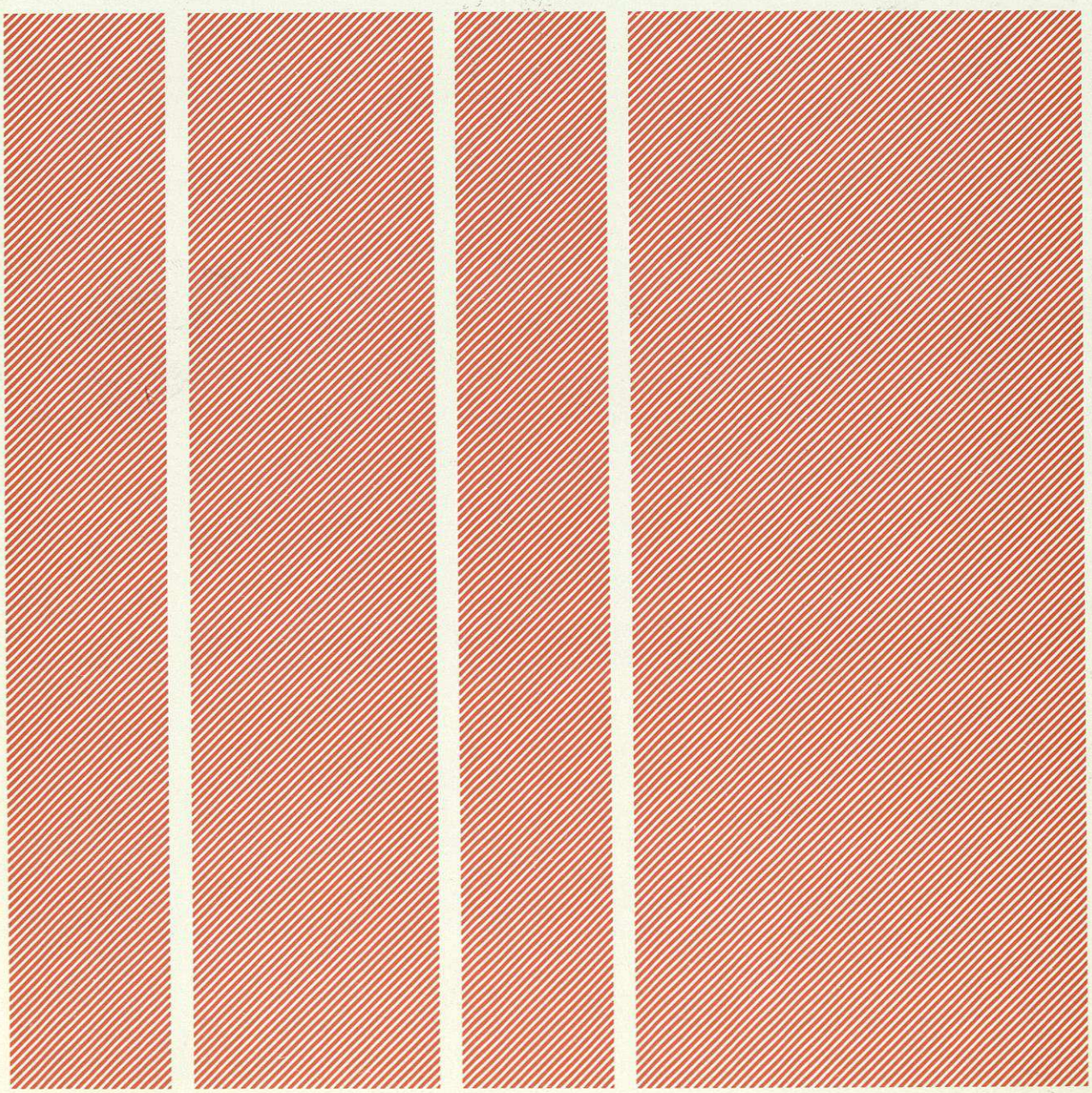
Computing for Competitive Edge

A Paper by
Anthony Bargioni



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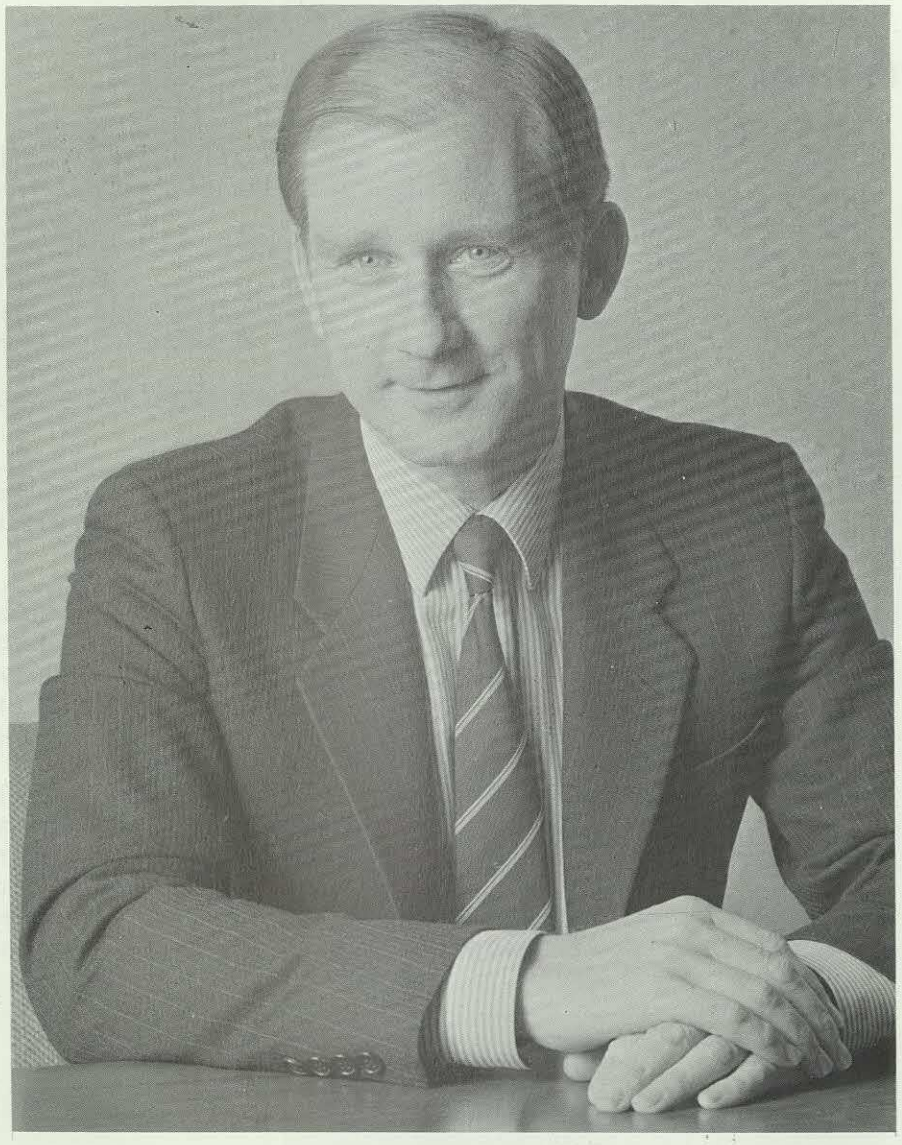
COMPUTING FOR COMPETITIVE EDGE

