect XIT through their transformation have adopted and created a management philosophy which is well characterized by these three P's. Accordingly, we recast Table 2 as a heptagonal model where the seven components of transformation are organized around Purpose, Process and People in Figure 2 below.

Figure 2: The Transformed IT Organization



We propose that this model provides an integrating perspective on XIT's transformation. Furthermore, it also may serve as a useful organizing framework for others considering embarking on reform of the IT function. We now re-examine BPX's achievements through this perspective.

From Strategy to Purpose. Traditionally strategy has been defined either in terms of a very broad strategic vision or a highly focused strategic intent. Strategic vision has been criticized as being too broad and focused, and thus it is often unable to galvanize or guide a firm's employees. Strategic intent (Hamel and Prahalad, 1989) was introduced as a reaction to these criticisms, and called for the corporation to have a very focused objective to challenge and eventually defeat less focused rivals. However, Bartlett and Ghoshal (1994) argue that the downside of strategic intent is creating a narrowly focused organization that is "strategically myopic" and inflexible. They suggest a more balanced approach they refer to as purpose. Purpose characterizes the strategic objective of XIT's senior management team. Despite the

obvious cost cutting objectives of the initial stages of the change effort, John Browne and John Cross avoided the temptation of defining financial targets, as many firms have done, as the sole strategic objective for BPX. They realized that financial targets were only part of a larger agenda and that the organization must be aware of and driving towards the broader objective of developing a robust, flexible IT capability. Indeed some of the early cost savings were used to fund re-architecting of the IT platform.

We suggest that the shift from systems provision to infrastructure planning is an appropriate purpose because it focuses on creating an enduring and flexible infrastructure that will hold BPX together and facilitate an open plug and play environment. This broader planning purpose differs from highly focused strategic plans of obtaining competitive advantage through a particular IT application. Instead, it sets a general direction that can be adapted to changing business conditions and in this sense is the foundation or anchor of the new management philosophy. As Appendix 1 shows BPX characterized this direction-setting through “vision and goals” statements.

From Structure to Process. Having established a new purpose, XIT also redesigned the manner in which it worked - away from structure towards process. Ghoshal and Bartlett (1995) argue that many organizations that were once dominated by a structure of largely hierarchical authority-driven relationships, are now supplanting this structure with a series of horizontal processes that cut across functions and business divisions. Such an argument will come as no surprise to IT researchers and practitioners, who in many ways rekindled the interest in process-oriented organizational activities (Davenport, 1993; Davenport and Short, 1990; Hammer, 1990; Hammer and Champy, 1993). However, Ghoshal and Bartlett (1995) are not concerned with using IT to redesign work processes, but with the managerial processes

that orchestrate work and the processes of conducting the work itself, as has Champy (1995) in subsequent work.

XIT initiated a series of process changes in moving toward mixed sourcing, developing industry standards through POSC, and managing through centralized topsight. Each of these efforts required people to work in a very different manner. No longer were people placed in narrowly defined jobs with explicit directions, but instead were given much broader guidelines and ultimately the responsibility to make things happen. In many cases part of this broader approach to solving problems included working horizontally across a business process with parties from multiple functions, business units, and outside companies. Appendix 2 which reproduces BPX's outsourcing principles, we suggest, is a good example of the emphasis on process.

In summary, organizational processes shape the behavior of people and create a work environment that enables them to take initiative, to cooperate and to learn (Ghoshal and Bartlett, 1995). This view was reflected by Norman Garden, who stated: "*Future success requires that XIT evolve into a learning organization - one that sees the possibilities for achieving extraordinary performance and is not constrained by old organizational hierarchies and the rigidity of old behaviors. In the learning organization, the traditional roles of manager and worker are under challenge. Our premise for evolving a new set of behaviors is the notion that the only things that count are the strength of an idea and the value of the contribution. In a truly open environment, the source of the idea and the status of the individual do not matter.*"

From Systems to People. Such changes in the manner in which people work also requires a shift in their skills. Many corporations working with an industrial-based business

paradigm have ensured that people were interchangeable or standardized by providing them with tasks that were well defined, measured, and controlled (Bartlett and Ghoshal, 1995). Such procedures may have been correct when capital and equipment were the most valuable resources that a business possessed. However in a changing environment that values the ability of an organization to adapt quickly, such procedures designed to drive-out individual creativity and innovation are no longer appropriate. Increasingly, the most valuable resource that a corporation possesses is the knowledge and creative spirit of people and the organizational capability to leverage and infuse these insights and innovations throughout the organization (Bartlett and Ghoshal, 1995).

