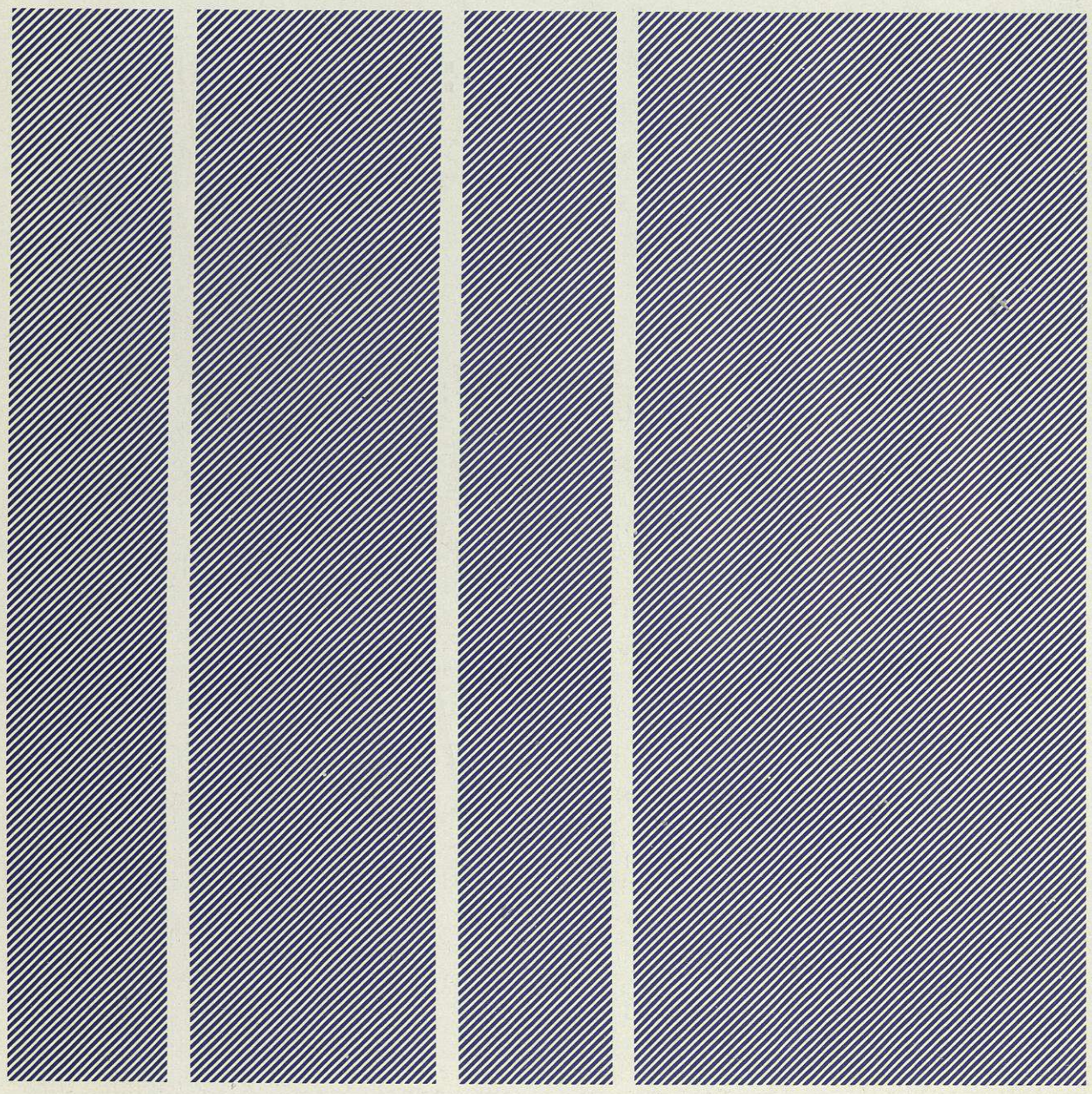
Report Series
No. 31

A Director's Guide to Information Technology

September 1982



The Butler Cox Foundation

THE BUTLER COX FOUNDATION

REPORT SERIES NO. 31

A DIRECTOR'S GUIDE TO INFORMATION TECHNOLOGY

ISSUED SEPTEMBER 1982

Abstract

Directors in many enterprises have formed a negative view of information technology as a result of difficulties experienced when computers were first introduced. The time has now come for a serious reappraisal of the position and a new assessment of directors' responsibilities. The technology of computers, telecommunications and office systems is advancing at a phenomenal rate, promising improvements in employee productivity, in management productivity, in the use of information as a corporate resource and in corporate effectiveness. The main obstacle to progress lies in a gap between directors and technical staff, a gap in how information technology is perceived. The report proposes a basic review of this perception, and provides practical guidelines for directors.

