

Strategic Groups of High Technology Firms in Terms of their Degree of Market-Orientation: Influence on Companies' Performance

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1. HIGH TECHNOLOGY COMPANIES: CONCEPT, CHARACTERISTICS AND COMPETITIVE CONTEXT.

1.1. Concept of “high tech” firm.

The definition of what should be understood as a high technology company is a question pending of a more concrete delimitation in the literature. There is no single, universally accepted concept which sums up the characteristics that must be met or which identify this type of company. On the other hand, definitions of various types -qualitative, quantitative and mixed- have been formulated. Figure 1 synthesises some of the definitions most commonly mentioned in the literature and in research works on the subject.

Figure 1
HIGH TECHNOLOGY DEFINITIONS.

QUALITATIVE DEFINITIONS	
Authors: <u>McKENNA</u> McKenna (1985)	High technology sectors, -and thus the companies competing in them-, typically offer complex products which cause great consumer confusion due to their novelty and, besides there exist a large number of young companies which compete in markets rapidly undergoing changes.
<u>MACINNIS</u> MacInnis and HESLOP (1990)	High technology companies are those characterized by exploiting any rapidly evolving technology, giving rise to constant product improvements and new discoveries.
<u>ROOKS</u> Rooks and WEINROTH (1993)	High technology companies imply having highly sophisticated engineering based on exploiting the most advanced scientific knowledge available at the time.
QUANTITATIVE DEFINITIONS	
Authors: <u>SHANKLIN</u> Shanklin and RYANS (1987)	One of the most widely used criteria is the number of technical staff working in R+D and the R+D expenditure compared to the country's overall average. If an industry is classed as high tech, this implies it must have at least twice as many technical staff and double the R+D expenditure compared to the National average. Likewise, this author compiles other criteria such as the total volume of R+D expenditure or the number of patents registered by the company. All of these criteria have received great criticism.
MIXED DEFINITIONS	
Authors: <u>VON GLINOW</u> Von Glinow and MOHRMAN (1990)	High technology companies should satisfy the following criteria: a) the ratio of scientists, engineers and technicians employed must be much greater than the industry average; b) R+D expenditure over sales must be, at least, more than twice the average expenditure in this area in the country's industry; c) technology obsolescence must be very quick due to the emergence of other new improved technologies; d) the companies' potential for

	growth has to be exceptionally high, due to the fact that the applications of the new technologies give rise to a wide range of new products and processes.
ESCORSA Escorsa (1990)	Proposes the following guidelines to identify advanced technology; a) the ratio of employees working in R+D, compared to the total number of personnel, is at least 1.5 times greater than the average used in the industry as a whole; b) the ratio of R+D expenditure in relation to the Total Added Value is at least double the average of the industry as a whole; c) the ratio of personnel in R+D and R+D expenditure are at the same time greater than the averages of the industry as a whole; d) consider as high technology sectors those defined as such in the most industrialized countries.

Of all the possible alternatives, we understand that the most advisable is the use of simultaneous performance indicators, which should be qualified as exactly as possible and include the following aspects:

1. Nature of the key technological competence in terms of complexity, obsolescence rate and innovation outputs derived from this.
2. Inputs used for innovation in relation to the country's industrial average.
3. Measures of the environment turbulence levels.
4. Measures of sector growth

1.2. Internal behaviour characteristics and competitive environment of high technology companies.

Despite the difficulties entailed in defining high technology, it is possible to synthesize certain behavioural patterns typical of these companies and their markets, which condition their activity.

To begin with, it is necessary to mention the environment conditions typical of high technology sectors, which can be summarised in the very high levels of turbulence due to several factors: 1) the constant coming and going, which usually arises in these markets, of new competitors which may come from the most varied sectors (McGRATH, 1995); 2) the uncertainty as to which will be the most profitable commercial applications of new technologies (MACINNIS and HESLOP, 1990); 3) the emergence of new markets or the radical transformation of existing ones (SHANKLIN and RYANS, 1987); and 4) the shortening of product life cycles, due to the speed of the technology development, diffusion and obsolescence, which puts great pressure on the company to recover the investments made in new products (MACINNIS and HESLOP, 1990). To all of this, we must add the uncertainty experienced by the potential users of technological products themselves, as to whether new technologies are capable of meeting their needs or if on the other hand their expectations will not be fulfilled (MORIARTY and KOSNIK, 1989). There is also uncertainty as to whether in the future there will be available efficient, quick after sales services or a regular distribution service, either of new product units or of complements which may be needed;

and even, in these markets, there are fears concerning the possible unexpected repercussions of technology (ERFFMEYER, RUSS and HAIR, 1992; TRAYNOR and TRAYNOR, 1992).

On the other hand, high technology companies operate conditioned by another series of characteristics, which together with the previously mentioned competitive context, encourage, at times, their excessive technology orientation.

Hence, high technology companies frequently have their origin in the discovery of a new technological field which companies wish to exploit commercially, although in many cases it is not even very clear in what type of commercial applications, and so there is usually exceptional interest in developing all the possibilities of this new technology (LITTER and LEVERICK, 1994).