ANTHONY BARGIONI



Anthony Bargioni is the Head of Information Systems for the Beecham Group companies within the UK.

In October 1985, he addressed the International Conference of the Butler Cox Foundation on the topic of "Computing for Competitive Edge". His presentation covered three major subjects:

—The key issues that information systems managers must address before information technology can be used as a competitive weapon.

—Examples showing how information technology had made a significant competitive contribution.

—Practical guidelines for using computers for competitive edge.

Anthony's views are often regarded as controversial and with suspicion by his data processing colleagues, but they are liked by the business community. His presentation is reproduced in full in the following pages.

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COMPUTING FOR COMPETITIVE EDGE

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need to address if we are to provide a major contribution to the competitiveness of our businesses (see Figure 2).

Understand the business in which you operate

The data processing profession has spent twenty years trying to keep up with technology. The basis of that technology is changing every ten years and, even worse, the whole approach to applying it (in terms of languages, methodologies and departmental organisation) is also changing. We simply have not had the time to understand the businesses in which we operate. Likewise, we have not had the time to help the business understand us. If we do not develop a sound understanding of businesses, then we cannot perform the role of innovator and leader in applying information technology to business opportunities.

What I mean by business knowledge is not an understanding of the procedures followed in the order office, but a fundamental understanding of the business and its marketplace. Such things as:

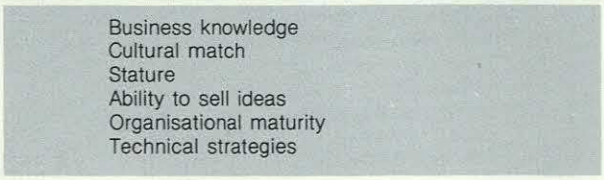
— What are the critical factors for success in my business? Why do people buy from us rather than our competitors? What do our customers think of us? What strategies are our competitors following to combat us? What new strategies are we employing? How is our marketplace changing?

— How do the performance ratios of our business compare with those of our competitors? How has the makeup of our costs varied over the last decade or so? Are our overheads increasing? What are the major business and financial criteria by which our managing directors are being measured?

These are the sorts of facets of the business that we need to understand. Armed with this type of basic business knowledge we can then, for example, spend a day with a brand manager, confident that we understand the fundamental objective of his role. As a result, our ideas are much more likely to make a significant contribution to his job, rather than just a minor improvement.

Nevertheless, we should not lose sight of the fact that many information systems departments will never play a significant role in the area of business innovation. Real innovation will continue to be the domain of general management, but I believe that information systems management can perform a major part in helping to shape the fundamental business thinking, provided we develop the ability to do so. If we do not do this, we will simply be perceived as mere technicians, not as total systems thinkers. And our salaries will certainly not rise for the next decade as fast as they have for the last.

Figure 2 The six key areas that really matter



Adopt the organisation's culture

I believe the only way that an information systems organisation can innovate, lead and change a company is if its management style (culture) matches that of the parent company. Up to now, the style of most data processing organisations has been typified by a professional 'do it right' culture. This style has made it difficult for systems 'professionals' to accept a compromise. For instance, most systems departments have always insisted on using a system design approach that ensures the system is flexible and reliable, and will last for at least five years, even if the business only needs a solution for one year. We have not had an answer to that sort of need.

If the business that we serve is an entrepreneurial one, its management expects entrepreneurial, fast-moving management action, and the systems department would be wise to operate in a compatible style. But this does not happen. We tend to develop our own culture. We even promote the differences between our department and the business by saying we are special and need separate salary scales.

If we see ourselves as agents of change, then we have to be compatible with our 'marketplace' (that is, the organisation in which we operate) because we have to 'sell' our ideas to the business. Any sales organisation, even those selling ideas, that is not compatible with its marketplace will not succeed.

Earn the stature required to enter the corridors of power

The next subject is stature. By stature I mean the respect gained by an individual or a department, and this respect is based on the recognition of, and the confidence in, the contribution being made. Stature does not come automatically — it has to be earned. In many businesses, the contribution of the information systems department has not yet been recognised as being of significance for the future success of the business. More often than not, the 'contribution' is seen in terms of additional cost, extra management hassle as a result of the changes associated with introducing new systems, and a highly dubious return on IT investments when all the follow-on costs are taken into account.