Research team

The report was researched and written by ***David Butler,*** Chairman of Butler Cox & Partners and of its research group the Butler Cox Foundation.

The staff of the Foundation wish to thank the many members who have contributed suggestions and comments on the aims and shape of this report.

Photoset and Printed in England by Flexiprint Ltd., Worthing, Sussex.

THE BUTLER COX FOUNDATION

Butler Cox & Partners

Butler Cox is an independent management consultancy and research organisation, specialising in the application of information technology within commerce, government and industry. The company offers a wide range of services both to suppliers and users of this technology. The Butler Cox Foundation is a service operated by Butler Cox on behalf of subscribing members.

Objectives of The Foundation

The Butler Cox Foundation sets out to study on behalf of subscribing members the opportunities and possible threats arising from developments in the field of information systems.

New developments in technology offer exciting opportunities — and also pose certain threats — for all organisations, whether in industry, commerce or government. New types of systems, combining computers, telecommunications and automated office equipment, are becoming not only possible, but also economically feasible.

As a result, any manager who is responsible for introducing new systems is confronted with the crucial question of how best to fit these elements together in ways that are effective, practical and economic.

While the equipment is becoming cheaper, the reverse is true of people — and this applies both to the people who design systems and those who make use of them. At the same time, human considerations become even more important as people's attitudes towards their working environment change.

These developments raise new questions for the manager of the information systems function as he seeks to determine and achieve the best economic mix from this technology.

Membership of The Foundation

The majority of organisations participating in the Butler Cox Foundation are large organisations seeking to exploit to the full the most recent developments in information systems technology. An important minority of the membership is formed by suppliers of the technology. The membership is international with participants from the United Kingdom, France, Sweden, Switzerland, Denmark, the Netherlands, Belgium, Italy, South Africa and the United States.

The Foundation research programme

The research programme is planned jointly by Butler Cox and by the member organisations. Each year Butler Cox draws up a short-list of topics that reflects the Foundation's view of the important issues in information systems technology and its application. Member organisations rank the topics according to their own requirements and as a result of this process a mix of topics is determined that the members as a whole wish the research to address.

Before each research project starts there is a further opportunity for members to influence the direction of the research. A detailed description of the project defining its scope and the issues to be addressed is sent to all members for comment.

The report series

The Foundation publishes six reports each year. The reports are intended to be read primarily by senior and middle managers who are concerned with the planning of information systems. They are, however, written in a style that makes them suitable to be read both by line managers and functional managers. The reports concentrate on defining key management issues and on offering advice and guidance on how and when to address those issues.

THE BUTLER COX FOUNDATION

REPORT SERIES NO. 31

A DIRECTOR'S GUIDE TO INFORMATION TECHNOLOGY

REPORT SYNOPSIS

Computers are seen in some organisations as a source of enormous problems, whatever the benefits they may have brought. There is often a gap in perception of these problems between directors and computer managers. This report sets out to examine information technology (a wider concept than computing) from the viewpoint of a director in an enterprise. The terms 'director' and 'information technology' are defined in the report.

The report identifies four main areas of potential benefit to companies using information technology:

— Higher employee productivity.

— Higher management productivity.

— Better use of information as a corporate resource.

— Increased corporate effectiveness.

To realise the potential of information technology, an enterprise must align its technical strategy with its business aims.

The report describes briefly the significance of changes in information technology, particularly in computing and communications. It shows how a series of inventions since the mid-19th century have led to the emergence of the 'information society'. The impact of computer networks on organisations is profound and (some argue) subversive of management control.

Information systems are no longer marginal, back-office functions. In some businesses they are crucial to competitive success.

Yet managing information technology is far from simple. The report identifies a number of the most common problems. Achieving value for money is a problem. Estimates for computer projects are often over-optimistic. Directors often regard system building as a step-by-step process which should lead inevitably to success. In fact there is an experimental element in all new systems. Directors need to control overall expenditure on information technology. The report suggests that strategy plans are an indispensible tool for such control. Many systems have hidden costs, which only become apparent when they are in use. Examples of such hidden costs are given. Technical fascination sometimes blinds people — computer staff and others — to the real business purpose of a proposed system.