On the other hand, potential customers are considered as agents who are incapable of determining what they really want, due to their lack of knowledge of the new technologies and so, their opinions are initially not taken into account in the new product development process. Therefore interest is basically focused on technical aspects and optimising technology. In this sense, it is also feared, that excessive customer attention results in limiting innovation to incremental improvement (CAHILL, THACH and WARSHAWSKY, 1994; DAY and MONTGOMERY, 1983; WORKMAN, 1993).

Furthermore, technology development is based on logical principles, but in the marketplace the competitive situation is subject to many changes and customer preferences are often variable. The technical training of the management in high technology companies makes it difficult to accept the environmental uncertainty and this factor has a direct impact on the reluctance to develop Marketing strategic planning (KNIGHT, 1986).

Finally, technology orientation is increased due to the need to keep up with the non-stop evolution of new technologies and so, in this context, the application of market orientation and Marketing philosophy within the company can be subject to limitations.

Although some of the approaches made from the internal perspective of high technology companies may justify the initial absence of market orientation in the case of radical innovations, the very conditions of the environment and, in particular, the rate at which technologies mature and

at which experience is gained about these from their market diffusion, makes such an orientation essential in order to successfully compete in the long-term. Furthermore, potential customers can orient the applications of innovation reducing the uncertainty of finding profitable markets, which will enable the company to obtain competitive advantages via greater customer satisfaction from the beginning of commercialization.

2. MARKET ORIENTATION; CONCEPT AND BENEFITS OF ITS APPLICATION.

It seems clear that within high tech companies there exist greater difficulties in achieving market orientation and avoiding an excessive technology orientation. The level of success of high technology companies will be linked, nevertheless, to their capacity to conceptualize future needs and consequently apply technology. In other words, it will be related to their capacity to understand and meet customer needs and adopt a market orientation, as R+D without strategic orientation is a "stray bullet" which can contribute or not to the company's survival.

In order to determine the difficulties entailed in implementing market orientation in high technology companies, it is necessary to delimit what is understood by market orientation¹. There seems to exist a certain consensus of opinion as to the fact that market orientation implies implementing Marketing philosophy (GRÖNROOS,1994) although various authors have proposed many other definitions for this concept.

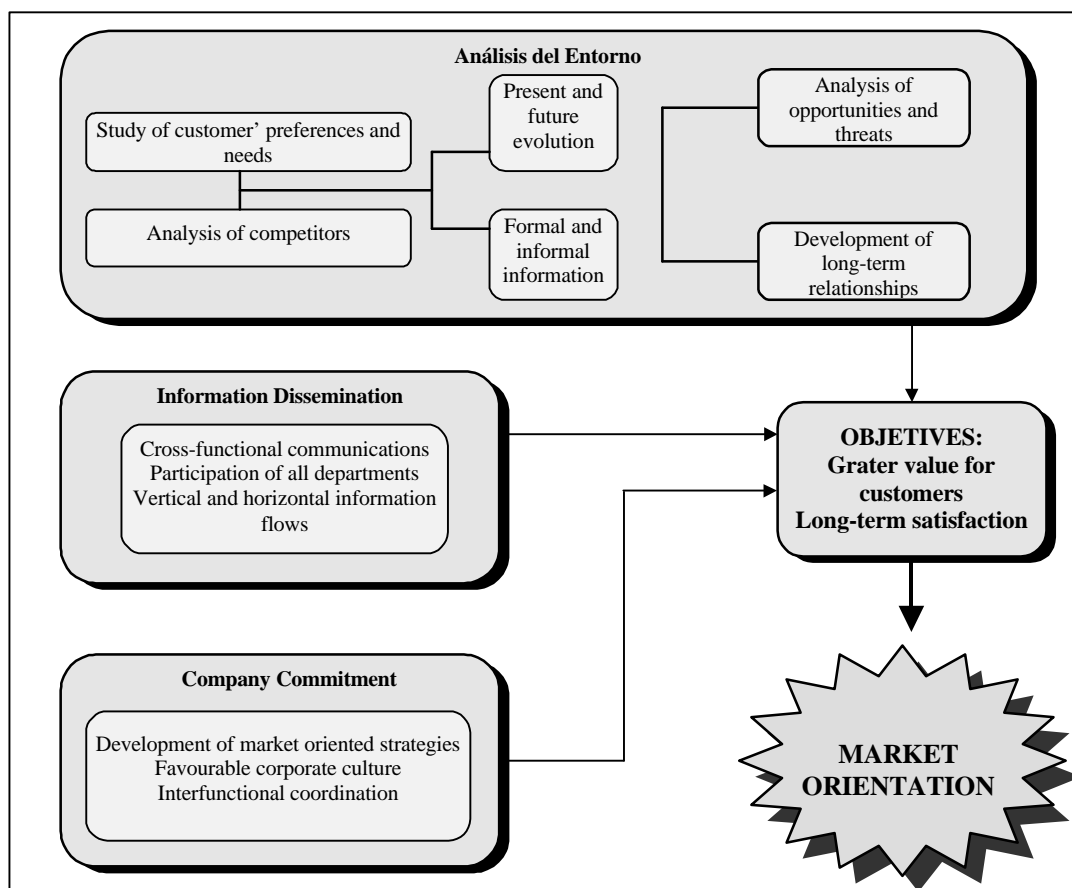
Based on the different definitions consulted (SHAPIRO, 1988; WEBSTER 1988; KOHLI and JAWORSKY, 1990; KOHLI, JAWORSKY and KUMAR 1993; NARVER and SLATER 1990; RUEKERT 1992; WEBSTER 1992; DESHPANDE, FARLEY and WEBSTER 1993; AVLONITIS, KOUREMENOS and GOUNARIS, 1994; VÁZQUEZ and TRESPALACIOS 1994; HUNT and MORGAN 1995; SLATER and NARVER 1995), it is understood that market orientation implies developing the following activities - see Figure 2.