As a consequence, information systems managers have not earned the stature required to be seen as 'big men' in the so-called 'corridors of power'.

Significant business changes are initiated within these corridors, and if we are outside them we will be bogged down by having to defend our ideas with detailed justifications. Worse still, we may be told to form a committee to study the idea, and that is the guaranteed way of ensuring that rapid and innovative change will not take place. Really significant decisions are not made in these ways. They are based on judgement and are made by the men at the top of the business.

Thus, to contribute to significant business change, we first need to have earned the stature that permits us to be a member of the decision-making 'club'. Second, we have to understand the aims of the club members, so that we have a basis for our ideas. We will then be in a position to operate in the environment where intuitive judgements are made. The implication is that most of our future contributions will not be easy to justify in a purely cost-saving or financial sense.

Learn how to sell ideas effectively

If our role is to innovate, and stimulate change within a company, then we must be able to sell those ideas. Selling is not only about having a good product, but is about understanding the reactions of human beings and being good at managing interpersonal skills. Our profession has relied largely on logic to carry out its task. This is not an effective base for selling ideas to people. Selling is therefore a difficult task for us to perform, but it is absolutely critical if we are to be effective in the future. We have to develop greater ability in forming relationships, in managing the art of persuasion, and in refining the tactics for selling an idea within an organisation or group of people. All these are skills in which we have not received training or gained experience.

Understand the importance of organisational maturity

However effective information systems managers are at overcoming the four major problems mentioned previously, the maturity of the organisation in using, accepting and feeling comfortable with managing information technology is also critical to ensuring success. The company is our marketplace, and the maturity of the market significantly influences the seller and the success of his product.

Nolan's analysis of the learning process that a company goes through in increasing its ability to manage information technology successfully is a very good base for understanding the maturing process. The need to acquire this understanding is so fundamental that I regard it as a management activity in its own right. Acquainting top managers with the maturing process, and gaining their support and assistance in managing it, is therefore a very major contributor to ensuring success in overcoming the previous four problems.

Continue to manage the technical strategies

Earlier, I poured scorn on the overemphasis another data processing manager placed on technology issues. However, in a complete list of issues I do have to admit that if technical strategies are not well managed this can cause the systems department enormous problems in actually delivering the end result. I do not think that technical strategies need a greater emphasis than they are currently given — we all spend too much time on them now. This does not mean to say that we have mastered this problem. My point is that the other issues need greater attention than they are currently receiving.

INFORMATION TECHNOLOGY'S CONTRIBUTION TO COMPETITIVENESS

If we at least partially solve the six major problem areas detailed above, what sort of opportunities will arise for information technology within the business? I think that they can be categorised under four headings. We can help our organisations to achieve a competitive edge by contributing in a significant way to any of these four categories.

Improved efficiency

We must not lose sight of the fact that information technology will continue to be applied in its traditional areas in the 'back room' of the business, where the dominant aim has been, and will continue to be, to cut costs and improve efficiency.

Better control

The integrated MIS developments of the 1960s and '70s were the first attempts at providing management with better information, the aim being to improve their ability to control the business. I believe that for the vast majority of organisations, these (and later) developments have not significantly improved the control that managers exercise over the business. We simply provided in an easier fashion information that had always been used to manage the business. The really significant advances only occur when the information that technology can provide makes it possible either to tighten the control of the business, or to alter the way in which it is controlled.

Change the way the business operates

Technology is offering some businesses and industries significant competitive opportunities by allowing them to perform their traditional business function differently. The retail industry is a prime example. Technology has probably been the largest single factor in enabling the major supermarket chains to exercise far greater central control of their stores.

Modern information technology has permitted the major buying and merchandising decisions to be centralised, and it has allowed supermarket chains to develop central warehousing facilities and to control the distribution of goods to the stores. Overall, technology has provided the means for a far tighter centralised infrastructure. These developments have become practical by using sophisticated modern communications technology as well as electronic point-of-sale equipment that collects the basic data at the 'sharp-end' of the business.

Another example is provided by the pharmaceuticals wholesaler who provides his retail customers with a computer terminal. The retailer uses the terminal to place orders for drugs and the wholesaler provides a half-day delivery response. As a result, the retail customers are now locked-in to, and highly influenced by, that wholesaler. In addition, the wholesaler has made programs available through the terminal that help the retailer to manage his local stock, print bottle labels, etc. Thus, technology has allowed the wholesaler to perform its business in a different way and this has led to significantly different competitive elements contributing to the business' success.

Technology as the basis of a new product or service

The most dramatic impact of technology as a contributor to competitive edge can be seen when it is used as the basis of a new product or service. The financial services industry is full of examples where brand new products or services have become possible as a result of information technology. American Express, Merrill Lynch, Citibank, Sears Roebuck and the Nottingham Building Society are some of the best-known examples of organisations where the business strategy is now built around the new offerings that information technology can provide. The basic technology is, of course, available to the whole industry. Competitive advantage will be gained by those companies who have the innovative ability to be the first to bring the new offerings to the market.

CASE HISTORIES

From what I have said so far, it should be clear that I do not regard technology as such as the major barrier to success. Human factors, in my view, form the major barrier, and to support this contention I will now examine some examples where information technology has played a significant part in increasing the competitive edge of the business. In each case, I have analysed the reasons the particular project was a success and relate the result to my overall thesis.

The five case histories set out below are based on real business situations, although they have been slightly modified to disguise the actual business concerned. My aim in presenting these cases is to illustrate the main points of my presentation, not to report on a particular business situation.

Consumer products industry (sales and marketing)

This case history describes a project that set out to provide better information to account managers. The business objective was to increase sales volume.