The report also examines how information technology is organised in some enterprises. Such organisation is sometimes ill-matched both to the needs of the enterprise and to technical realities.

Finally the report turns to the role of directors in information technology. Twelve basic guidelines are given which will help directors to play a constructive, strategic role in information technology, with a view to better business results for their enterprise.

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REPORT SERIES NO. 31

A DIRECTOR'S GUIDE TO INFORMATION TECHNOLOGY

CONTENTS

CHAPTER 1

INTRODUCTION

A DIRECTOR'S VIEW OF COMPUTERS

"Our computer department poses more problems than it solves. The press say computers are getting cheaper but we spend more on them every year. Projects run late, exceed budgets and sometimes don't entirely meet the need, even when detailed specifications are made. Once a system is working, even a minor change costs a fortune and takes months to effect. The computer staff talk a language that no one else understands. They seem to be first and foremost computer people and only secondly our employees. Organisationally computers are a headache. We are trying to push profit responsibility down the line. The computer department want to keep too many things centralised. It's far too late to revert to manual systems but I sometimes wonder whether we might have been better off if we had never heard of computers."

This view of computers may be too bleak to be either fair or typical. But it contains enough truth to wound most computer managers and to strike a chord in the minds of many directors. The difficulty is one of perception. Computer staff see themselves weighed down with technical and resource problems, doing a good job in adverse circumstances. Directors look only at results and are often puzzled or dissatisfied.

This report proposes a basis for a view of information technology shared between directors and the technical managers who build and run systems — the terms 'director' and 'information technology' being defined below.

READERSHIP AND SCOPE

Who is a director and what is information technology? In European and American parlance, the title of director is applied in at least three senses. Main boards in Britain and the United States and supervisory boards in continental Europe often include directors who represent shareholders, investors or employees in a non-executive capacity. Executive directors in contrast are responsible for every aspect of a company's performance; they direct the firm. The senior managers of such specialist functions as personnel or public affairs are often titled directors, whether or not they have a board seat. It is the second category of director for whom this report is specially intended — executive directors who direct firms. Foundation members in the public sector will make their own adaptation of these distinctions.

In recent years the terms 'computing' and 'data processing' have become inadequate to describe the uses of computers in modern organisations. Word processors and electronic telephone exchanges, for example, are specialised kinds of computers. Industrial instrumentation systems, robotics and even home information systems and games are recognisably part of the same development as commercial computers — all these innovations being based on silicon chips and electronic circuits. The term 'information technology' was coined in an attempt to categorise all those uses of electronic technology that facilitate the handling of information. It is far from universally accepted, being rarely used in the United States, but seems the most appropriate term for this report.

The thirty Foundation reports published to date have been intended for senior managers within the information technology function, and have been concerned with technical policy. This report is for directors. Despite the title of the report it concerns itself little with technology, but rather with how directors can establish the right framework for information technology to be used to further the business interests of the firm, to realise its business potential.

THE POTENTIAL OF INFORMATION TECHNOLOGY

This potential lies in four main areas, which are outlined here and developed in greater detail later.

1. *Employee productivity*
   Increases in employee productivity can be secured by means of information technology. In industries where administration is very intensive (e.g. banking and insurance) information technology has contributed to a huge increase in the transactions handled per employee per day. In the manufacturing industry too, some companies have used information technology to shed tens of thousands of jobs without loss of production.

2. *Management productivity*
   Increases in management productivity can be achieved if information technology is used to

extend the span of control of managers. One example is the package travel business, where sales operators now use a computer terminal to enter the holiday-maker's needs. The system records the transaction and suggests the nearest alternative if the desired holiday is not available. Managers can now look after many more clerks; the knowledge they once gained by years of experience is in the system.

3. *Information as a corporate resource*
Information technology provides a means of recording the key information about an enterprise, from its products, customers, competitors and profitability to the simple messages of daily management, and making such information consistently and reliably available to those in the enterprise who can exploit it for better business performance.

4. *Corporate effectiveness*
Increases in corporate effectiveness may also be achieved by information technology. As an example, some motor manufacturers now place computer terminals in the salesrooms of their dealers. If the dealer does not have the particular model required by a customer, the sales person enters details of the colour, model and trim of the required car into the system. The stock records of the motor manufacturer tell the dealer where to find the nearest available car that matches the need. The customer can be driven to see the car and sign the order. Here the system has become part of the product, part of the reason to buy one car and not another. Computers have moved from the back office to the sharp end of the competitive battle, a trend which will both grow and spread.