¹ It is necessary to point out that Market orientation and Marketing orientation are not necessarily interchangeable terms, as explained by LLONCH(1993). Marketing orientation involves an excessive emphasis on Marketing techniques and tools and an overly prominent role of this department, which operates in isolation. In this way, the commitment with the other functional areas and different levels of the company's organizational structure necessary to meet customer needs is over looked. This commitment forms the basic nucleus of the Marketing philosophy and so Market Orientation -defined in general terms as the implementation of this philosophy is a wider concept than the behaviour classed as simple Marketing orientation.

1. Considering together consumers -understanding of needs and preferences- and competition -ascertaining their strengths and weaknesses-, establishing lasting relationships with the various clients and agents with which the company interacts -the need for Relational Marketing or long-term continuous exchanges and not simply transactions arises-. An in-depth understanding of the environment in which the company operates, as well as the analysis of opportunities and threats deriving from this must prevail.

2. The coordination, processing and distribution of information gathered across all the company's functional areas so that an Organizational Response may be widely agreed upon and enriched by the contributions made from various areas. The final aim must be to efficiently meet needs and provide greater value for clients.

Figure 2
IMPLEMENTATION OF MARKET ORIENTATION.



3. Market orientation must likewise be integrated in the strategic planning process or that is to say reach a strategic dimension in the company for its actual implementation. Therefore it requires the commitment of all the company's functional areas, which must collaborate and be concerned

about quality, service and value offered in the marketplace. Consequently, this implies interfunctional co-ordination and the development of a corporate culture aimed at efficiently generating greater value for customers as a source of long-term competitive advantage.

4. Measure and control of the results obtained in terms of the greater value provided to the customer.

In general, there is a positive relationship between market orientation and the company's results (DIAMANTOPOLUS and HART, 1993; WONG and SAUNDERS 1993; GREENLEY, 1995; PELHAM and WILSON, 1995; AVLONITIS and GOUNARIS, 1997) whatever the criterion adopted to measure the results of the company -profitability, market share, customer satisfaction, loyalty, success of new products, sales growth-. Nevertheless, the most recent studies warn of the dangers inherent in the absence of market orientation in high technology companies. Basically these can be summarized in the development of products which are commercial failures, as they are not desired/unwanted by customers or are not adapted to their needs (CAHILL, THACH and WARSHAWSKY, 1994). Similarly, another danger is the loss of competitive advantages by the companies, either due to their failure to take advantage of uncovered commercial opportunities (JHONE and ROWNTREE, 1991), or finding themselves overcome by competitors who have greater commercial skills or are quicker at incorporating these skills (SHANKLIN and RYANS, 1987; ROBERTS, 1990).

From the above it cannot be interpreted that market orientation should end up replacing technology orientation in the company, as this is also necessary to compete, but rather market orientation should be incorporated in the company's operations with more weight than it actually has. It is a question of reaching an optimal balance between both orientations (JOHNSRUD 1994; SAMLI, WIRTH and WILLS, 1994) in such a way that the aim is not to focus excessively either on technology or on the customer - but rather to focus on the benefits, identifying a technology which contributes the greatest benefits possible to the market and society, to invest in this technology and master it (HAMEL and PRAHALAD), 1995).

3. MARKETING STRATEGIES IN HIGH TECHNOLOGY COMPANIES: DETERMINING STRATEGIC GROUPS IN ACCORDANCE WITH THEIR DEGREE OF MARKET ORIENTATION.

This section aims to analyse the degree of market orientation of the companies competing in the various sectors of the Spanish economy considered as being high tech. Specifically, the intended objective is to identify strategic groups of companies with a homogeneous behaviour as regards market orientation and as differentiated as possible compared to other groups, in order to determine their specific features. In this sense, we took a national sample comprising of companies belonging to the pharmaceutical, electronics, electronic components, telecommunications and hardware and office equipment sectors. These sectors have been chosen in accordance with criteria of a quantitative nature compiled in the literature² (ESCORSA, 1990; LITTER and LEVERICK, 1994; MACINNIS and HESLOP, 1990; McKENNA, 1985; ROOKS and WEINROTH, 1993; SHANKLING and RYANS, 1987; VON GLINOW and MORHMAN, 1990) and for which the relevant information was obtained.