The project history

The project originated with a planning exercise, led by the managing director of the business, that culminated in he and his senior directors sitting in a hotel room during a weekend thrashing out a systems investment plan. The result was a decision to increase the expenditure on systems that contribute to obtaining more sales. This decision contrasted with the previous systems development programme that was dominated by back-room administrative-support activities predominantly aimed at improving the efficiency of middle management. Even though a business case based on cost-savings could not be put forward, the planning group intuitively felt that the system ideas would result in more sales. Nevertheless, the investment had to produce a short-term return (within one year), and this meant that traditional systems development, taking several years, was not acceptable.

The development approach adopted was similar to that called prototyping, where no traditional systems analysis is performed or systems specifications written. Discussions took place between the systems designer and some key users, and a prototype system was built and demonstrated to a user. Conventional wisdom says that the prototype is then abandoned and a 'real' system is built using traditional methods. But, in this case the prototype was improved to handle operational requirements and it became the real system.

The system was not designed to last for more than about six months, and no formal documentation was produced. The only vehicle for confirming the users' understanding of the system or gaining agreement as to what it would do was the prototype model itself. Using this approach, the first usable system was produced in one month. As the ideas for using the system evolved in the light of operational experience, the prototype was simply replaced with a more sophisticated prototype.

In conventional computing terms, the system was developed very quickly at a very low cost. Furthermore, the prototype approach adopted allowed the business to become familiar with the original concept before deciding whether to take the next step. Contrast this with the more traditional approach, where an enormous act of faith has to be made before a major project can be initiated, where the end

result is not terribly clear at the outset, where the specific ideas are not clearly defined, and where the client's (the user's) confidence is far from high.

Needless to say, the resultant system did produce better information that resulted in more sales. Before analysing the reasons for its success, I need to describe exactly what the system was.

The system

The first system provided a simple way of presenting sales data that already existed within the computer. (Up until then, the data was presented on a monthly basis as vast piles of computer printout.) The system used the technologies of visual display terminals and colour graphics, and enabled sales data to be presented on a selective, exception basis by specifying parameters such as customer, product, or territory. It could present the results either as up-to-date numeric data, or in pictorial (graphical) form. The latter form of presentation was aimed at managers who were not deeply involved in an activity, but who needed to assess quickly what was happening in a particular market and decide whether further investigation was necessary.

In traditional computing terms, the system was nothing more than a glorified sales statistics system, but from the users' viewpoint it was a dramatic step forward because it provided them with real benefits in understanding the market. It was not easy to quantify the direct contribution made to increasing the company's sales volume. Nevertheless, the account managers and the directors were of the opinion that the money spent on the systems had contributed to the company's competitive edge.

Why did the project succeed?

The project had succeeded in an area where previous attempts within that company had failed. In analysing the reasons for this success, and that of the other case histories, I will relate the experiences to the six key areas of attention I identified earlier.

You will recall that I said that the *stature* of the systems manager is a vital area of concern. The systems manager had gained the personal confidence of the managing director. As a consequence, the managing director felt confident to lead the planning study. In my experience, this ideal state of affairs is rarely achieved.

Another important factor was that the *business knowledge* of the information systems members of the planning team (complemented by an external management consultant) was very appropriate to the particular business environment. The planning team was made up of people whose backgrounds were significantly influenced by the marketing environment, not predominantly by a computer background.

The *style* adopted by the information systems team was highly opportunistic, which matched the entrepreneurial style of the business. In practice, this meant that when an idea surfaced, the difficulties of achieving it were relegated to the background. The technical members of the systems department were certainly very concerned when they were told that their management had committed them to understand within an elapsed time of one month the new technology of colour graphics, build a database, and deliver the first system. However, the opportunistic or entrepreneurial style adopted forced them to accept, and meet, that objective.

The project was also successful because the marketing department was a very fertile area in which to sow new ideas. This reinforces the point I made earlier, where I said that there is nothing wrong in the systems department developing a *sales strategy* that seeks out the most likely areas of the business where its products will be 'purchased', rather than concentrating on its more traditional market (the accountant, for example) where new ideas may not be greeted with so much enthusiasm.

This case history also illustrates that the innovative use of technology was successful because the systems team possessed a *very significant understanding* of the areas highlighted by the business directors. The systems team was therefore in a position to make a major innovative contribution at the planning stage. Then, when the projects were selected, the project team was staffed and structured in a way that enabled it to continue to lead in innovation. The key to this was when the managing director agreed to transfer his sales support manager to the information systems department. This individual was given the technical resources to build the systems identified.

I believe that this approach to staffing the project team is fairly untypical. The more traditional approach is either for a project team to be formed both from the user and computing areas, hence merging both sets of expertise, or for computing staff to transfer to the user department for further career progression. Both approaches have some benefits, but in this particular situation the culture of the company did not encourage joint project teams or committees. Also, the need to achieve results quickly was a key part of the opportunistic and entrepreneurial style of the total exercise. The formation of an integrated team within the information systems department was a very significant move in enabling the project to produce results extremely rapidly.

Between them, the team members had the appropriate skills and an in-depth appreciation of the user environment. As a consequence, the team was able to adopt a leadership role with the ultimate users,

instead of the more traditional role of analysis, which inevitably relies on user perceptions of what is possible. Obviously the tactics employed were to say to a user "would this be interesting to you?". But in practice the real initiative about what the system would do came from the project team. In other words, once the overall direction had been agreed by the directors, *the whole project was 'driven' by the project team, not by the users.*

This approach meant that the traditional systems development method could be scrapped. There was no need for formal analysis to find out what the user environment was about, because the project team already possessed that knowledge. There was no need for a formal specification to ensure that the user was satisfied and that the project team understood the requirements, because the team, in effect, set the requirements. There was a need to make sure that the user was enthusiastic about the resultant system, however, and this was achieved by demonstrating a prototype that, in practice, went far beyond the aspirations of selected key users.