It is no coincidence that information technology is simultaneously pervading many aspects of human life in schools, hospitals, scientific centres, the armed forces, police and emergency services and even people's homes. The technology is ubiquitous and the applications are numberless. For any enterprise (whether private or public) the challenge of harnessing the new power is basically the same: how to align technical strategy with business aims so as to secure the maximum benefit. Thus our first appraisal of information technology leads us to the formulation of business aims, for which directors themselves bear responsibility.

CHAPTER 2

THE SIGNIFICANCE OF INFORMATION TECHNOLOGY

In this chapter we examine the progress of information technology, and its impact upon organisations.

THE PROGRESS OF INFORMATION TECHNOLOGY

One of the world's computer suppliers expects to have produced by the year 1990 a computer processor with a speed of three or four picoseconds. A picosecond is 10^{-12} seconds. In more human terms, a picosecond is to a second as a second is to thirty thousand years. Such (in sheer speed of calculation) is the progress of computers foreseen in the next few years.

While the revolution in computer technology has been in progress, a similar or even greater advance has taken place in communication technology. There are now so many communication satellites in orbit or planned over North America that the orbital parking slots are all booked until 1985. For certain applications fibre optics are replacing cables; fibres have enormous potential capacity and are immune to electrical interference. Electronic switching systems in both private and public use are transforming the reliability and range of service offered by message or telephone networks.

Figure 1 overleaf shows the evolution of information technology over the past century and more. It illustrates how, as time has passed, the possibilities of storing and exchanging information in the form of text, voice messages, numbers and images have been extended. It also illustrates how from the 1950s onwards the various message media have been combined, each adding richness to the others in the kind of information exchange permitted. The latest stage of this process is the so-called Integrated Services Digital Network (or ISDN) which will soon permit the worldwide exchange of information in all four media.

For organisations, including firms and public agencies, the most crucial problem is how to absorb information technology — how to evaluate it, identify the opportunities it creates and seize them.

THE IMPACT ON ORGANISATION STRUCTURES

Professors Hiltz and Turoff have carried out experiments in the United States with electronic communication systems. They find that such systems are organisationally subversive. People who are supposed to work for a given manager or function find it easy to build closer links with other groups or individuals who may be geographically far removed. Membership of an electronic community may be a greater reality than working in the next-door office. Management responsibilities may thus be undermined. The dangers are obvious, yet so too are the possibilities. How can the electronic organisation chart be put to profitable use?

Consider the role of information technology in the domains of armed conflict and space exploration. The most striking difference between a modern and an ancient army — apart from the massive imbalance in sheer firepower — lies in the area of command and control. A modern commanding officer can deploy tactical and operational units by land, sea and air together with all the logistical back-up they require. Computer and communication networks permit him to do so. The real triumph of the space programme is also the performance of the command and control system which enables thousands of scientists and engineers to collaborate in each mission.

In war and in space, information technology firmly decouples physical location from organisational control. The astronauts and mission control are separated by hundreds of thousands of kilometres — but work as a close-knit team. The same thing is happening in business. In the past the only way to combine devolved operations with central supervision was to insert layers of intermediate staff or line functions. Today the organisational options are much wider.

THE SHIFTING FOCUS

The impact of information technology on organisations is shifting from marginal, back-office functions to the heart of their operations.