XIT's attitude toward its people reflects this belief as they changed the roles of their personnel to be business consultants and project managers working in lean teams. Increasingly, as Appendix 3 illustrates, people were given tasks requiring an understanding of both business needs and IT capabilities to solve problems more quickly, and in many cases with fewer resources. Also, the assembly of a project team was no longer driven by positional authority or job title, but instead was focused on bringing together the team with the most appropriate skills. The team was also composed of a few XIT members with critical skills, who then brought in personnel with complementary skills to complete the project.

Highly trained and motivated individuals are key to a successful implementation of XIT's new purpose and processes. Ongoing education was a high priority because XIT realized that individual staff are the ones that enact and improve the clarity of the corporate vision on a daily basis. Improving people is necessary for the business to improve, and XIT sought to redesign both the tasks and skill mix of employees to enable this. Norman Garden summarized XIT's belief in the importance of its individual employees as follows, "*We believe in continually developing a style and climate which liberates the talents, enthusiasm and*

commitment of all our people. We can then respond positively to the increasing change of pace in a rapid and flexible way to achieve real competitive advantage."

The model in Figure 2 therefore not only is a graphic representation of the transformation agenda in XIT which others can follow, but also provides an integrating managerial framework. We are not only proposing that any agenda for reform of the IT function should tackle all three constructs of purpose, process and people but also suggesting that changes to just one set of dimensions of IT activities - purpose, process or people will be suboptimal without attention to the others. More precisely, the model implies that without careful consideration of purpose, a change agenda may be neither understood nor sufficiently ambitious. It proposes that process thinking and redesign is applied as much to the IT function as to the business at large. And it argues that that inevitably transformation is achieved through people and thus people development is essential.

Moreover, the model is depicted with purpose as the foundation, because in the case of BPX, the new purpose of infrastructure planning evolved before many of the other transformation activities began in a substantial manner. We suggest this as sound advice for any other organization embarking on such a transformation of their IT function, because it is the new purpose of the IT organization that shapes the subsequent changes in process and people. For example, once your main purpose is no longer developing systems, but is instead infrastructure planning, it clearly follows how process changes emphasizing a centralized management focus and industry infrastructure standards could evolve. Similarly, the people changes in such an environment would facilitate changes in the required skill set and project team size.

Once the transformation process is underway, how should the people and process changes, as suggested in the model, occur? In BPX, we observed that many of these changes occurred in parallel. Often these changes make more sense if they are collectively implemented as part of a comprehensive change package. Moreover, with such an effort, the different elements are mutually reinforcing, and appear consistent not only from the organization's viewpoint, but also from the individual's perspective. However, as other organizations attempt such transformations, management must adjust the nature and order of implementing these changes based on the organization's unique business situation, which may suggest implementing certain changes first, as well as their overall tolerance for change, which will affect how many changes are pursued in parallel. Thus, in summary, for IT transformation, we suggest that the model indicates a clear starting point for many organizations, and a description of factors that must be addressed during the transformation, but the exact sequence of this individual elements will be situationally dependent.

LEARNING FROM BPX

IT departments of several large organizations are embarking upon substantial programs of change. Reskilling, reshaping and reengineering are terms frequently found on corporate IT agendas (Rockart et al, 1996). We suggest that our model in Figure 2 provides a coherent change program in that each of the seven statements not only captures what is required in the late 1990's (the "to" statements) but captures the degree of change from the past (the "from" statements). We seek to generalize from BPX below.

The transition from system provider to infrastructure planner could be important for most organizations. The goals at BPX - overall IT cost reduction, platform integrity and pursuit of synergies through information-sharing and applications integration - are familiar and become

more important as technologies multiply. Because only the IT function can understand, plan and oversee infrastructure, infrastructure planning becomes more important than systems provision.

Multiple sourcing of IT too is becoming generic as both the cost and service pressures on IT functions increase and the challenges of embracing ever more technologies grow. We suggest that development of industry standards is important in enabling multiple sourcing, and in creation of IT alliances with other firms. The shift from a decentralized bias to centralized topsight might be recognized by organizations who sense that too much decentralization of IT activities in recent years has increased total IT costs and impeded the development of cross-functional, corporate or global infrastructure and applications.