From the users' point of view, the result was that the project team was seen to be leading them into areas that they would not previously have gone into themselves. Furthermore, the whole project developed its own 'hype' because it was seen as being glamorous and exciting and innovative (remember that this was the first experience of colour graphics within the company). Altogether, the project was seen as being different from any of the company's previous experiences of computing.

The final reason for the success in this particular project must be attributed to the *computing maturity* within the particular organisational unit. In terms of Nolan's organisational learning principles, the unit provided a fairly mature environment that was receptive to new computing ideas. The involvement of top management, the maturity of the planning and budgeting process, together with the high penetration of technology in the back-room administrative tasks of the business, were all positive factors. In my view, the experience of this company simply confirms that it is realistic to aim for even greater ambitions once organisational maturity has been achieved.

The result

By ensuring that the project team possessed good business knowledge, by using an opportunistic approach and by being innovative, this business now has a set of support systems that are contributing to its competitiveness because they have helped to increase sales revenue. The managing director is well pleased with the systems investment that has been made. Could anyone ask for more?

Consumer products industry (sales force)

My second case history concerns a business where consumer products salesmen call on retail stores during the day and transmit their orders from their homes to the company for processing and product delivery. The business environment is characterised by fierce competition, low margins, a gradual increase in the buying power of retailing groups and a reduction of market share by the branded manufacturers. As a result, many consumer products salesforces are being reduced in size, with a consequent need to increase the effectiveness of each salesman.

The project history

Up to the early 1980s, the method used for transmitting orders was a daily mixture of conventional mail and telephone calls for more urgent orders. The changing nature of the business was demanding a greater proportion of telephone orders that not only increased the amount spent on peak telephone calls, but also cut into the salesman's selling day. (Eventually, up to 70 per cent of the orders were urgent, and had to be telephoned in.)

Evaluation for a new sales order-entry system began in 1980. The initial evaluation set out to find a more efficient (and cost-effective) means of transmitting orders from the salesforce to the company. Later, the objective was expanded to include also all aspects of improving communications between the remote salesman and his manager. If the communication problem could be solved by a small increase in the cost of a procedure for transmitting orders, then it became the prime objective. Improved communications was becoming increasingly important because of the need both to increase the effectiveness of a salesman (measured in terms of sales-call productivity) and to increase the total service provided to the customer by the salesman (ie to expand the role of the salesman from that of simply being an order taker).

By 1982, Viewdata technology had been selected as the route to follow because it could meet all of these objectives.

The first phase of the project was to implement the order-entry system. This was a high-risk project because order entry was a critical part of the company's business, and Viewdata technology was new both to the computer technicians and to the salesmen. Nevertheless, the project was a success.

Attention then turned to providing better communications. The first stage was a mailbox facility that allowed a one-page memo to be transmitted from the centre or from individual salesmen. This simple free-form means of communications allowed a memo sent at 5.00 pm by head-office staff to be received by a salesman at 6.00 pm when he sent in his orders. The

mailbox facility helped considerably in gaining the confidence and enthusiasm both of the salesman and top management for electronic communications, and made it easier for them to accept the rather more formal and structured information communication facilities introduced later.

Today, the system transmits details of production shortages, performance against sales targets, special promotion information, or credit-chasing notes. This wider range of information is now being conveyed in a much easier and faster way than was previously possible. As a result, the real emphasis and value of the system is as a means of making the salesmen, and other field representatives, closer to management.

Why did the project succeed?

The key strategic decision to expand the objective of the project was made by the directors of the company. However, in the early stages, the project was led by middle management whose main aim was to find a new and maybe less expensive method for sending orders from the salesmen to the centre for processing. In other words, middle management was looking for a way of improving the existing procedures. When the directors became involved, the perception of what was possible became far broader. To the directors, the remoteness of staff in the field was a fundamental constraint to 'sharp-end' efficiency. The directors perceived that significant benefits could be gained by improving communications with these staff. Thus, the directors elevated the prime objective to being one of better communications.

The nature of this sort of decision is totally different to those typically made by middle management. In the example just quoted, middle management focused on the direct cost savings of the new method compared with the previous one. Once the prime objective had been elevated to providing better communications, the estimate of the 'added value' that would accrue from achieving that objective had to be mainly a matter of judgement. The decision could not be justified only in cost-reduction terms. There were direct costs for equipment, or course, but most of the potential costs were in intangible areas: the disruption caused by changes in working practices; the risk of industrial relations problems; the time and effort required to learn how to use and exploit the new forms of communications; and the risk of using what was essentially new technology.

In some companies, the justification for this type of decision would involve quasi-scientific methods that attempt to place a value on the so-called intangible benefits. In this particular company, the style is for the key director to make a judgement based on his intuition and experience and defend that decision to the management above him. An individual's judgement can be followed without the need for a detailed, quantified cost-justification. The decision to proceed was made on this basis, and was backed by the directors of the business concerned.

They were prepared to take the risk of investing in the system because they perceived it would meet a real business need. The 'sharp end' of the consumer products business is highly competitive, and a well-informed salesman offering a responsive and rapid service to his retail outlets is now a key competitive weapon, and will become increasingly so in the future.

Experience has shown that the directors were completely justified in their decision (even though the fears about the disruption that would be caused by introducing the new system proved to be well-founded). There are now many instances where the new form of communication has provided huge improvements compared with previous methods. Today, the facilities provided by the system are accepted as a normal part of everyday business operations.

A crucial reason for the project's success was that the project team had a *good understanding of the business*. Having recognised the wider business potential, the team was able to gain top management's attention because it had *sufficient status* in the eyes of the directors.

The result

This case history has shown how the directors of a company elevated the objectives of a systems project beyond the cost-reduction goals of middle management. As a result, the system is now seen as a key investment that has made a real contribution to competitive advantage.

