



# Information Management — The Science of Solving Problems

A. PICOT

**As information becomes an increasingly important production factor, effective information management is becoming ever more relevant to corporate success. On the other hand, the introduction of new information technologies can pose problems regarding personnel training and attitude. Balancing these two factors is a tall order, but one that can result in significantly improved productivity.**

---

Dr Arnold Picot is Professor of Information Science and Communications Research for Business Administration, Institute of Organizational Studies, Ludwig Maximilian University, Munich, FR Germany.

---

The vital ingredient in effectively combining the classic factors of production — land, capital and labour, or labour, resources and materials — is information. The more carefully and imaginatively these factors are combined, the better the result. Trite as this remark may sound, it was only recently that economists, in particular von Mises, Schumpeter and von Hayek, pointed out the true value of knowledge in the creation of wealth.

## Creative communication

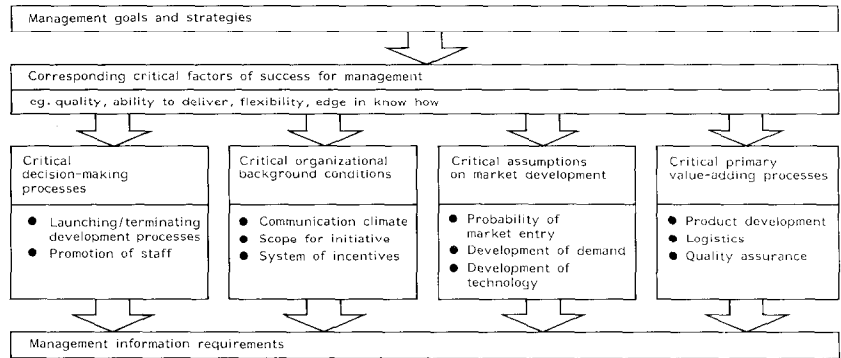
Gaining an edge in information is crucial to corporate success. In the final analysis, entrepreneurship and survival in the marketplace depend on the unequal distribution of information (i.e., purpose-oriented knowledge, ability and ideas) in both society and the economy. When all players in the game reach the same level of knowledge and skill, scope for enterprise is exhausted.

Entrepreneurial ideas result when someone discovers new or better ways of combining available resources to satisfy customer needs. According to von Hayek, competition between companies becomes a process of discovery that opens up new fields of knowledge and fosters emulation.

Entrepreneurial ideas can in fact be described as a bridge spanning the gap between two areas of information: information about resources (such as ability, knowledge, manpower, capital and raw materials), and information about the problems and purchasing power of prospective customers. Resources must be combined in new ways to solve problems, for example to provide a new end product or a service that is more cost-effective thanks to improved technology or organization.

How do these considerations affect information management and corporate strategy? One of the purposes of management is to ensure that information is used effectively and efficiently. Information shapes organizational, technical and personnel considerations, and at the same time provides a basis for developing corporate strategy.

Implementing an entrepreneurial idea involves the following steps: translating the idea into sound corporate strategy, determining market opportunities and risks with the aid of appropriate information systems,