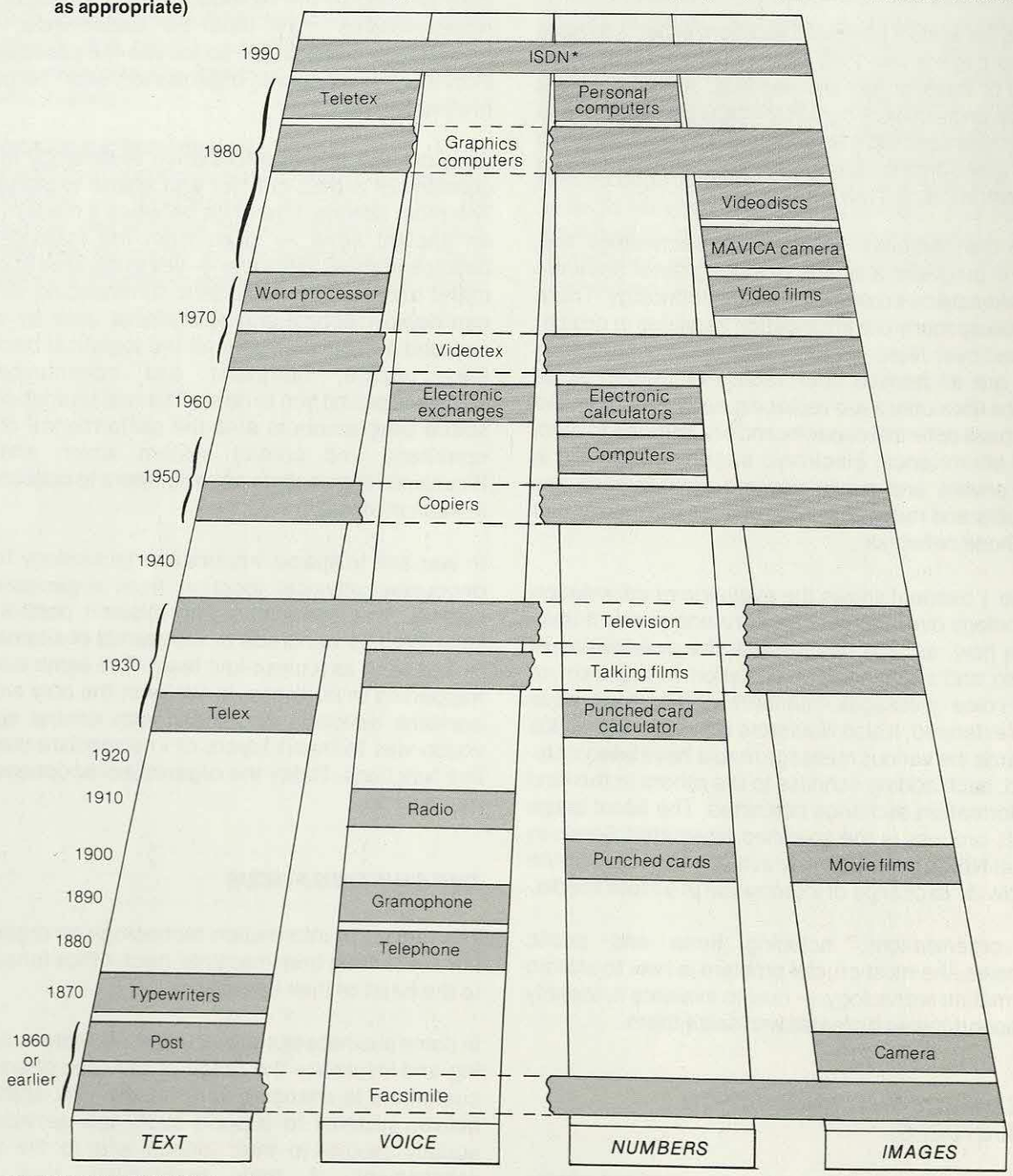
In some businesses such as travel, real estate, banking and insurance the range of services offered to customers is changing very rapidly. The ability to deliver systems to support such new services is equally crucial to their launch and to the later assessment of their profitability. Visit the headquarters of any major credit card company and

you will find that they are really in two businesses: marketing and systems.

Perhaps the most forward-looking industrial nation in the world is Japan. The maxim that knowledge is power is taken very literally by the Japanese. They have decided on a massive transfer of resources into what they term knowledge-based industries; by 1990 over half of all Japanese beginning work will be graduates. The industrial performance of Japan in past years suggests that Japanese readings of the future should be treated with some respect.

We have so far established that information technology is becoming all-pervasive, that it promises improvements in employee productivity, in management productivity, in the use of information as a corporate resource and in corporate effectiveness. In some cases the very nature of businesses may be changed. Yet all these rosy prospects ill accord with the negative view of computers held by many directors, based on the disappointments of the past. What are the real problems of managing information technology in a firm?

Figure 1 The evolution of information technology towards multi-media messages (dates relate to invention or introduction, as appropriate)



*Integrated Services Digital Network

CHAPTER 3

THE PROBLEMS OF MANAGING INFORMATION TECHNOLOGY

Managing the introduction of a complex and volatile technology in large and complex organisations is inherently and objectively a difficult and sometimes daunting task. But the problems are not just concerned with technology; the skills, self-perception and the motivation of the people who use systems are also key issues. What can directors do to help or hinder?