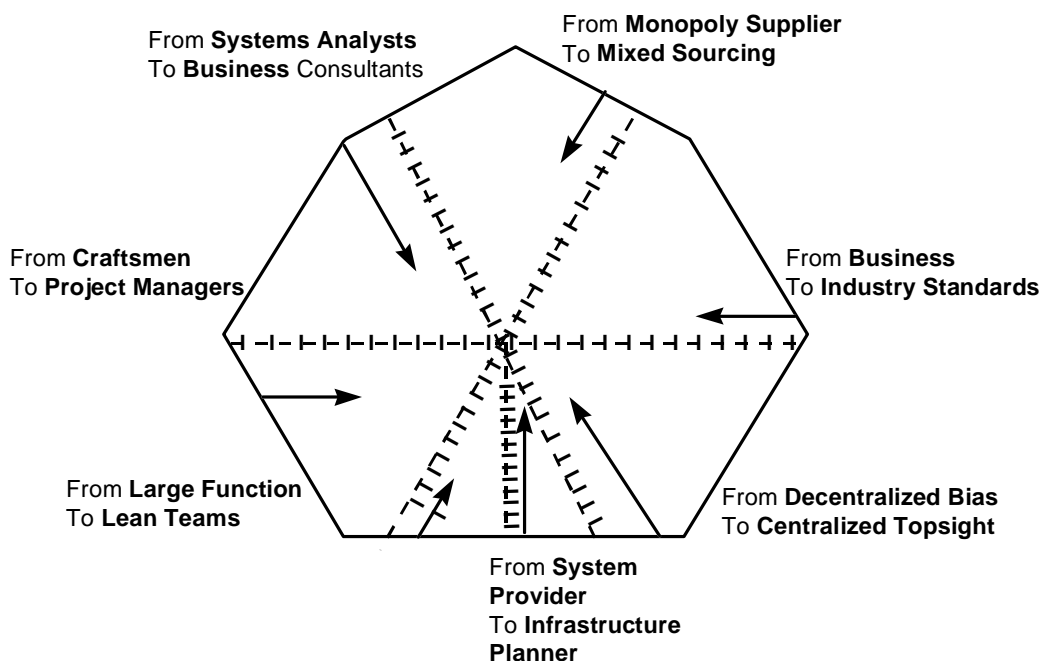
However, it is important to note that the outsourcing decision in BPX preceded many of the other changes, if not conceptually, at least in initiation. By removing XIT's primary responsibility of developing systems, this forced XIT management to redefine their roles and rethink the nature of functional activities. In other words, changing the mission of XIT was the catalyst for many of the other changes.

Technology change, new system development methods and the use of third parties are all raising questions about the skill-base of systems analysts and developers. At the same time, IT professionals are being asked to contribute to business change initiatives and rethinking of business strategies. Thus a shift from the traditional systems analyst role to that of business consultant seems appropriate. So too does the transition from craftsmen to project managers as IT development and operations involve ever more parties. This redistribution of IT activities between the organization and the market-place together with corporate trends on

size, cost structure and process thinking also suggest that leanness and teamwork will replace large functions.

Our model of transformation has been further validated and tested in a workshop with another large UK multinational. The senior IT executives of each division met with the CIO in a workshop to map out a change program. The heptagon model was then used in the following way. A spoke was drawn from each side to the hub (Figure 3) in a sort of Likert scale. The divisional representatives then assessed how far their businesses had progressed along each spoke (the arrows). This helped identify each division's strengths and weaknesses and to scope the overall change agenda in the corporation. We might have begun with the Purpose, Process and People metamodel to ensure that all the changes appropriate to this particular company were considered. However, the team felt that the seven elements were generic to all industries and organizations and provided a relevant roadmap.

Figure 3: The Heptagon as a Diagnostic Tool



The distinguishing feature in the case of BPX, is that their journey is more than well-publicized IT outsourcing. For those who have highlighted the risks and rhetoric of outsourcing (Lacity and Hirschheim, 1993; Earl 1996) or others who have called for careful and strategic approaches (McFarlan and Nolan, 1995; Lacity, et al. 1995), the BPX philosophy has been to deploy outsourcing alongside other complementary changes of practice, to focus on infrastructure planning and the new roles for IT personnel. Thus, the heptagon model perhaps represents an integrated, interdependent agenda for change.

