
Manufacturing Strategy in Global Markets: An Operations Management Model

Marketing
Strategy in
Global Markets

7

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Introduction

Twelve countries and over 300 million consumers are involved in the European Community (EC) market integration. This is much larger than the US market. The economic, monetary, fiscal and commercial integration has already begun and will be completed during the 1990s. There are obstacles, such as language, political and cultural differences, as well as problems in transport and distribution, but community co-ordination is improving.

The recent developments in Eastern Europe and Germany have clearly accelerated EC market integration[1]. With this perspective it is possible to explain the large increase in alliances and acquisitions between European and American companies. The reduction of trade barriers within the EC market will help to make consumer needs more uniform, a tendency which already exists on a global scale[2].

Thus there is a growing tendency towards a global market in different industries. Among the environmental factors which trigger off the globalization process within the EC process of integration are rationalization of distribution channels and changes in government policies[3].

Globalization is growing as far as both finished products and components are concerned. The refrigerator market, for example, is not yet global as there are still many differences between the needs of families in different countries, while for certain refrigerator parts the market is already global.

In global industries competitive advantages derive in large part from the integration and co-ordination on an international scale of the various activities of the value chain, while in the so-called multidomestic markets the competitive advantages are specific to each country and different local strategies are adopted[4]. In global strategy it is of vital importance to reduce total costs as well as design, production and distribution times. Distribution in Europe will tend to reward low-cost producers[5], in this sense the EC will also be an appetizing market for American companies which are already used to serving several different markets and to facing strong price competition[6], while changes will be required in those European companies which only operate in specific markets and focus on particular types of performance (e.g. quality).

With regard to manufacturing, advantages can be obtained in a global strategy through: the effective utilization of scale economies; the concentration of learning

in one plant or a small number of plants; the integration of operations; the co-ordination or the concentration of activities to support production and product development; the use in general of world-class manufacturing policies[7]; and the so-called "stage 4"[8].

This article presents a conceptual model containing all the operations which can be utilized to understand and to single out the most important opportunities and decisions in order to obtain competitive advantage in the presence of global strategies.

The Conceptual Model

The proposed model considers the competitive advantages, the performance of the operating system — as a source of competitive advantages — and the operations articulated in four phases: design, purchasing, production and distribution. These four phases represent what can be defined as the "operation value chain".

For each of the four phases the study of the implications deriving from globalization is tackled by utilizing three groups of strategic decision categories:

- (1) organization and management;
- (2) management systems;
- (3) technologies.

For each phase of the operation value chain, the model makes it possible to observe the influence of decision categories on the performance of the operating system and on the competitive advantages which the company can obtain as a result.

Figure 1 shows the proposed conceptual model.

The Operation Value Chain

The phases which are considered by the model are those which make up the operation value chain: design and development of products, purchasing or raw

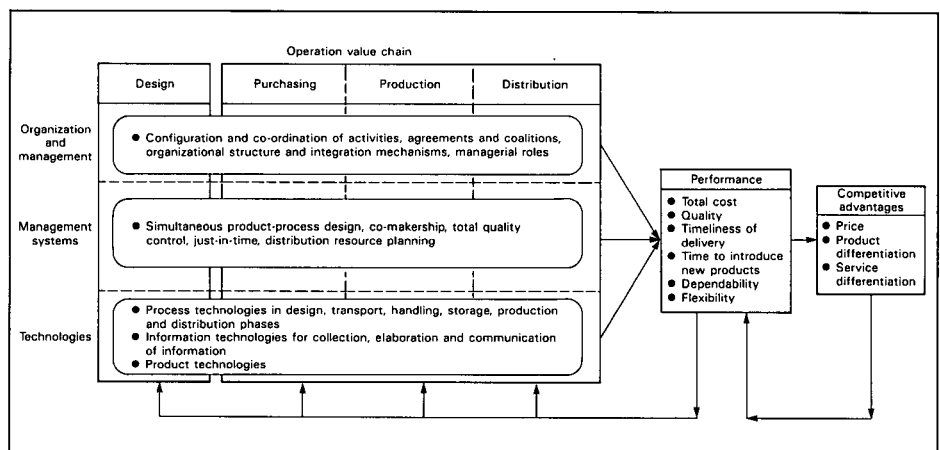


Figure 1.
Conceptual Model

materials and components, manufacturing of components and assembly of finished products, and distribution.