A total of 78 companies agreed to participate in the study -response rate 26.62%-. The data collection was based on a detailed 16 paged pre-tested questionnaire. In order to increase response rate, the questionnaire was sent up to three times to some companies. Similarly, several telephone contacts were also made with each company during the response period to solve any questions raised and guarantee appropriate understanding of information required.

A question which has received particular attention in this research work is its external and internal validity. External validity assumes that the results are generalizable beyond the scope of analysis being considered. For this reason, besides justifying the selection of the sectors under study, the representativeness of the companies to whom the questionnaire was sent was checked³, as well as the representativeness of the population sample analysed⁴. Internal validity requires the information to be obtained from the appropriate sources and so it was found - by means of several

² The quantitative nature criteria considered in accordance with the statistical information available were: sectors with expenditure in R+D over sales above the national industry average (MICYT, 1992; INE, 1993); sectors with expenditure in R+D over the added value greater than double the National industry as a whole (MARTIN y VELÁZQUEZ, 1993); sectors with expenses in R+D over sales and exports above the national industry average (MARTIN y VELÁZQUEZ, 1993; FARMAINDUSTRIA, 1994).

³ The electronics, telecommunications and hardware and office equipment companies are mainly grouped, respectively, in the associations ANIEL - National Association of Electronics Industries- and SEDISI -Spanish Association of Information Technology Companies- which collaborated in the research. The pharmaceutical companies are represented by FARMAINDUSTRIA, from whose membership the companies participating in the National Plan for Promotion of Research in the Pharmaceutical Industry were chosen since they have the most significant levels of investment in R+D.

⁴ The response rate by activities is similar to that of the composition of the population census.

questions formulated- that all the respondents were in a position to have direct knowledge of, or to efficiently obtain, the information required.

Market orientation is considered to be made up of three dimensions (KHOLI and JAWORSKY, 1990, 1993): Organizational Response, Marketing Intelligence Generation and Information Dissemination across functional areas. The questionnaire used in this research work requires information on these dimensions. Based on this, the hypothesis to be tested are the following:

H1.: There exist strategic groups of companies with different levels of market orientation. In particular:

H1.1.: The smaller companies have a lower degree of market orientation. However, nor is this considered to be exclusive to the large companies.

H1.2.: The companies which have adopted Marketing philosophy to a greater degree obtain better results than the rest of the companies at an overall-business-level as well as at the level of the innovations they commercialize.

Each of the market orientation dimensions requires a set of variables to clarify their content. The criteria used were: a) to measure the Marketing Intelligence Generation we analysed the sources of information used about customers and/or market and the most commonly used sources for new product ideas; b) in the study of Information Dissemination we evaluated the degree of collaboration between Marketing and R+D in various subjects and the degree of collaboration between Marketing and other functional areas; c) Organizational Response implies determining the frequency of using Marketing analytical techniques and the importance given to the use of Marketing tools. It is interesting to point out that the variables intervening in this analysis combine evaluations of the respondents, together with measures of the actual use of the instruments and the Marketing analytical techniques which should accompany market orientation. To our understanding, this gives a wider view of the set than that based exclusively on respondents' opinions which tend to be closer to an ideal functioning rather than the company reality. Figure 3 details the variables considered, their grouping into the relevant dimensions and the abbreviations which, for each of them, will be used in the following tables.

In order to test the hypothesis proposed, the multivariable technique known as Cluster analysis was first applied. By means of this methodology we obtain typologies of companies with characteristics and behaviours which are internally homogeneous but different from one another.

The proximity measure used in this cluster analysis was the euclidean distance of each case to the centroid of the groups. In short, it is the measure of proximity most frequently used in this type of analysis.

On the other hand, the classification algorithm selected was the k-means method, a disjoint method by which at the end of the process each case is assigned to the cluster whose centre is closest, maintaining of course the starting hypothesis that the resulting clusters are disjoint (BISQUERRA, 1989). This method requires the researcher to specify the number of clusters he desires. Not knowing a priori the number of clusters making up the population, various successive attempts were made considering from 2 to 5 segments.

Figure 3
VARIABLES USED IN THE CLUSTER ANALYSIS.

ABBREVIATIONS		VARIABLES
MARKETING INTELLIGENCE GENERATION DIMENSION		
FZAVTS. INFINTR. INVMER. INFUBL. DIALCLIE.		* Sources of information used concerning consumer needs and preferences: Sales force reports Internal reports Market research Published information Dialogue with company customers
CLIENTES. I+D. VENTAS EJECTM. OTRSEJC. PRDCOMP. DISTRB. OTRAS.		* Sources of new product ideas most used in the organization: Ideas contributed by company customers R + D department Sales team Marketing executives Other company executives Competitors' products Distributors Other sources.
DISSEMINATION DIMENSION		
M/VTAS. M/I+D. M/PRODC. M/CONTB. M/DISTRB. M/FINANZ.		* Degree of information exchange concerning the market and tendencies between Marketing and: Sales R + D Production Accounts Distribution Finances.
COLBNP. COLBNEC. COLBDNP. COLBCOMP.		* Degree of collaboration between Marketing and R + D in the following matters: Defining objectives and priorities for new products Analysis of customer needs New product development in accordance with market requirements Information exchange concerning competitor's strategies and reactions
RESPONSE DIMENSION		
OPORTAMZ. EFFECTVM. CICLOVID. AUDTMARK. SIMMERC. CURVEXP. MTCTPDT. PERCPOSC.		* Frequency of use of the following Marketing analytical techniques : Analysis of opportunities and threats Evaluation of Marketing strategies implementation Product life cycle Assessing Marketing effectiveness Market simulation Experience curve Product range matrices Perception and positioning maps
IMAGEN. ULTTECNL. CUALFZAV. SERVICIO. COMPPREC. LINCOMPL. REPDISTRD. HINVMER. PUBLICD. CREATIV. PATENTES. AGENCIA. MARKDRTO.		* Importance of using the following Marketing tools: Product image Products incorporating the latest technology Highly qualified sales personnel Appropriate system of customer support services Price-competitiveness Comprehensive product lines Distributors' good reputation Use of market research Publicity Message creativity Patents Using a good publicity agency Direct Marketing