The BPX case study demonstrates some principles of the process of transformation, that is, how to achieve radical change in the IT function. Six characteristics stand out:

- 1. BE PART OF A WIDER TRANSFORMATION.** BPX itself was pursuing a business transformation and IT was seen as a key enabler. Thus, the IT function's change program was neither in isolation from the rest of the business nor did it seem unduly aggressive. The mission for BPX IT was tied to the business mission. The cost reduction goals were related to the wider economic restructuring and the new organizational and management processes were congruent with the BPX OPEN program.

- 2. SET EARLY AND DEMANDING GOALS.** A target of reducing costs by 40% and then more set the tone. The drive for a new, global architecture confronted local and cherished technical beliefs head-on.

- 3. EXTERNALIZE THE TRANSFORMATION PROGRAM.** Not only was the mission to change IT tied into the wider organizational mission, it was shaped and

publicized outside. Thus, vendors were brought into the change program and were clearly informed about, and expected to contribute to, improvement goals. The industry standards initiative not only aided the BPX drive for openness, but helped legitimize it.

4. CREATE A SPIRIT OF BREAKING THE MOULD. The transformation program was characterized by challenging orthodoxy and by creative use of language. Old practices were challenged and more recently newer ones have been too. For example, the statement that not to outsource creates a competitive disadvantage is a radical notion that seeks to change one's thinking. The aim to work with three or four vendors as one was an order of magnitude departure from current practice at the time. The continuous use of 'value' in models and rationales is an interesting use of language to focus on intent, but in a positive way. The program of transformation was called "the journey" to signify ongoing, continuous change.

5. BUILD A STRONG CEO-CIO RELATIONSHIP. Browne and Cross shared the same goals. Indeed Browne understood both how necessary IT was to achieving his business vision and how necessary it was to turn around the performance of the IT function. Cross involved Browne in key decisions and was able to drive and measure performance improvement in terms of Browne's required contribution (interestingly each attributes success in the transformation to the other.) The importance of a strong CEO-CIO relationship in IT strategy-making has been identified by Watson (1990) and in ensuring effective IT leadership more broadly by Feeny et al (1992). Interestingly, our interview data suggest that Browne attributes much of the achievement to Cross, while Cross attributes it to Browne. This could be a measure of a good relationship!

6. DEVELOP AND EMPLOY TEAMWORK. Cross used teams and teamwork in the transformation in three areas. He assembled a management team from across BPX in order to transform the IT function on a global basis. He involved vendors, who over time became “partners” in the program. Finally, he encouraged the IT function to codify and develop the relationship between central and local IT management. All this led him to initiate team-building processes.

We do not argue from a sample of one that there are either necessary or sufficient “principles” for a transformation process in general. However, they appeared to make a difference in BPX.

The BPX case documents how one firm asked value questions of its IT function and then set about delivering value to a business under pressure. In a strategy document written in 1992, XIT recognized and pursued two sources of value from IT. The first was **value realization** or *"ensuring a world class delivery of IT in terms of the quality and cost of provision."* The second was **value creation** or *"dedicating ourselves to pursuing new opportunities to create value in support of the business."* We began this paper with a summary of value realized in BPX (Table 1). We close with a summary of investments made in the pursuit of value creation (Table 3) by 1996.

Table 3. Investments in Value Creation

INVESTMENT	CHARACTER
Architecture	Open; Information-centered; Client Server
Applications	Enabling increased information exchange across regions, functions teams and firms
Management	Global business view plus local partnership
Skills	Technical and human competences; Consulting and Implementation
Learning	Continuous challenge; External relationships

The opening statement of the 1992 strategy document pronounced :

"Information Technology (IT) is freeing itself from its past. The legacy from the IT industry of the 1980's is an IT environment which is complex, proprietary and expensive. However, new and emerging technologies allow IT to be delivered as an off the shelf commodity freeing staff to work closely with the business to improve the finding and production of hydrocarbons."

These sentiments, we suggest, are appropriate for the 1990s and the BPX journey we have described provides lessons which remain relevant and valid for other organizations.