It should be noted that in Figure 1 the design phase has been kept separate from the other phases. The reason for this is that only in the case of "engineer-to-order" firms is the design phase routinely performed as the first operation, followed by purchasing, manufacturing and distribution. In other firms of the "make-to-order", "assemble-to-order" and "make-to-stock" types, design is an activity which is not synchronous with the other operations, which are instead carried out in a cyclical fashion.

With reference to the primary activities of Porter's value chain[9]: inbound logistics, operations, outbound logistics, marketing/sales and service, and to support activities: procurement, technology development, human resource management, and firm infrastructure, the following should be emphasized.

- Two primary activities of the value chain, that is to say marketing/sales and services, have not been taken into consideration because this model is concerned with "operations". Furthermore, when the downstream primary activities of the value chain are of vital importance for competitive advantage, the international competition strategy tends to be multi-domestic; while in those industries where upstream primary activities and support activities, like technology development, are critical, global competition is more frequent[4].
- The outbound logistics are the same as in our distribution phase; the production phase also includes the inbound logistics.
- The support activity classified as procurement in Porter's model (purchasing of raw materials, machinery, buildings, etc.) has been restricted to one of the activities which are described by this term: purchasing of only raw materials and components, that is, those parts which are cyclically purchased by the firms; in this case it is correct to consider purchasing as a primary activity, because it plays an effective role in the physical creation of the product[9].
- The design phase is also considered a primary activity because it too is involved in the physical creation of the product.

Operating System Performance and Competitive Advantages

As far as operating system performance and competitive advantages are concerned, there are in literature contributions both by authors who clearly distinguish them and by authors who introduce a single concept called competitive priority.

Among the first, Schroeder and Lahr[10] propose seven distinct objectives of the operating system: manufacturing cost, quality (conformance) expressed as a cost of quality or in terms of customer satisfaction, inventory turnover, customer service, cycle time (the time from receipt of raw materials until the product is in the customer's hands), time to introduce new products, time to change capacity. The same authors propose the following as examples of

competitive advantages: unit cost, quality, service, capacity, and process technology.

As far as the authors who introduce the concept of competitive priority are concerned, Hayes *et al.*[8] propose five classes of variable: cost, product performance, dependability, flexibility, and innovativeness. Ferdows *et al.*[11] propose four principal competitive dimensions: quality, dependability, cost-efficiency and flexibility. According to Ward *et al.*[12] there are five competitive priorities: costs, delivery performance (dependability and speed), quality, flexibility (product mix and volume), and innovativeness.

In the model which is proposed in this article the aspects of the performance which can be obtained from the operating system — considered as sources of competitive advantages — are grouped into the following classes:

- total cost (meaning the unit cost of the product including all costs: design, development, manufacturing, distribution, inventory costs, etc.);
- product quality;
- timeliness of delivery;
- time to introduce new products;
- dependability (in product quality, delivery time, etc.);
- flexibility (product mix and capacity).

The previously mentioned performances coincide, in a large part, with those proposed by Hill[13]: variable and fixed costs, quality, delivery time and dependability, flexibility both in product specifications and in production volumes.

With reference to the general concept of competitive advantages, in the proposed model we define three types of advantage: price, product differentiation, service differentiation.

This definition of competitive advantages derives from the fact that, in general, consumers choose among several product alternatives, which include the connected services, on the basis of the price-quality relationship. It is important to underline how, for manufacturing companies, market success is becoming more and more dependent on the ability to offer a balanced mix of products and services. The link between product and service is becoming so tight that it is difficult to distinguish between product and service; in fact some authors are proposing the concept of “service-enhanced product”[14].

Strategic Decision Categories

The strategic decision categories in the manufacturing field are extensively discussed in literature. Hayes *et al.*[8] identify ten categories divided into structural (capacity, facilities, technology, vertical integration) and infrastructural (production planning and control, quality, organization, workforce, new product development, performance measurement systems). Skinner[15] proposes five strategic decisional categories: structural (plant and equipment) and infrastructural (production planning and control, organization and management,

labour and staffing, product design/engineering). Fine and Hax[16] propose six strategic decision-making areas, of which three are structural (capacity, facilities, process and technologies) and three infrastructural (product quality, human resources, scope of new products).