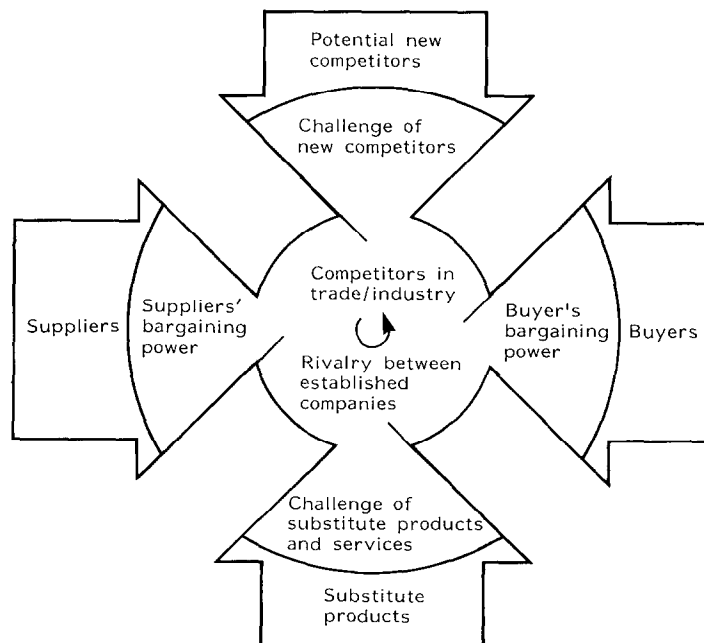


**Figure 1.** Management identifies corporate information needs on the basis of critical success factors

translating strategy into operations, and recognizing the need for adjustment if the original idea proves impracticable.

Success in business hinges on the quality of this informational process. It is no longer appropriate to consider information as simply a fourth factor in production. Corporate management is nothing else but information work. This means that information has become the prime production factor, and the purpose of information management is to make sure that it is put to good use at both strategic and operational levels.

Of course, business administration theory has always recognized the fundamental importance of information to successful corporate management. But today's information requirements are more exacting than ever, a fact that has both market-related and structural causes. Markets are being transformed by fierce national and international competition, accelerated technological and social change, and exponential growth in



**Figure 2.** The dynamics of competition: A model for evaluating corporate information requirements

international knowledge, with a corresponding increase in information transparency. Structures are being reshaped by a growing demand for information in administration and budgeting, by increasing mechanization and production automation, and by more stringent legal demands on corporate activities.

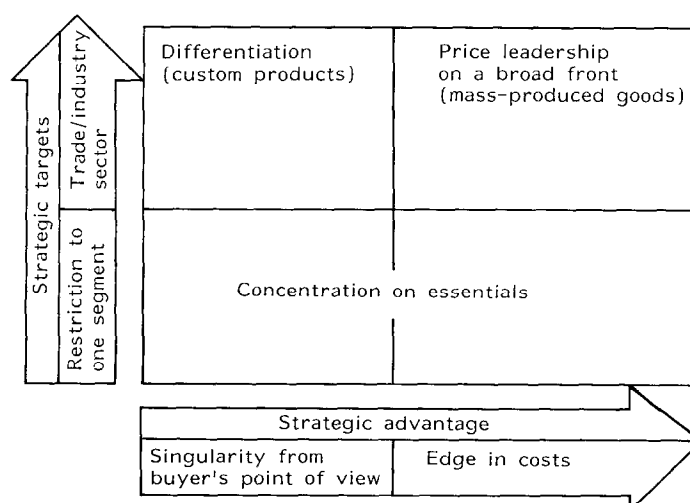
### Growth in quality and quantity

As a result, it is not only the information-related service sector that's growing. In many companies, information as a production factor accounts for as much as 50 per cent of total costs — for market and technological research, planning, coordination, control, data processing, communications, accounting, and training.

Information technology and information management have a profound effect on a company's strategic position because they fundamentally change both the mechanism of adding value and the driving forces of industrial competition. As the cost of information processing continues to fall, dramatic changes in company economics will continue. Between 1958 and 1980, for example, computing costs fell by a factor of 80 million while error rates remained extremely low. At the same time, the activities of everyone involved in adding value — suppliers, producers and distributors — can be better linked and integrated by IT.

The result has been a striking increase in the efficiency of information processing in terms of translating strategy into operations — for example, in data analysis regarding competitive factors, or flexibility in meeting special customer requirements. Improvements have also been made in the physical output process (CAM, flexible manufacturing systems), and in the process of consultation with suppliers and customers through interorganizational IT systems.

The competitive environment (see Figure 2, source M. Porter) is set to change just as radically, creating both new opportunities and new risks. An information management system that is strategically oriented can both erect barriers to market entry (knowhow, deployment of capital), and facilitate access through segmental marketing and synergistic use of technical infrastructures.



**Figure 3.** Forces affecting competition: Information technology is radically changing the picture

While customer and supplier bargaining power is strengthened by improved market transparency and greater ease of upward or downward compatibility, it is weakened if locked into a single vendor's standards.