References:

- Anthony, G.R. Planning and Control Systems: A Framework for Analysis. Boston: Harvard Graduate School of Business Administration, 1965.
- Bartlett, C.A. & Ghoshal, S. "Changing the Role of Top Management: Beyond Strategy to Purpose." Harvard Business Review, Nov/Dec 1994, pp.79-88.
- Bartlett, C.A. & Ghoshal, S. "Changing the Role of Top Management: Beyond Systems to People." Harvard Business Review, May-June 1995, pp.132-142.
- Bartlett, C.A. & Ghoshal, S. "Rebuilding Behavioural Context: A Blueprint for Corporate Renewal" Sloan Management Review, Winter 1996, pp.23-36.
- Boynton, A.C., G.C. Jacobs, and Zmud, R.W. "Whose Responsibility is IT Management?", Sloan Management Review, 1992, Vol. 33, No. 4, pp. 32-38.
- Burns, R.N. and Dennis, A.R. "Selecting the Appropriate Application Development
- Champy, J. "Reengineering management: the mandate for new leadership" HarperCollins, 1995.
- Clemons, E.K. and Kimbrough, S.O. "Information Systems, Telecommunications, and their Effects on Industrial Organizations," Proceedings of the Seventh International Conference on Information Systems, 1986, pp. 99-108.
- Cross, J "IT Outsourcing: British Petroleum" Harvard Business Review, May-June 1995, pp. 94-102.
- Davenport, T. H. "Process Innovation: Reengineering Work through Information Technology" Harvard Business School Press, Cambridge MA, 1993.
- Davenport, T. H. & Short, J. E. "The New Industrial Engineering: Information Technology and Business Process Redesign." Sloan Management Review, Summer 1990, pp. 11-27.
- Davis, G.B. "Strategies for Information Requirements Determination," IBM Systems Journal, 1982, Vol. 21, No. 1, pp. 4-30.

- Earl, M.J. Management Strategies for Information Technology. Hemel Hempstead, England: Prentice Hall, 1989.
- Earl, M.J. "Outsourcing Information Services," Public Money and Management, 1991, Vol. 11, pp. 17-21.
- Earl, M. J. & Feeny, D. "Is Your CIO Adding Value?" Sloan Management Review, Spring 1994 pp. 11-20.
- Earl, M.J. "The Risks of Outsourcing IT," Sloan Management Review, 1996, Vol. 37, No. 3, pp. 26-32.
- Emery, J.C. "Misconceptions about Strategic Information Systems," MIS Quarterly, 1990, Vol. 14, No. 2, pp. vii-viii.
- Feeny, D. F.; Edwards, B. R. and Simpson, K. M. "Understanding the CEO/CIO Relationship" MIS Quarterly, December 1992, pp. 435-448.
- Ghoshal, S. & Bartlett, C. K. "Changing the Role of Top Management: Beyond System to Process." Harvard Business Review, Jan-Feb 1995, pp.86-96.
- Gorry, G. A. and Scott Morton, M. S. "A Framework for Management Information Systems," Sloan Management Review, Vol. 13, No. 1, pp. 55-70.
- Gouillart, F. J. & Kelly, J. N. "Transforming the Organization" McGraw Hill, New York 1995.
- Grudnitski, G. "Eliciting Decision Makers' Information Requirements: Application of the Rep Test Methodology," Journal of Management Information Systems, 1984, Vol.1, No 1, pp. 11-32.
- Hammer, M. & Champy, J. "Reengineering the Corporation: Manifesto for Business Revolution" Harper Business, New York, 1993.
- Hamel, G. & Prahalad, C. K. "Strategic Intent" Harvard Business Review, May/June 1989, pp.63-76.