In the proposed model three groups of strategic decisional variables are identified:

- (1) organization and management;
- (2) management systems;
- (3) technologies.

The categories which are proposed are in many cases the same as those which have already been indicated, but others are introduced with the objective of underlining all the elements and decisions which are significant in obtaining strategies of a global type. Each group of categories can be referred to the operation value chain and represents a framework within which management makes strategic choices which have operative implications and effects on performance.

The first group of strategic decision categories — organization and management — includes elements which can be traced back to the external and internal organizational structure of the company and to the role of management; these are:

- configuration and co-ordination of the activities;
- the level of concentration/decentralization of activities in the value chain and the way in which they are co-ordinated;
- agreements and coalitions;
- internal organization structures and integration mechanisms;
- managerial roles: the role of the manager in integrating activities to obtain a continuous improvement of the operating system.

The second group of strategic decision categories is represented by management systems, considered both as approaches to process management and as formal techniques and procedures. Of those which are applicable to one or more phases of the operation value chain we list the most important ones:

- simultaneous product-process design;
- co-makanship;
- total quality control;
- just-in-time;
- distribution resources planning.

The third and final group of strategic decision categories is represented by technologies. These can be divided into the following:

- process technologies of all the phases: design, transport, handling, storage, production and distribution;

- information technologies for collection, elaboration and communication of data and information (information and communication systems);
- technologies incorporated in the product aimed at improving quality and reducing costs.

The crossing of the three groups of strategic decision categories with the four phases of the operation value chain makes it possible to identify 12 areas which represent the implications in terms of opportunities and decisions for the realization of a global strategy.

Implications of Globalization

Market globalization requires achievement of high standards of performance in quality, timeliness, total costs and customer service. To reach these levels of performance simultaneously it is necessary to change and improve "all" the phases in the value chain continuously. The proposed model is useful in identifying the lines of action to be taken. In each phase (design, purchasing, production and distribution) these actions must involve organization and management, management systems, and technologies, that is the three groups of strategic decision categories. The effectiveness of the change depends on the degree to which functional-type logics, focused on single operating phase, are overcome. Physical and informative processes will have to be followed with a horizontal and integrated approach. The groups of strategic decision categories, identified in the model, are made up of variables which are concerned with processes and horizontal flows. The actions to be taken, in the globalization perspective, will be presented below by strategic decision groups. Table I summarizes these decisions and activities.

Organization and Management

The configuration and the co-ordination of activities can lead to competitive advantages. Among the factors which favour the concentration of activities there are[4]:

- scale economies;
- management of the learning curve;
- the specific advantages of each country;
- advantages which derive from the common localization of interrelated activities such as product development and production.

On the other hand, factors which can encourage decentralization are:

- easier access to know-how;
- better adaptability to local demand;
- tariff and customs barriers;
- risk of political changes.

With reference to the operation value chain, the most favourable configuration of each phase can differ from the others. With regard to product design and

	Design	Purchasing	Production	Distribution
ORGANIZATIONAL DESIGN	Choice of location of development centres in leading environments	Choice of suppliers on international markets	Choice of plant relocation to obtain an integrated manufacturing system	Choice of companies providing distribution and/or information services
	Co-ordination among development centres for the exchange and increase in know-how	Co-ordination in the purchase of common materials	Agreements among producers to obtain economies of scale and access to know-how	Agreements for distribution in new markets
	Agreements between producers and/or suppliers in the development of new products and in the improvement of already existing ones	Agreements with suppliers on the global scale and in the long term	Agreements between producers and/or suppliers of technologies in the improvement of the process	Agreements with producers and/or distributors on the global scale to serve the same markets and to reduce distribution costs
	Task force and committees as permanent organizational structures to favour multidimensional approach			
	Informal relations as a means of coping with the enormous information needs			
	Managerial roles as a means of integration (management internationalization)			
	Evaluation and reward systems which favour the attitude to integration and to continuous improvement			
MANAGEMENT SYSTEMS	Product-process standardization policies on a global scale	Co-makership policies with transfer of the highest standards to all suppliers	World-class manufacturing, total quality control, and just-in-time policies	Order and stock management policies on a global scale through distribution requirements planning techniques
	Overlapping approach between different centres in the development of products	Transfer of managerial innovation developed in managing plants, in plant-supplier relations and from other suppliers	Transfer of management systems and skills	Storage and transport systems management on a global scale
	Simultaneous product process design in collaboration with production units		Aggregated planning of plants according to global needs of the distribution system	
	Integrated and/or centralized management of product and documentation changes			
TECHNOLOGICAL INNOVATIONS	New methods of cost accounting and new performance measurement systems to understand and to control total cost and other performances including response time			
INFORMATION TECHNOLOGIES	Assisted design technologies for product-process standardization	Transfer towards suppliers of innovations in technical processes developed in company plants or by other suppliers	Automatic production techniques to exploit economies of scale	Storage and handling technologies
	Technologies for simultaneous design		Learning of new technological processes concentrated in pilot plants	Transfer of technological innovations among distribution systems
	Transfer of product technological innovations among plants	International transfer of technological innovations incorporated in raw materials and/or components	Transfer of technological innovation from plant to plant	
	Information technologies for collection, elaboration, and communication of data and information among operation units to allow integration within and among the different phases of the operative value chain			