Competition between companies in the same trade or industry is also changing as a result of information technology: the pressure to streamline and the barriers preventing a company from leaving the market (usually the result of high investment) increase rivalry. But rivalry is reduced for competitors who can realize differential advantages through effective information management.

Basically, information management supports two major corporate strategies (see Figure 3, source M. Porter): price leadership in mass markets as a result of internal productivity gains and extension of information technology to suppliers' resources, and differentiation through additional customer service or product information.

### **The changing competitive environment**

If the above strategies are fused, the advantages of both medium-sized and large companies (custom products and economies of scale) can be combined. Strategic information management can bring about a kind of reconciliation in the traditional conflict between profitability and flexibility. But this requires careful prior analysis and planning that cover the company as a whole. If information management is driven solely by technological euphoria, the consequences for corporate policy may be an unwelcome surprise.

Will management really be able to cope with more and more information activity? There is no simple answer to this question. What is needed is an innovative, information-oriented corporate development plan that takes a global view of affairs and covers organizational structure, personnel and technology.

Naturally, the aspect that shows the most promise will be selected as the basis for the plan, but this will inevitably mean compromise in the other two areas: if new technology is implemented, adjustments will have to be made in skills and organization; if staff skills or motivation are improved, there will inevitably be justified requests for better tools and reform of outdated procedures.

### **Success: checking for vital signs**

What are the key criteria for more productive use of information by management? Apart from taking a global view, I would like to stress six 'success factors' vital to strategic information management:

1. Redefining responsibilities.
2. Modular structure and expansion.
3. Compatibility.
4. User orientation.
5. Organizational adjustment.
6. Improved qualifications.

Communications-oriented infrastructures increasingly are relying on decentralized solutions — yet another argument for taking a global view. As a result, responsibilities must be redefined. Many companies continue to separate related functions: conventional office equipment is

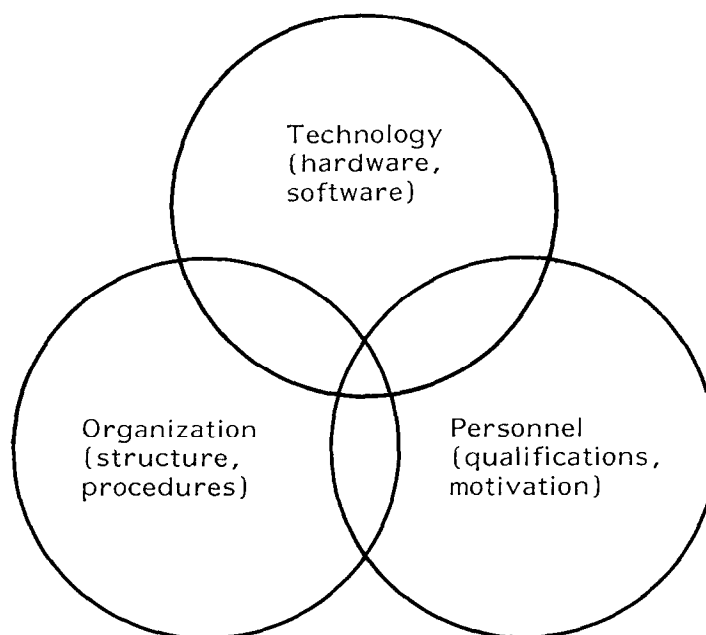
normally in the hands of O&M experts; data processing is the reserve of computer centre specialists; and telecommunications remains the domain of building utilities management. A global approach does away with this fragmentation. In highly computerized companies, it seems advisable to place overall responsibility in the hands of the DP manager, the person who knows the computer resources best — provided, of course, that he or she is versed in the wide application potential of integrated information technology and realizes its organizational implications. The person holding this position should of course also be sensitive to questions concerning procedures and personnel.

Staff responsible for the information infrastructure should also be at a senior level in the hierarchy. Many companies, particularly in insurance and banking, make information resources management a board level appointment.