- Hamel, G. & Prahalad, C. K. "Competing for the Future" Harvard Business School Press, Boston MA 1994.
- Henderson, J.C. and Sifonis, J.G. "The Value of Strategic Planning: Understanding Consistency, Validity, and IS Markets," MIS Quarterly, 1988, Vol. 12, No. 2, pp. 187-200.
- Henderson, J.C. and Venkatraman, N. "Strategic Alignment: Leveraging Information Technology for Transforming Organizations," IBM Systems Journal, 1993, Vol. 32, No. 1, pp. 4-16.
- King, W.R. "Strategic Planning for Management Information Systems," MIS Quarterly, 1978, Vol. 2, No.1, pp. 27-37.
- Konsynski, B. R. "Advances in Information Systems Design," Journal of Management Information Systems, Winter 1984-1985, Vol. 1, No. 3, pp. 5-32.
- Lacity, M. C. & Hirschheim, R. "The Information Systems Outsourcing Bandwagon" Sloan Management Review, Fall 1993, pp.73-96.
- Lacity, M.C. and Hirschheim, R. Information Systems Outsourcing: Myths, Metaphors, and Realities. Chichester, England: Wiley, 1993.
- Lacity, M.C., L.P. Willcocks, and Feeny, D.F. "IT Outsourcing - Maximize Flexibility and Control," Harvard Business Review, 1995, Vol. 73, pp. 84-93.
- Lacity, M.C., L.P. Willcocks, and Feeny, D.F. "The Value of Selective IT Outsourcing," Sloan Management Review, 1996, Vol. 37, No. 3, pp. 13-25.
- Loh, L. and Venkatraman, N. "Diffusion of Information Technology Outsourcing: Influencing Sources and the Kodak Effect," Information Systems Research, 1992, Vol. 3, No. 4, pp. 334-358.
- Lyytinen, K. "Different Perspectives on Information Systems: Problems and Solutions," ACM Computing Survey, 1987, Vol. 19, No. 1, pp. 5-46.

- McFarlan, F.W. "Information Technology Changes the Way You Compete," Harvard Business Review, 1984, Vol. 62, No. 3, pp. 98-103.
- McFarlan, F.W., J.L. McKenney, and Pyburn, P. "The Information Archipelago - Plotting a Course," Harvard Business Review, January-February 1983.
- McFarlan, F. W. and Nolan, R. L. "How to Manage an Outsourcing Alliance" Sloan Management Review, Winter 1995 pp.9-23.
- Montazemi, A.R. and Conrath, D.W. "The Use of Cognitive Mapping of Information Requirements Analysis," MIS Quarterly, March 1986, pp. 45-56.
- Parsons, G.L. "Information Technology: A New Competitive Weapon," Sloan Management Review, 1983, Vol. 25, No. 1, pp. 3-15.
- Porter, M.E. and Millar, V.E. "How Information Gives You Competitive Advantage," Harvard Business Review, 1985, Vol. 63, No. 4, pp. 149-160.
- Rackoff, N., Wiseman, C., and Ullrich, W.A. "Information Systems for Competitive Advantage: Implementation of a Planning Process," MIS Quarterly, 1985, Vol. 9, No. 4, pp. 285-294.
- Rockart, J. F. "The Line takes the Leadership - IS Management in a Wired Society" Sloan Management Review, Summer 1988, pp.57-64.
- Rockart, J. F., Earl, M. J. & Ross, J. W. "The New IT Organization: Eight Imperatives". Sloan Management Review, Fall 1996, Vol.38 No.1.
- Ross, J. W., Beath, C. M. & Goodhue, D. L. "Develop Long Term Competitiveness through IT Assets" Sloan Management Review, Vol. 38, Iss.1, Fall 1996, pp.31-42.
- Sprague, R.H. "New Directions in Information Systems Management," Information Technology, 1987, Vol. 1, No. 3, pp. 31-38.
- Stopford, M. J. & Baden-Fuller, C. "Rejuvenating the Mature Business: The Competitive Challenge", Harvard Business School Press, Cambridge MA, 1994.

- Vitale, M.R., Ives, B. and Beath, C.M. "Linking Information Technology and Corporate Strategy: An Organizational View," Proceedings of the Seventh International Conference on Information Systems, 1986, pp. 265-276.
- Ward, J.M. "Integrating Information Systems into Business Strategies," Long Range Planning, 1987, Vol. 20, No. 3, pp. 19-29.
- Watson, R. T. "Influences on Information Systems Managers' Perceptions of key issues: Information scanning and relationship with the CEO", MIS Quarterly, 1990, 14(2), pp.217-231.
- Weill, P., Broadbent, M. Butler, C. and Soh, C. "An Exploration of Firm-Wide Information Technology Infrastructure Investment and Services," Proceedings of the Sixteenth International Conference on Information Systems, 1995, p. 349-350.
- Weill, P., Broadbent, M. and St. Clair, D. "IT Value and the Role of IT Infrastructure Investment," in J. Luftman (editor), Strategic Alignment. Oxford: Oxford University Press, 1995.
- Zmud, R.W., Boynton, A.C and Jacobs, G. C. "The Information Economy: A New Perspective for Effective Information Systems Management," Database, Fall 1986, pp.17-23.