In terms of the results obtained -subjective interpretation in agreement with the sample reality analysed and contrast of differences between the characteristics of each cluster- a three-group partition was selected to be optimum. The results enable us to confirm the hypothesis put forward:

there do exist strategic groups of companies with different levels of market orientation. The denominations assigned to these segments are:

CLUSTER 1: *Companies with weak market orientation*. Formed by 30% of the population analysed.

CLUSTER 2: *Companies in transition*. Groups 16.7% of companies.

CLUSTER 3: *Companies with considerable market orientation*. This category of companies is the largest, consisting of 47.3% of the companies in the sample.

Before going on to describe and justify the reason behind the denomination of the strategic groups identified, we proceed to synthesize the information available on each of them to ease interpretation. Hence, Figure 4 displays the characteristics of the strategic groups for those variables which besides providing an information input to apply to the cluster analysis, establish significant differences between the companies belonging to each group. Figure 5 completes this information showing the average values of the variables mentioned regardless of their discriminatory power. Figure 6 summarizes the information on other variables surveyed in the questionnaire, but which have not been used in the cluster analysis application process. These are variables considered as being relevant to establish significant differences between the groups, in order to clarify the characteristics and behaviour of the clusters. We now go on to comment on the features of each strategic group.

3.1 Companies with weak market orientation (Cluster 1).

This cluster is, basically, made up of small or very small companies, less than 100 employees (60.8%). Hence, we can confirm the first part of the hypothesis formulated in the following terms: the small high tech companies have lower market orientation, although -as we shall later see- this orientation cannot be considered to be exclusive to the large companies.

Whereas the electronic components sector is hardly present in this strategic group (11.1%), 71.4% of the telecommunications companies and 46.4% of electronics companies are grouped here. Nevertheless, we believe that we cannot speak of an excessively pronounced sector affinity as the importance of hardware and office equipment and pharmaceutical companies is, in turn, considerable -35.1% and 31.3% respectively-.

Figure 4
CHARACTERISTICS OF THE STRATEGIC GROUPS.