ACHIEVING VALUE FOR MONEY

Consider one much debated question, that of cost estimation. Foundation Report No. 24 found, from a survey of over fifty enterprises, that "organisations have been notoriously bad at providing reliable estimates for computer projects. Generally the figures have been grossly optimistic rather than uncertain". In other words estimates are pressured down to an acceptable level, acceptability being more important than realism. Directors will rightly condemn such estimating methods. But who creates the atmosphere where the wish is father to the thought? All too often in the past directors have been faced with phony cost-benefit analyses. Usually the computer department was expected to estimate benefits, though in fact it is the users of systems who actually have to secure the benefits. Where resources are limited, different projects compete for them. Naturally each project manager is tempted to put up the most alluring case he can. Directors are often badly placed to test these proposals.

The building of systems is not a step-by-step, deterministic process but an experiment in combining technology, people and the abstract entities called data or information.

The experimental nature of system development should be more widely recognised. Not every experiment will (or should) lead to a fully operational system. Nor should a sense of failure be associated with experiments leading to no new system. Some companies provide a systems research and development budget, money not attributed to particular projects.

TOWARDS A STRATEGY FOR INFORMATION TECHNOLOGY

The difficulties described above flow from the absence or inadequacy of a policy towards information technology. Directors should ask four questions:

—What is the appropriate level of overall expenditure on systems for an organisation?

—Who sets the level?

—Against what yardstick is it set?

—How is it controlled?

Foundation Report No. 24 examined these questions in some detail (see pp. 11 et seq.). It concluded that directors have at their disposal three mechanisms for setting and controlling global expenditure on systems. The first is to formulate an overall strategy towards systems. The second is to agree and approve the annual budget. The third is to create an environment within which investment is controlled. In brief the conclusion of Report No. 24 was that the second and third mechanisms are reduced in value in the absence of the first; that the development of a systems strategy is the real key to determining the right level of expenditure. In chapter 4 of this report we offer some practical advice on how such a strategy may be established and supported.

THE TOTAL COST OF SYSTEMS

Another important concept which is far from easy to grasp is that of the total cost of a given system. A great deal of effort (technical and managerial) goes into the launch of a new system. Once a system is fully operational, many people expect it to run for the rest of its life at minimal cost. In fact the reverse is often true. A complex system in a volatile business will demand continual adjustment and adaptation.

Many systems consume much more development effort after they become operational than before. Commitment to this further effort, often hard to estimate, is part and parcel of the decision to adopt the system — a hidden cost in future years.

Hidden costs often make comparison between different solutions to a given problem very difficult. Where a choice is to be made, for example between a local computer system in a remote factory or depot and the use of a central bureau computer by communication links, the figures as presented nearly always favour the local solution. In many instances the local solution may indeed be cost-effective. But

often the comparison is not valid. In the case of the bureau, the support services to keep the system running are already in place. A proportion of that overhead is built into the bureau's estimated charge. The local solution may ignore such additional costs, the need for support becoming clear only at a later stage. It must also be admitted that some (not all) computer suppliers deliberately ignore all but the most obvious costs in order to submit an ostensibly seductive bid.

With the advent of desk-top microcomputers the problems of hidden costs are becoming even more serious. It is natural and highly desirable that staff and managers in certain functions should wish to buy and experiment with cheap and powerful microcomputers. Most computer managers encourage this tendency, partly because they know they cannot stop it and partly because they are delighted to see their colleagues taking an interest in computers. The problems may come later. Managers who buy a microcomputer system often think that their business problem is tightly bounded, involving only their own staff and data. In reality few business tasks are really tightly bounded. Very soon the need may arise for data from someone else's system, or a central computer. Today not all computers can exchange data without considerable effort and conversion cost. The lesson is not to discourage managers from buying and using microcomputer systems but to ensure that the full requirement is known and that the present and future costs are (as far as possible) driven into the open. In the case of microcomputers, sensible standards about communication are the means of doing so.

THE ORGANISATION OF INFORMATION TECHNOLOGY

There is a curious anomaly in the way information technology is organised in most enterprises. At board level (whether it is the main board of a group or the board of an operating company) directors take a broad view of the enterprise's needs. They think in terms of problems, opportunities and information and not of technology. The managers of departments and their staff also take the same view. But the expert technical functions concerned with computers, communications and office systems are usually organised separately on the basis of obsolete technological distinctions. In some firms a management services chief supervises all three departments. In others the functions are fragmented but the problem is partially solved by close collaboration between all three.