But not everything can be done at once: scarcity of financial and organizational resources, and a lack of special skills dictate a modular strategy so that the technical solution chosen can be upgraded at any time. Ensuring sufficient flexibility to deal with future developments is a difficult task, and in this area it's good policy to adhere to official or industry standards.

Closely connected with this idea is the need for compatibility of data organization, interfaces, networks, and information media, so that information can readily be shared and exchanged. All of this suggests a strong need for user orientation which means gearing new hardware, software and procedures to the specific tasks and needs of people working with information. Central to the successful implementation of user orientation is organizational adjustment and the provision of improved qualifications.

Information technology is causing corporations to move away from a



**Figure 4.** Connecting points for improvement:

The art of information management is to spot the shape overlaps

rigid division of labour based on simple, specialized steps, and toward integration of tasks on the basis of problems, projects or products. Correspondingly, organizational procedures are taking on interdepartmental and even intercompany dimensions.

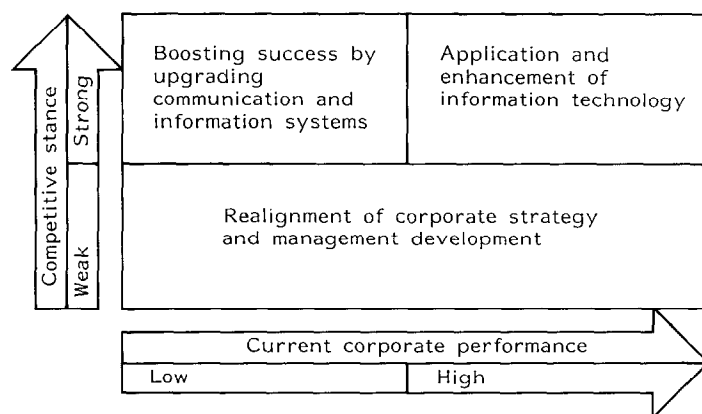
All of this tends to thin out middle management, which in many companies has the function of relaying information. Gathering, collating and forwarding information can be carried out faster and more directly by technology. This causes the organizational pyramid to flatten out, facilitating direct communication between base and peak. At the same time, more emphasis is placed on project and implementation management, which defines the milestones of organizational change, and ensures that those affected by it are kept informed and involved from an early stage in the process.

### Investing in skills

The organizational consequences mentioned above are closely linked with job skills. Personnel at all levels, from typists to managers, need more coherent knowledge and general abilities, such as powers of concentration and the capacity to think in abstract terms. There is less demand for pure specialists trained in manual skills only. And as all staff need a good grounding in the new information technologies and their applications, investment in human resources is becoming an increasingly fundamental factor.

The impact of investments in communication and information technology on corporate success and positioning has been investigated by the Strategic Planning Institute (Cambridge, Massachusetts) in collaboration with management consultants Arthur D. Little, also of Cambridge (see Figure 5). Briefly, it was found that whenever a company has a strong competitive position — in other words, a future-oriented market that promises success — it is not merely advisable, but essential to get involved in it and pursue a deliberate policy of expansion. Doing so means gaining a clear competitive edge.

On the other hand, whenever a company's competitive position is weak and the market promises few prospects for the future, it is more important to reformulate strategy. In this case, management should give



**Figure 5.** Determining Priorities:

A strategic view of competitive stance reveals the crucial role played by information systems

information technology second priority. The conclusion to be drawn from this study is that to improve competitive stance, companies must get their strategic orientation right before investing in new communication and information systems.

Information management has become part of corporate strategy. Calculating profitability is no longer just an accounting problem, but must address the benefits it has to offer. What can be calculated should be calculated; I am thinking here of reductions in lead times, which in many cases are quantifiable. On the other hand, strategic considerations relating to competition cannot be expressed in dollars and cents alone. What matters here is a company's competitive stance and the corporate infrastructure required. And that calls for entrepreneurial judgment and vision rather than an accountant's sharp pencil, which cannot express economic imponderables. This is nothing new to entrepreneurs, but these principles must be applied to investments in other areas, such as research and development or continuing education. In fact, where information management is concerned, the old saying still holds true: nothing ventured, nothing gained.