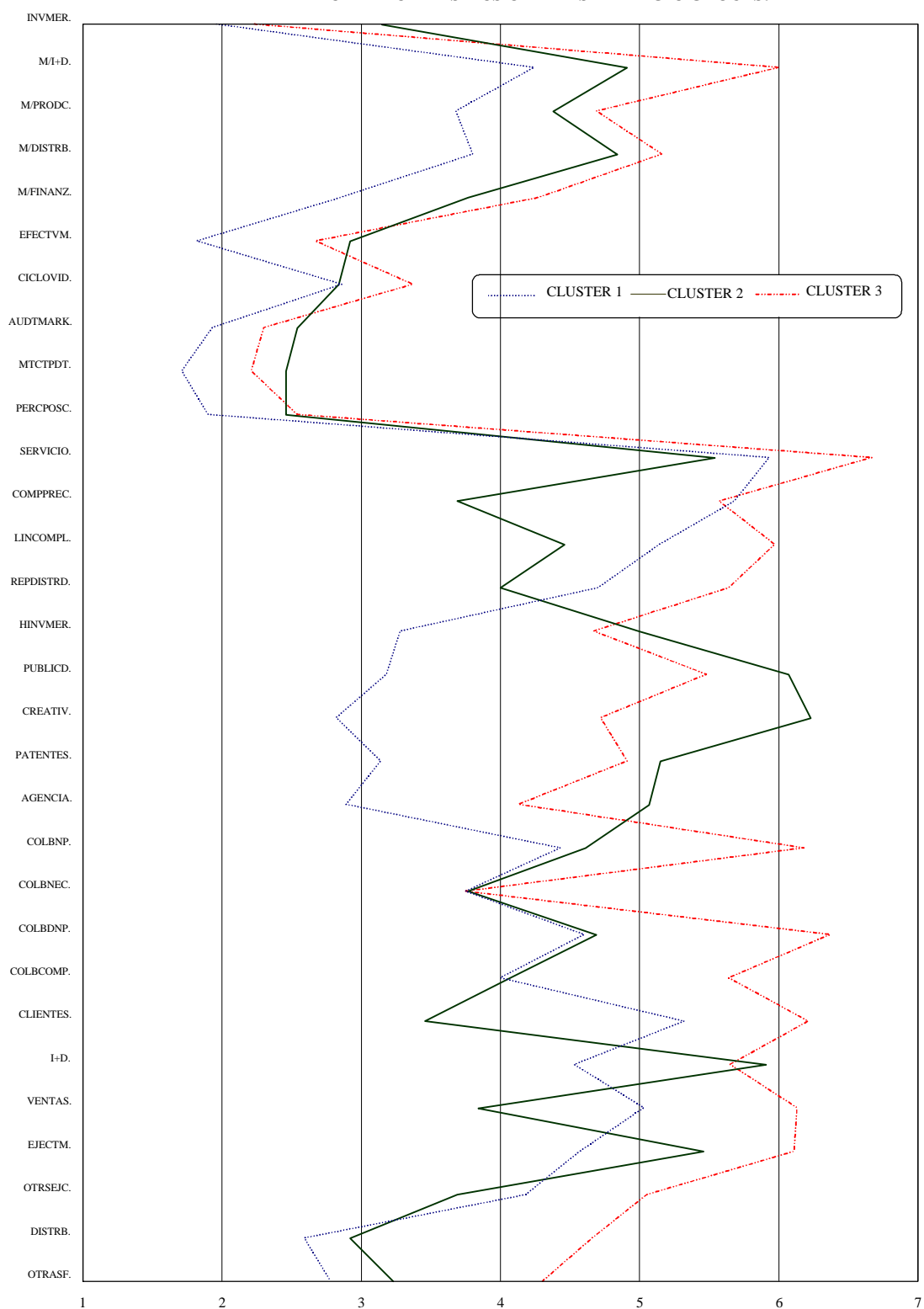


Figure 5
AVERAGE VALUES OF THE VARIABLES WHICH ENABLE THE DEFINITION OF DIFFERENT STRATEGIC GROUPS.

VARIABLES	CLUSTER 1	CLUSTER 2	CLUSTER 3
FZAVTS.	3.18	3.15	3.3
INFINTR.	2.96	2.3	3.05
INVMER. *	1.96	3.15	2.23
INFPUBL.	3.07	3	3.11
DIALCLIE.	3.36	3.3	3.14
M/VTAS.	6	6.38	6.4
M/I+D. *	4.24	4.91	6
M/PRODC. *	3.68	4.38	4.69
M/CONTB.	2.39	2.69	3.08
M/DISTRB. *	3.8	4.84	5.16
M/FINANZ. *	2.85	3.77	4.27
OPORTAMZ.	3.1	3.69	3.35
EFFECTVM. *	1.82	2.92	2.67
CICLOVID. *	2.86	2.84	3.37
AUDTMARK. *	1.93	2.54	2.3
SIMMERC.	2.03	2.31	2.24
CURVEXP.	2.03	2.46	2.43
MTCTPDT. *	1.71	2.46	2.21
PERCPOSC. *	1.9	2.46	2.54
IMAGEN. **	6.32	6.61	6.75
ULTTECNL. **	5.71	5.61	6.21
CUALFZAV.	5.5	6	6.11
SERVICIO. *	5.93	5.54	6.67
COMPPREC. *	5.68	3.69	5.57
LINCOMPL. *	5.14	4.46	5.97
REPDISTRD. *	4.7	4	5.64
HINVMER. *	3.28	5	4.67
PUBLICD. *	3.18	6.07	5.48
CREATIV. *	2.82	6.23	4.72
PATENTES. *	3.14	5.15	4.91
AGENCIA. *	2.89	5.07	4.13
MARKDRTO. **	3.32	4.3	4.32
COLBNP. *	4.43	4.61	6.18
COLBNEC. *	3.75	3.77	3.75
COLBDNP. *	4.6	4.69	6.37
COLBCOMP. *	4	4.07	5.64
CLIENTES. *	5.32	3.46	6.21
I+D. *	4.53	5.91	5.65
VENTAS. *	5.03	3.84	6.13
EJECTM. *	4.57	5.46	6.11
OTRSEJC. *	4.18	3.69	5.05
PRDCOMP.	5.03	5.3	5.57
DISTRB. *	2.59	2.92	4.66
OTRAS. *	2.78	3.23	4.3

NOTE: Significant at a confidence level of 95% (*) or 90% (**).

Figure 6
RELEVANT VARIABLES FOR DEFINING THE STRATEGIC GROUP CHARACTERISTICS.