The whole concept of information technology emphasises that distinctions based on the form devices happen to take are very misleading. Some suppliers of equipment can offer large, medium and small computers, electronic telephone exchanges, network devices and office equipment such as word processors and photocopiers. Some offer several solutions to the same problem. To negotiate with such vendors through independent and even competing departments is sheer folly.

The best solution to this problem is to have one senior manager responsible to the board for information technology policy. Consultation between functions is the next best solution, but no amount of consultation really compensates for divided responsibility.

Perhaps the most hotly debated issue in the field of information technology is where to deploy skilled resources. Should they be in a central team or dispersed into operating units? There are many and cogent arguments on either side. Highly skilled technical staff are both scarce and expensive. They are more likely to be fully utilised and properly developed if they are part of a single, professional team. On the other hand, they may contribute more to business results if they live in the business itself, rather than in a central team.

Many firms have established their information technology resource as a separate profit centre or a separate company, with the responsibility for selling their services at a commercial rate to their colleagues in operating division. Some also offer their services to external customers.

The skills demanded of information technology experts are both technical and business-oriented. A few years ago such staff were in exceedingly short supply. In recent years the recession has blunted the demand for staff. Economic recovery will doubtless unleash renewed demand, exacerbated by the fact that there are almost no staff in the pipeline with the most sought-after skills — three or four years experience in a particular field of specialisation. Just at the point where improved economic prospects will justify increased activity, a staff bottleneck is almost certain to limit what can be achieved.

The organisational model chosen for information technology may vary across a very wide spectrum. No single model is right for all enterprises, none wholly wrong. The important task for directors is to ensure that the model chosen accords with the intended role of the information technology function. Is information technology seen as a mere adjunct to retrospective accounting? Or as a major instrument for organisational change? As a serious influence on the enterprise's competitive posture? As a prime determinant of personnel productivity? Directors should not expect a major contribution to business results from staff whose career paths are seen as

bounded by technology. It is true that computer staff have a tendency to forget their business environment and burrow into the technology and its incomprehensible jargon. But usually they do so because no real role in the life of the company has been offered them.

CHAPTER 4

THE ROLE OF DIRECTORS IN INFORMATION TECHNOLOGY

The role of directors in information technology can first be described as a set of responsibilities. Later we will propose twelve practical rules.

THE RESPONSIBILITIES OF DIRECTORS

The first responsibility of directors is to lead the hunt for profitable uses of information technology. They should concentrate on the possibilities of much better business results, looking for major improvements in performance. Then and only then should they consider what information would be required to enable such changes to occur. There is no simple, single formula to identify highly profitable uses of information technology. But two good rules are to look very hard at those areas of business that generate the most heated disagreement and at those areas that most sensible people agree are unchangeable. Twenty years ago, for instance, most bankers thought it was impossible to extend bank services to people who were not bank customers. But what if one could? Whole new markets would open up. So the credit card was born. Without vast and complex computer systems credit cards could not exist. But the really intelligent question to ask was not how to use the computers in banking, but how to serve people without their being customers.

The second responsibility of directors is to demand appropriate action from line managers and professional staff to realise profitable use of information technology. The main vehicles for such action are strategy plans. They should be brief, intelligible and clearly related to business goals. They will inevitably concern themselves in part with standards, such as which computers and which communication network methods to use.

Typically four strategy plans — or four parts of a single plan — will be required. They will cover processing, communications, data management and office systems. One company calls these four its "pivotal policies", since other plans depend upon them.

Finally directors must set the stage, in an organisational sense, for information technology to prosper. The dangers of managing computers, communications and the office in an unco-ordinated or even conflicting manner have already been stressed. All around us is evidence that information technology as a concept is replacing the separate disciplines of the past. No company or public agency can afford to pretend that it is not so.

TWELVE BASIC GUIDELINES

1. *Avoid dabbling*
   Directors should not become amateur technical experts. They should not learn programming languages (even for fun) or read books on microchip technology. They should not try to manage computer projects at one remove.

2. *Insist on system plans*
   Directors should insist that every new business plan, or plan for a substantial change in business practice, must be accompanied by a system plan. What new or radically altered information will be needed to support the new business? How will it be provided? Can information technology be used to push further in the desired direction than the business planner imagines possible?

3. *Plan strategically*
   Directors must insist that information technology usage is planned at a strategic level. Basic policies for processing, communications, data management and office systems must be developed. Who owns data and who may use it are very basic management questions. Technical policies fall naturally out of such business policies, though if changes of technical policy are found to be necessary they will take time to effect. Similarly the detailed tools for planning and control (budgets, project management reports) can be set in place once the strategy is clear.