Chemical industry (production)

This case history is from a highly capital-intensive industry, with expensive chemical plant and high energy costs. There was little experience of computing in the production side of the business, as the majority of the computing investment had gone into back-office administrative systems.

The project history

In 1978, the data processing staff put forward an idea to develop a computer model that would help production management predict the performance of the chemical plant and the cost of producing product. They failed to convince production management that the idea was worthwhile pursuing because they could not describe the idea in the business terms that would stimulate production management's interest. Also, production management was not confident that the data processing staff either understood the problem or were capable of delivering any results.

The data processing staff then adopted a different tactic. They identified one plant manager who was interested in the idea and who had taken a personal interest in computers and felt that computers had something to offer him. He was given a microcomputer and two systems staff so that he could build an experimental model of his plant. He took total responsibility for the project and did not feel that he was in any way subservient to central systems management. If the project succeeded, he would purchase his own microcomputer and return the experimental one to the centre.

The project team produced a model, initially using nothing more sophisticated than a Texas Instruments programmable calculator and later a microcomputer. The model was based on principles and measurements identified by the plant manager and his staff. 'His' people had produced 'his' system and therefore it was a viable system. He boasted with pride of its worth to central management and indeed there were several instances when the cost of producing additional product predicted by the model was different to those produced by central management or the accounts department. The plant manager backed his figures and in practice was able to produce additional product at his predicted costs.

His success caused central management to become very interested, and the managing director visited the plant specifically to hear about the model.

The result was that the concept of building computer models to predict plant performance and costs was validated. The approach was then used successfully to cut costs by optimising plant operation and production plans throughout the company. But the biggest benefit came from the fact that the model made it easier to predict the marginal cost of producing additional product. As a result, the company was able to bid on the European spot market and obtain additional sales where previously it was not considered profitable to have done so. The combination of reduced costs and additional market opportunities produced by this investment in computing made a significant contribution to the company's competitive edge.

The original concept of local microcomputers was then developed further so that, instead of just optimising production locally, central management could have daily performance reports from local computers. A central model was developed to use the data provided by the local computers to optimise performance across the different plant locations. This development provided a significantly different opportunity for management control and was recognised as being of fundamental importance to the business and therefore very worthwhile investing in.

Why did the project succeed?

The mix of the personalities involved in the project was an important factor in its success. A mixture of traditional data processing staff and production management with little computing experience was not the right environment for developing brand new ideas. Instead, results orientated, down-to-earth, practical computer people were assigned by the systems department to a plant manager who enjoyed showing central management that he could come up with new ideas before they could. The individuals' personalities gelled and together "they were going to beat the system".

The systems staff assigned to the project were much more interested in the challenges posed by the chemical production process and by the business than in computer technology. To them, the opportunity of climbing all over chemical plants, drilling holes in pipelines and taking measurements at midnight at the top of a plant was far more exciting than the boring world of computers. Their attitude endeared them to local production management and motivated the plant manager to teach them what they needed to know about chemical production.

The systems people did not use traditional professional data processing techniques. There was no system specification — they simply produced the first model on the TI calculator and demonstrated its worth. They were not interested in quality for quality's sake — but they were interested in rapid results. In practice, the two individuals were not liked by the traditional data processing staff, nor were they respected for the approach they adopted.

Throughout the life of the project, the ultimate aim of the systems department was to implement a central model on the mainframe computer. However, once it became clear that this could not be achieved from the outset, the use of the TI calculator, followed by a microcomputer, was an excellent tactical stepping stone on the way to achieving the eventual strategic aim. Interestingly, this approach was even more unconventional in the late 1970s than it would be today. At the time, it was almost unheard of for data processing professionals to use a microcomputer.

The result

This case history provides another example of the importance of the personalities involved in making innovative uses of computer systems. It also shows that success does not necessarily depend on using the 'correct' technology.

The end result was that the business benefited by using very modern technology to control costs in a fundamentally different way. In addition, the flexibility to calculate marginal costs provided by the system created new market opportunities for the company.

The distribution industry

This case history concerns the delivery of a liquid product in the United Kingdom to tanks stored at customer sites. Historically, the customer re-ordered when the level in his tank was low, and replacement product was delivered by a tanker within a few days. The supplier had to provide a rapid response, and this meant that it was necessary to plan the tankers' routes on a daily basis. The supplier was only given two days' notice of the need for a delivery, and the problem was to group the deliveries into convenient and efficient routes for the tankers.

The project history

In 1979, an American company in the same industry began to experiment with a new concept of managing its distribution operation. This company reasoned that, if the computer techniques used for stock recording and control in the manufacturing industry could be applied to the customer's tank, then it would be possible for a computer system to predict when a fresh delivery was needed. It was not practical to install a device in the customer's tank to record the amount of liquid used, but it was feasible to measure the level in the tank each time a delivery was made. This data became the input to the computerised stock-control model.

Distribution management accepted that the idea was practical, even though it represented a very significant change in approach that required careful experimentation and changed the way in which the supplier dealt with its customers.

The idea was 'sold' to the customer on the basis that the supplier would undertake to keep his tank filled with liquid. The supplier would top up the tank when the computer predicted it was necessary to do so. In this way, deliveries could be scheduled to minimise delivery costs. The customer was assured that he could always ask for a delivery if his usage varied from the norm, or if he was concerned about receiving a delivery.

The system was implemented and provided the supplier with dramatic cost-saving opportunities. Delivery schedules were now under the control of the supplier, not the customers, and the company could optimise its vehicle fleet accordingly.

In essence, the system allowed the supplier to change its basic business from selling a product to providing a service (that of undertaking to keep a tank fully supplied with liquid). This basic change had a fundamental impact on many aspects of the business, including pricing, sales strategy, and instrumentation technology. However, the change produced enormous benefits for the business, and the investment in the computerised system was regarded as having provided the company with a strategic competitive advantage.

Why did the project succeed?