VARIABLES ⁵	CLUSTER 1 (35.9% cases)		CLUSTER 2 (16.7% cases)		CLUSTER 3 (47.4% cases)	
	% Rows	% Column	% Rows	% Column	% Rows	% Column
NUMTRABJ.*						
Under 50	44.4	42.9	11.1	23.1	44.4	33.3
Between 50 and 100	29.4	17.9	11.8	15.4	58.8	27.8
Between 101 and 250	66.7	28.6	16.7	15.4	16.7	5.6
Over 250	14.3	10.7	28.6	46.2	57.1	33.3
TIPOSECTR.*						
Pharmaceutical	31.3	17.9	62.5	76.9	6.3	2.7
Electronics	44.4	14.3	-	-	55.6	13.5
Electronic components	11.1	3.6	11.1	7.7	77.8	18.9
Telecommunications	71.4	17.9	-	-	28.6	5.4
Hardware and office equipment	35.1	46.4	5.4	15.4	59.5	59.5
HORPLA.**						
Long-term, at least	17.9	18.5	28.6	61.5	53.6	41.7
Medium-term, at least	45	66.7	10	30.8	45	50
Short-term and no planning	50	14.8	12.5	7.7	37.5	8.3
RPLANMP.*						
Activity not performed	80	14.3	-	-	20	2.7
Exclusive responsibility of Marketing	44.4	57.1	13.9	38.5	41.7	40.5
Responsibility of other departments	75	10.7	-	-	25	2.7
Shared responsibility	15.2	17.9	24.2	61.5	60.6	54.1
RELAGEP.*						
Activity not performed	55.6	17.9	-	-	44.4	10.8
Exclusive responsibility of Marketing	37.5	64.3	27.1	100	35.4	45.9
Responsibility of other departments	25	3.6	-	-	75	8.1
Shared responsibility	23.5	14.3	-	-	76.5	35.1
RESTCLIEN.*						
Activity not performed	58.3	25	8.3	7.7	33.3	10.8
Exclusive responsibility of Marketing	29.7	39.3	32.4	92.3	37.8	37.8
Responsibility of other departments	50	3.6	-	-	50	2.7
Shared responsibility	33.3	32.1	-	-	66.7	48.6
RIDENCOMP.*						
Activity not performed	100	7.1	-	-	-	-
Exclusive responsibility of Marketing	27.5	39.3	25	76.9	47.5	51.4
Responsibility of other departments	100	10.7	-	-	-	-
Shared responsibility	36.4	42.9	9.1	23.1	54.5	48.6

⁵ The table only records those variables for which there exist statistically significant differences: number of workers in each company (NUMTRABAJ.); type of sector (TIPOSECTR.); company planning horizon (HORPLA.); department responsible for medium-term Marketing plans (RPLANMP.); department responsible for the relations with the publicity agency (RELAGEP.); department responsible for studies on the existing or potential customer needs (RESTCLIEN.); department in charge of identifying the main competitors (RIDENCOMP.); department responsible for defining the relevant market (RDEFMCDO.); status of Marketing in relation to production (ESTATMP); concern about anticipating the future evolution of customer needs (EVFNECL.); concern about anticipating future market evolution (EVNEMER.); concern about collaboration between Marketing and R+D (COLBM/I+D); initiatives adopted to achieve this collaboration (INICOLB.); importance of the innovation to maintain the company's competitiveness (IMPINV.); type of procedure used to develop new products (PRCDNP.).

	CLUSTER 1		CLUSTER 2		CLUSTER 3	
RDEFCDO.**						
Activity not performed	-	-	-	-	-	-
Exclusive responsibility of Marketing	23.1	21.4	11.5	23.1	65.4	45.9
Responsibility of other departments	62.5	17.9	12.5	14.4	25	5.4
Shared responsibility	39.5	60.7	18.6	61.5	41.9	48.6
ESTATMP.**						
Hierarchically subordinate	50	3.6	-	-	50	2.7
Same hierarchical level	41	89.3	19.7	92.3	39.3	64.9
Hierarchically superior	13.3	7.1	6.7	7.7	80	32.4
COLBM/I+D.*						
An objective to be achieved	35.7	35.7	25	12.5	39.3	29.7
Company does not pay explicit attention	62.5	35.7	12.5	15.4	25	30.8
The company operates on this basis	23.5	28.6	11.8	30.8	64.7	59.5
INICOLB.**	<i>It is impossible to record in this table the great variety of potential combinations of tools which arose and so these results will be commented on in the description of each cluster.</i>					
Management participates in resolving conflicts						
Joint remuneration systems						
Common seminars						
The predominance of a single department is avoided						
The importance of collaborating from the management is encouraged						
PRCDNP.*						
Always	15.8	21.4	21.1	61.5	63.2	64.9
Almost always	50	35.7	10	15.4	40	21.6
Sometimes	56.3	32.1	12	15.4	31.3	13.5
Never	75	10.7	25	7.7	-	-
	AVERAGE VALUE		AVERAGE VALUE		AVERAGE VALUE	
EVFNECL.*	6		5.92		6.65	
EVNEMER.*	5.96		5.84		6.65	
IMPINV.*	6.21		6.46		6.7	

NOTE: Significant at a confidence level of 95% (*) or 90% (**).

Cluster 1 has the lowest average values for almost all the significant variables used in the cluster analysis process, only reaching the maximum value in the importance of price-competitiveness. This price-competitiveness is typical of mature markets in which standardised products predominate. This does not seem to fit in the profile of high technology markets unless we assume that all the products of these companies are in mature phases of their life cycle. However, the importance of having the latest technology available at any given time and allocating resources to innovation is considerable in order to compete, which indicates that companies continue to innovate. All of this can be interpreted in the sense that the companies in this cluster, small or very small, are those which have greatest difficulties in differentiating their offer and opt for lowering the prices of their products.