Table I.
Decisions and Activities
Related to Strategies of
a Global Type

development — both of which are strongly linked to R&D activities — decentralization of the development centres can facilitate access to know-how and its development, as decentralization improves the flow of information, improves contacts in border areas, and induces contacts with leaders in the field[17]. The choice of suppliers in international markets makes it possible to reduce costs and improve the quality of acquired materials. Finally, as far as production is concerned, the generation of economies of scale can be realized either through the concentration of all production activities or through the construction of a number of plants according to the logic of specialization. Production in decentralized plants can favour the attainment of various objectives: low cost, learning economies, the establishment of a company in foreign markets, the introduction of new products, and technical leadership[18].

The co-ordination of decentralized units is fundamental in obtaining competitive advantages. These advantages derive more from how the company manages the various activities than from where these are located. As is shown in Table I, co-ordination among development centres allows an exchange and increase in know-how, while co-ordination in the purchasing of materials makes it possible to obtain economies of scale and create a base for long-term agreements with suppliers. The transfer of experience can be considered as a form of co-ordination; the ability to capitalize and transfer experience among the various units represents an important advantage for global companies in their competition with national firms. As can be seen in Table I the transfer of management and technological experience is often recurrent. Three types of transfer class can be recognized[19]: transfer of plants and resources, transfer of knowledge and ability, and transfer of tasks and responsibilities; the transfer of just one of these classes is ineffective.

Agreements and coalitions with other producers or with other companies which are upstream or downstream on the operation value chain have the objective of creating economies of scale and learning economies, allowing access to know-how, reducing risks and modifying the competitive environment[20]. A higher degree of vertical integration involves fewer risks when it is realized through agreements and coalitions than it does when it is obtained through acquisitions or the utilization of internal resources. Through coalitions a company is repositioned more quickly than through internal development. The time which is necessary to create the minimum threshold of experience within a firm is greater than the time which is required if a coalition is formed; this can occur in the case of rapid technological innovation, for example in the computer field. Examples of agreements and coalitions are given in the top four quadrants of Table I.

As far as aspects of internal organization are concerned, successful global competitors must have an organization capable of managing multidimensional problems. In this sense it becomes important to create a structure which is complementary to the line structure, with task forces and committees which represent a permanent and non-transitory supplementary decision-making body[19]. Even informal relations become fundamental when dealing with firms which operate on a global scale. The formal systems alone are not able to satisfy the enormous information needs which are necessary to co-ordinate such a complex configuration.

The roles and tasks of management also change noticeably in these contexts. When several different cultural backgrounds are present within a company at any one time, management cannot assume that all values are common. Often the shared understanding of the role of management becomes an instrument of integration which is more powerful than formal structures and systems. The manager therefore becomes a vehicle of integration. Internationalization and cosmopolitanism are the new characteristics which are required of this person. The task of the top manager is not that of submitting the activities of a national organization to a central control, but rather that of co-opting abilities and obtaining the involvement of the national organizations; paradoxically, attention shifts from control of the strategic content to management of the organizational process. Evaluation and reward systems must favour the free exchange of information and commitment to global objectives over the above local interests, so as to obtain a positive attitude to integration and thus favour a climate of continuous improvement. The peculiar characteristics of the internal organization and of the role of management present some notable similarities in the various phases of the operation value chain.