4. *Recognise the need for infrastructure*
   Directors must understand the distinction between individual projects or uses of information technology and the infrastructure required to make them work. Both are important. Projects can usually be costed and managed quite comfortably. A communications infrastructure (for conversations, messages, data transfer) may be as essential to a modern enterprise as a road system to a modern city — and just as hard to justify in direct cost saving.

5. *Manage technical staff as company resources*
Directors should manage information technology staff first and foremost as company employees and resources. Otherwise they tend to burrow into the technology. They all need business training; some need the possibility of career development outside the area of systems.

6. *Ask questions and demand answers*
Directors should concentrate on questions and expect their information technology managers to provide the answers. It is worthwhile, when the opportunity arises, to talk to directors of other enterprises about what they have achieved. It is rarely useful to talk to them about technology.

7. *Emphasise the link between systems and business goals*
Directors should emphasise the link between business goals and information technology resources. It is wrong for new business plans to be prepared without system plans. It is equally wrong for new system plans to be prepared without a business plan. What changes will the proposed system bring? Are managers committed to exploiting those changes?

8. *Create and sustain objectivity*
Directors should create and sustain objectivity in relation to information technology projects. It is fairly easy for directors to pressure technical managers into providing falsely optimistic timescales and cost estimates. Directors should press, gently but firmly, for realism rather than comfortable self-deception. Technical staff usually know the truth and want to tell it, if directors allow them to do so.

9. *Clarify the role of central expertise*
Directors should clarify the role of central expertise in large organisations in relation to local or overseas operating divisions. Is the central role one of control, of supervision or of advice? In many firms this question is fudged and muddled. Clear rules need to be set out and enforced, often in the face of severe pressure. Only directors can set these rules, which will vary from firm to firm. It is not essential that the rules should be perfect, as long as they are reasonable and clear.

10. *Concentrate on the key issues*
Directors should not spend much time on the question of which computer hardware to choose. Once it was the dominant question for most firms. Now the alignment of information technology with business aims, the delivery of working systems and the problem of technology absorption are the real issues.

11. *Be positive*
Directors should make a conscious effort to adopt a positive attitude towards information technology. It is easy for directors to act as passive observers of information technology, authorising projects but not fully supporting them, neatly distancing themselves from any failures. But the real task of directors is to ensure success.

12. *Consider change*
Directors should ask themselves what changes they wish to consider in the direction and management of information technology in their enterprise as a result of reading this report.

CONCLUSION

Let us briefly look at the jaundiced view of computers with which this report began. Some of its criticisms may now be seen in a different light.

"The press say computers are getting cheaper but we spend more on them every year." Two conclusions may be drawn. There are hidden costs in the total cost of systems, of which directors are sometimes unaware. Secondly, the approval of budgets does not by itself create a framework for control; strategy plans are also needed.

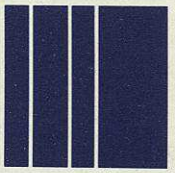
"Projects run late, exceed budgets and sometimes don't entirely meet the need . . ." In other words the environment within which estimates are prepared encourages regular and systematic over-optimism. Systems planning is not seen as an essential part of business planning.

"The computer staff talk a language that no one else understands.They seem to be first and foremost computer people and only secondly our employees." Maybe so. But in many cases they have turned inward towards the technology only because they do not receive the training and career development properly to belong to the enterprise.

"Organisationally computers are a headache." It lies in the power of directors to stop managing information technology as if it fell neatly into the old partitions of computers, communications and office systems and to create instead a single discipline. It lies too within directors' power to create a stronger link between business results and information technology. It is the traditional weakness of this link that generates organisational weakness.

". . . I sometimes wonder whether we might have been better off if we had never heard of computers." Any organisation where the attitude of directors can be accurately summated in such terms has a potentially serious problem. Major advantages in the productivity of employees and of management, in the use of information as a corporate resource and in corporate effectiveness can now be secured. The biggest obstacle to realising such advantages is the perceptual gap between senior technical managers and directors.

A director's view of systems needs above all to be strategic. Looking in the broadest possible terms at his business, its products, markets and competitors, the director needs to ask what changes would place the enterprise in a fundamentally stronger position. Among such possible changes, are there any that are constrained by the availability of information of the right type and at the right time on a company-wide or world-wide basis? For if lack of appropriate information is the constraint, the chances are that information technology today can remove it.



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