I believe that the key to the success of this project was the system innovators' fundamental understanding of the nature of the distribution business. This meant that they were able to recognise the potential of the original idea from the United States, and adapt it to their own circumstances. In practice, the idea was not implemented successfully in the United States because it was based on a mainframe batch-processing system and hence used out-of-date information. As a result, the system did not provide local distribution management with useful information.

In the United Kingdom, the system was implemented on microcomputers under the control of local branch management. (In fact, the branch manager was the project manager.) Up-to-date information was available and the system was programmed under local management control. Local management therefore regarded the system as 'their's' and the project had the local commitment necessary for it to succeed.

As in the previous case history, the technology selected (microcomputers) was not familiar to the majority of data processing professionals. In 1979, the microcomputer was not perceived as a viable machine for such a key business operation. In practice, the system was eventually transferred to the mainframe so that more sophisticated delivery-scheduling models and route-planning facilities could be used. This case demonstrates that, once again, it was necessary to adopt technical tactics apparently the opposite of the strategy so that the ultimate strategic aim could be achieved.

The result

The formula for success in this case was good business knowledge by the systems innovators, strong commitment by the management who were affected by the system and had to make it work, and the pragmatic selection of a technology for the initial implementation. The end result was a fundamental change in the company's perception of its business (from selling a product to providing a service) and a significant competitive advantage gained from investing in information technology.

Manufacturing industry

This company was organised on a regional decentralised basis, with each regional business (and branch office) being as self-contained as possible as a business unit. This structure was a logical outcome of the way the business had grown by acquisition. In practice, many of the branch offices or regions had previously been separate businesses. As a consequence, the administration and control procedures were different across the various regional groupings.

The project history
Following a planning exercise carried out by the corporate finance and systems functions it was proposed that the administration of financial systems, supplier payments and payroll should be centralised. These activities formed the bulk of the administrative workload at regional head offices. By centralising these activities, the number of staff at a regional head office could be reduced dramatically to a core of production and sales line management, together with the support staff required to keep them informed so that they could carry out their control functions.

The proposal was accepted, and common systems administered from a central site were established. Professional management was installed to optimise administrative efficiency using the latest automation techniques.

Why was the project a success?
The success of this project did not stem directly from the cost savings brought about by the more efficient administrative procedures. The main benefit came from the fact that it was no longer necessary to maintain large regional head offices. Over the years, the number of support staff at the regional offices had increased steadily. Today those offices have been slimmed down to just those staff required to control that part of the business. In fact, a complete level of management, together with its support staff, has disappeared from that company's organisation structure.

The market pressures in this particular business had led top management to identify the need to simplify the organisation, and the change in administrative systems facilitated the move. This business now operates with far less staff, and its profitability has increased, even though the market in which it operates has contracted.

The result
This case history provides an example of how computer systems can significantly change an organisation's structure. The simplified management and support structures made possible by the systems has reduced costs and speeded up the administrative procedures. The company has certainly gained a competitive edge from its investment in these systems.

Once again, the main reason for the success of the project was the right mix of human characteristics. The staff involved in the planning exercise were innovators. That is, they were seeking better ways of doing things, and they were able to translate conceptual thoughts into effective action. They were also fortunate in that the market pressures at the time the key decisions were being considered created a favourable climate for the changes being proposed. Furthermore the style of the chief executive was to grab new ideas and push them forward with great speed. He also had the ability to handle the problems generated by such a major change in the organisation of the company.

PRACTICAL GUIDELINES FOR USING COMPUTING FOR COMPETITIVE EDGE

So far I have emphasised that people issues, not technology issues, are the key to using computing for competitive advantage, and the case histories I have quoted reinforce this fundamental point. I would now like to offer you some practical guidelines for addressing these people issues. They concern the type of staff recruited into the information systems department, and the style that the department adopts in its relationships with the rest of the business.

Recruit a different type of person

Most new recruits to the computer industry are chosen for their ability to work in a logical and structured way and begin their careers as programmers. Few of them have any previous experience of business (often they come straight from university), and their careers develop in the self-perpetuating culture of the computer department. As a result, the department is full of highly intelligent logical people who are seen as being 'different' by the rest of the business. Furthermore, the typical data processing professional deliberately promotes and emphasises the fact that he is different from the rest of the business. Typically, this type of person has not, and will not, reach the corridors of power.

The traditional data processing person has been essential for the technical task of building and running conventional data processing systems, and will continue to be required for this task in the future. But, as computing begins to move into innovative areas of the business, a different type of person will be required as well. These people will need to have a 'feel' for the business, and must be interested in, and good at, dealing with people. They must also have the intuition to be able to make a decision based on incomplete facts, and they must be prepared to take risks. The psychological makeup of this type of person is almost the complete opposite of that of the traditional data processing professional.

Recruit front-men from the business

The 'feelers' and business innovaters will not be found from within the information systems department. (People who have spent ten or fifteen years working closely with the technology have little understanding of business in general.) People with the appropriate skills will only be found within the business, or will

have spent the majority of their careers in a non-technical role.

The information systems department needs to recruit this type of person as well — people with a sound understanding not only of business in general, but of the characteristics of the organisation's specific businesses. They need to have a less-structured and more informal attitude than the traditional computing professional, and they need to understand the importance of, and be capable of, building relationships with businessmen.

These people then become, either formally or informally, the interface between the businessman and the computer technologist. Nevertheless, it is still important to encourage the computing professionals to spend time in the business either on assignment or on an ad hoc basis. Only by doing this will they be able to build an understanding of how the marketplace for their 'product' (ie systems) behaves.

Experience has shown that these business frontmen become the major source of business systems innovations. They are also the major influence in gaining user directors' support for new system ideas. However, they do need to have sound technical backup to ensure that the realities of implementing new computer projects are not forgotten.