Appendix 1 - BPX : Information Management Principles

LINK TO IT VISION & STRATEGY

Information Management is an integral part of the vision and strategy for IT in BPX, which is focused on meeting the information needs of the business. Defining these needs provides the basis for development of Information System Strategies.

Information Management (IM) contributes directly to IT's role as an agent of change, adding value to the business. The IM strategy and work program will also contribute to cost-reduction through elimination of duplication and complexity. IM will support the introduction of open systems, the client-server architecture, and the "buy, not build" policy for application software.

VISION & GOALS

The strategy is based on a vision for the management of information in BPX, and a set of goals through which the vision will be achieved.

VISION

"The right information, of the right quality, available to the right people at the right time."

GOALS

Data Sharing between Business Activities - The use of standard definitions, together with appropriate technology, will allow a seamless flow of information between business activities, breaking down existing barriers and promoting teamwork.

Data Managed Independently of Applications - Libraries, databases and other data storage facilities will be established and maintained independently of the business activities which utilize the information they contain.

Common Definitions of Business Processes and Data - A common language to describe business processes and information needs, leading to a common understanding of the way in which information flows and is created, read, updated and deleted across the value chain.

Common Methods and Standards for Users to Access Data - A standard approach, based on industry standards where possible, to simplify the process of finding, retrieving, and maintaining data. A common "look and feel" to computer applications and indexes and harmonized standards and procedures for the management of electronic and hard-copy data.

Information Indexed for Fast Easy Reliable Access - An information inventory and indexes which are easy to use and which will greatly reduce the time and effort involved in information retrieval.

Data Responsibilities Clearly Documented and Understood - Responsibilities for business processes, and for data ownership, custodianship and access rights assigned to specific organizational units and/or individuals. These responsibilities will be agreed and made available across the business.

Portability of Data and Systems - Data and services delivered across the network to any "client" which requires those services, whether locally or worldwide.

The Quality of Information Products and Services Significantly Improved - These goals will be achieved by the introduction and use of standards and procedures, methods and guidelines. There will be a program of continuous measurement and improvement for information products and services. The result will be a significant improvement in user perception of the quality of all information products, services and the information itself.

Appendix 2 - BP Exploration Outsourcing Principles

At a meeting in the village of Aston Clinton in early December 1992 the three companies in recognition of their wish and intent to advance the negotiating process relative to the outsourcing of certain of BP's IT activities recorded the following agreed upon statement of the Key Principles which were subsequently to be incorporated, in an appropriate form to achieve substantially the same effect, in the draft Framework Agreements.

For reasons of confidentiality, some of the financial details from the commercial principles which were agreed at Aston Clinton have been omitted from the paragraphs below.

General Principles

The following basic principles have been agreed by BP and the Alliance with respect to the financial/commercial framework:

- Simplicity of practice
- Visibility of costs
- Trust between the parties
- Common Understanding between the parties
- Creation of a Win/Win relationship
- Fair Returns for Alliance Members
- Long Term Relationship but no legal partnership between the parties
- Non-Traditional relationships between the parties
- Site Targets will be agreed locally. These Targets will include the Margin.
- Risk/Reward arrangements will apply to the difference between the costs included within the target and the actual costs as demonstrated via an open book policy
- Same basic principle of a margin plus risk and reward arrangements will apply for five years
- Principles will generally apply on a site-by-site basis as well as on a global basis
- From time to time, benchmarks will be established by BP to validate "best in class" performance, not necessarily just financial performance
- Other alternative financial arrangements for ad-hoc activities can apply where appropriate:

Examples: Fixed Fee/Price
 Incremental Cost

Appendix 3 - The Core Skills Identified for XIT Staff

<u>Business Skills</u>	<u>People Skills</u>	<u>Technical Skills</u>	
Communication and Interpersonal		IS/IT Strategies and Architectures	
Problem Solving		Project Management	
Business Awareness	+ General Proficiency + and Teamwork	Process Analysis =	IT Adding Value
Leadership and Guidance		Client Relations	
Decision Making		Supplier Relations	
Planning and Organisation		Information Management	