Management Systems

The adoption, in certain cases, of unified functioning and service standards in applying managing methodologies can be of great value in reducing general co-ordination costs.

As far as the design and development phase is concerned, it is important to underline how policies of product standardization make it possible to increase the unit production volumes of codes (raw materials and components), thus favouring the consolidation of co-makership[21]. Often standardization takes place within the wider framework of redefinition of the product, which requires its transformation from local to global, that is, its redesign in order to meet the needs of a world market. The identification of a segment of the global market, the redefinition of the product and the consolidation of the sources of supply have been indicated as strategic factors which, together with the already-mentioned environmental factors, can trigger off the globalization of an industry[3].

As far as the production phase is concerned, an aggregate planning of plants, according to the global requirements of the distribution system, can be an advantage, because it becomes possible to shift production from one plant to another, to improve the development of plants and to optimize fluctuation in the rate of change[18].

Recent methodologies for cost accounting and for performance measurement, including response time, are important in all the phases.

Technologies

One of the main competitive advantages derives from the transfer of advanced innovations in process technologies, information technology, and product, raw-material and components technologies. Similarities of products and processes within the company help the transfer of technological improvements. High-tech firms, in which intangible assets are fundamental, are favoured in this process as transfer costs are very low[18].

As far as design is concerned, CAD technologies not only make it possible to implement product-standardization policies, but when used together with communication technologies, they also make it possible to design the product together with the suppliers.

New automation technologies make it possible to obtain economies of scale which utilize learning processes.

In the distribution context the regulation of control over communication technologies, together with deregulation in transport, favours the creation of alliances[22].

Modern information and communication systems allow greater integration among phases of the operation value chain, and make decentralized units efficient[23].

Conclusions

In many industries there is a clear tendency towards globalization. It is believed that this phenomenon will grow as it is aided by the progressive reduction in barriers between countries and differences between consumers. Market globalization, on the other hand, also depends on the behaviour of companies. For example, Japanese producers have given a significant impulse in this direction by redefining products on a world basis. To obtain competitive advantages in global industries, all producers, including those in other countries, must be taken into account. Market integration, both in Europe and in the world as a whole, means that choices in design, purchasing, and assignment of production and distribution tasks, must all be assumed and co-ordinated on a global scale to gain competitive advantages. In the model which has been presented we have tried to underline the most significant opportunities and decisions in the realization of strategies of a global type with reference to operations. Compared to domestic or traditional internalization strategies, three paradigms in global strategies seem to emerge as far as company performance and behaviour are concerned:

- (1) *Cost and time compression.* The reduction in costs in the whole operation chain and the compression of time make it possible to gain competitive advantages in price, product innovation and service. The cost and time compression which can be obtained by adopting a global strategy is greater than that which can be obtained by adopting a domestic one. Indeed, in global strategies it is possible to take greater advantage of the purchasing, production and distribution economies of scale by working on large manufacturing volumes, made possible through being present in a large number of markets. It is also possible to configure and co-ordinate the company structure on an international basis, utilizing the many differences (e.g. in cost and in access to know-how) among the various countries. In the previous paragraph some specific decisions on organization were discussed. Factors which play an important part in compressing time are: company organization, management as a strategic resource in integrating activities along the value chain, the use of management systems which help to make the operation flow 'lean', and the use of information technologies[24].

- (2) *Agreements and coalitions.* Agreements and coalitions are much more important in the case of globalization than in the case of other strategies. They are used for several reasons: to reduce innovation and know-how acquisition times, to reduce risks linked to research and entry into new markets, and to create better economies of scale. In Table I we have emphasized numerous cases in which agreements and coalitions in various phases of the operation value chain play an important role in obtaining sources of competitive advantage.
- (3) *Transfer.* This is another fundamental paradigm in global strategy and its use is an important source of advantage. As was seen above, transfer must be identified in all phases of the operation chain. The transfer of know-how, experience/learning in production, managerial skills and invisible assets[25] are fundamental elements for competitive advantage and are more easily obtainable by firms operating with global strategies.

In conclusion, the proposed model can be useful in identifying the decisions to be taken and the actions to be carried out in order to make the changes required by global strategy. The change is great, but the challenge is significant for many European firms which are, or soon will be, competing in the global market.

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