Adopt a style compatible with the business

I believe that before it can significantly influence the business, the information systems department must adopt a style that is compatible with the company's business culture. The environment in Beecham's consumer products business is not highly structured and logical. It is marketing dominated, and is therefore characterised by speed, aggressive selling, an entrepreneurial culture, and a multitude of decisions that are made on a short-term horizon. Our tactic is to reflect this culture in the systems department. We therefore place little emphasis on the new 'professional' methods currently favoured by the systems industry. Thus, we steer clear of structured design methodologies and systems architectures and long-winded project specification and design phases. Obviously, we cannot ignore professionalism because the business demands systems that work. But if the business criteria is for a system that lasts for two years, there is little point in using a development methodology that aims primarily at producing a system that will be flexible and responsive to change over a ten-year period.

But it is not simply a question of adopting appropriate methods. Most importantly, systems staff must adopt an attitude, a state of mind, that will make them seem responsive in a way that the business recognises. It would not be strictly correct to describe our systems environment purely as entrepreneurial. But we do have to demonstrate an empathy with the entrepreneurial basis of the business we serve, which means that, where appropriate, we have to be prepared to work in unconventional ways. Data processing purists may not approve of everything we do. But we do develop systems that produce real benefits for the business.

Establish a user-services centre

Like many organisations, Beecham has established an 'information centre'. I prefer to call it a "user-services centre", because this emphasises the attitude I believe is required within an information centre.

The obvious role of an information centre is to provide a support service for personal computing, whether it be based on mainframe timesharing or on PCs. A typical information centre will provide facilities such as a PC shop, education and technical assistance. In Beecham, however, it also has a development responsibility for specialist management support systems (commonly called decision support systems). The technical skills required to support both types of activity appear to be common (typically APL or some other personal computing tool). More importantly, though, they both require similar experience and attitudes from the people providing the service.

In our case, the people managing the user-services centre are ex-businessmen from the sales and marketing area of our businesses. Having staff with this background in this role provides two main advantages. First, some of the traditional reservations that data processing staff have about personal computing and the desire to 'protect' users from their own inexperience, are overcome. The attitude is one of "let us help the user to make the best use of personal computing". The underlying belief is that there are many application areas that are more suitable for a personal computing environment.

Second, their business experience provides us with the ability to take the initiative in building management support systems. We can provide the business with innovative ideas for the sorts of things that computers can do to support a manager in his job. The result has been a phase of rapid development during which a set of management support systems has evolved much faster than they would have done if a conventional project team, involving people from different parts of the organisation, had been formed. In our environment, an autocratic, integrated management style achieves results quicker.

Our experience is that combining the responsibility for management support systems and personal computing in a team led by businessmen, but with their own technical resources, has worked well. The

team has been accepted well by the business, is highly respected by top management and has delivered highly innovative contributions to business computing.

Match the systems planning process with the business planning process

It is also important for the systems planning process to match the business planning process. Within the sales-dominated environment of Beecham's consumer products business, most planning is typically short-term; long-term plans are less formally prepared. Our systems planning matches this culture. Thus, we do not have large planning committees. Instead, the opinion leaders or innovators develop ideas informally and then 'sell' them to decision makers. Strategic plans do exist, but they are more in the minds of the leaders in the business or systems area, rather than in the form of vast quantities of expensively produced paper.

Our planning process therefore is not very expensive to operate, but it works well in that it produces effective systems development actions. However, we do realise that the success of our method is very dependent on the individuals concerned with the process. If the ideas were not forthcoming it would be necessary to adopt a more-formal planning system in order to stimulate action.

In fact, we are now introducing a greater element of formality into the planning process. The aim is to formalise the organisational learning process so that the ability to manage computing is enhanced by a greater understanding of what can and cannot be done. The greater formality is unlikely to improve the 'quality' of our innovation, and it might even prevent the innovative 'visionary' from 'sneaking' his idea in. However, we believe that the ultimate objectives (gaining even greater confidence from the business, and enhancing the company's experience and maturity in managing computing) override any objections to deviating from the more natural style of the business.

CONCLUSION

I began this presentation by arguing that, in general, information systems managers spend the majority of their time on topics (often technology-related) that are not the most important isues for the next decade. People, not technology, provide the major constraints, and I have put forward some ideas as to how the constraints might be overcome. In Beecham, we have concentrated on identifying and understanding the problems. We have made a small amount of progress in solving them, but we make no claim of being any further forward than other organisations in this respect. I have related our experiences in the hope that they will be of value to others and that, in turn, Beecham can continue to learn from other company's experiences.

The main message I want to leave you with is that the information systems function has to have earned a major stature in business terms before it can become a prime-mover for major business changes. The easiest way to achieve the required stature is to 'fit' the system department to the organisation, and matching the cultural style of the business is a key aspect of doing this.

It will be necessary to invent good ideas for using computers in new and innovative ways, and the best way of doing this is to create an environment in which business experience can gell with an understanding of what the technology can do. But even good ideas need to be sold, and systems managers need to recognise the importance of paying greater attention to inter-personal skills. Only when the systems function has these skills on board will it be able to play a leading role in initiating change in the company.

Finally, the task of the information systems manager will be much easier if the organisation as a whole is experienced in, and feels comfortable with the concept of, using computing investments as a means to gaining a competitive edge. Building confidence, and generally progressing and managing the organisational learning process is probably on the critical path to ultimate success. Information systems managers must therefore be prepared to devote time and effort to these tasks, even if it means diverting resources from other more immediate activities.

The opportunities for systems professionals are enormous because information technology is opening up vast new possibilities for the way in which business is transacted. If they can recognise and identify with the demands of the business then their career options are limitless. If they cannot recognise the opportunities, their horizons will be limited to the world of technology, not to that of business change and innovation management.

THE BUTLER COX FOUNDATION

Butler Cox & Partners Limited

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.

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