This strategic group obtains scores halfway between Cluster 2 and Cluster 3 in the importance of service and the distributors' reputation as Marketing tools, the knowledge for the future evolution

of customer needs and market, and in the importance of the different sources of new product ideas - customers, sales force and company executives of Marketing or otherwise-. Nevertheless, the peculiarities of the second cluster enable us to justify, as shall be seen, these data without this being a reason for defending a greater market orientation of the companies in this first strategic group. Besides, Cluster 2 obtains higher scores than Cluster 1 in the rest of the variables indicative of market orientation.

These are companies in which, to a greater extent, explicit attention is not given to the collaboration between Marketing and R+D and in which less initiatives are implemented to facilitate this collaboration in quantity as well as variety- usually only direct actions by top management are resorted to-. In fact, information exchange between Marketing and the rest of the departments is very scarce and furthermore it is in this group of companies where, to a greater extent, the Marketing area is hierarchically subordinated to another functional area. Finally, the development processes are not planned, in accordance with the planning horizons being the most short term. Nonetheless, the companies belonging to this strategic group mainly assign Marketing the responsibility for the control of medium-term plans, relations with the publicity agency and competitor identification. However, if we consider their size, which favours very simple company organizational schemes -where tasks are highly concentrated and centralized- together with the high degree of hierarchical control Marketing is subject to, such responsibilities prove to be very scarce and also indicate the slight relevance of the Marketing function.

To sum up, we can state that this first strategic group is made up of companies which have weak market orientation as although they have acceptable levels of Marketing Generation Intelligence, they need to develop greater levels of Information Dissemination and Organizational Response. They frequently resort to price competition and are concerned for their environment, the service they provide, the distributors they work with although they operate with short-term vision and are those which, to a greater extent, do not study their customers or competitors.

3.2. Companies in transition (Cluster 2)

Cluster 2 mainly comprises pharmaceutical companies, which constitute 76.9% of the group and 62.5% of the sample of companies in this sector. The representativeness of electronic components and hardware and office equipment sectors is almost symbolic -three companies in

total-. The distribution according to size is quite uniform, with companies of over 250 employees having slightly greater weight.

This strategic group follows a behavioural pattern half way between Cluster 1 and Cluster 3, that is to say, the values of the variables for which there exist statistically significant differences usually oscillate between those of the two clusters mentioned. Nevertheless, we have already pointed out a group of variables in which Cluster 1 obtained higher average scores. One of them is the importance of the distributors' reputation. The fact that it is the doctors who actually prescribe the medicine can diminish the importance of the patient's image of the pharmacy from the company's point of view. Furthermore, the companies in this second strategic group also show less interest than those in the first group in relation to: customer service; the use of various sources of new product ideas -in fact, this cluster is the one which resorts more frequently to the R+D function as a source of ideas for new products, although it later attains the highest value in the collaboration of Marketing and R+D to define customer needs-; and in anticipating the future evolution of customer and market requirements -although it is the cluster which resorts most frequently to market research-.

In fact, it is in this strategic group where various Marketing tools and analytical techniques are used to a greater extent, and greater importance is also given to them. These are: assessing market effectiveness, evaluation of Marketing strategies implementation, positioning maps, publicity, creativity, patents, relationship with agencies and Direct Marketing. Nonetheless, if we carefully analyse all the information available, there seems to exist an over-emphasis on tools and techniques which does not agree with other companies' operations. In this sense, close collaboration between Marketing and R + D is only present in 30.8% of cases; more initiatives are adopted to achieve this collaboration than in the previous case, but to a much lesser extent than in Cluster 3; Marketing is only hierarchically superior to Production in 7.7% of cases; and in addition, this function receives exclusive responsibility only in aspects concerning dealings with publicity agencies and identifying the needs of customers and competitors. Besides, the scores in the variables which indicate the degree of Marketing Intelligence Generation and Information Dissemination are rather low.

These companies are in transition, in the sense that they seem to want to speed up the logical process of market orientation resorting to a series of tools and techniques which must arise as a

consequence of company orientation rather than being implemented in order to achieve this orientation.

3.3. Companies with considerable market orientation (Cluster 3).

This strategic group is fundamentally made up of the companies from the electronic components, hardware and office equipment, and electronics sectors. Sixty-one per cent of the cluster is composed of companies of less than 100 employees, whereas 33% have more than 250, following a size distribution which is very similar to that of the total sample. This fully confirms the first section of the second hypothesis: market orientation is not exclusive to large companies. These are the companies which we consider as more market-oriented as they present the most coherent overall behaviour in relation to the three dimensions considered within this orientation. In any case it should be borne in mind that the scores of the companies considered are, in general, lower than those reported in similar studies and so although we speak in terms of greater market orientation we do not refer to a full orientation, but rather a limited one.

The companies in this cluster consistently obtain the highest scores in the dimensions of Marketing Intelligence Generation and Dissemination. In the Organizational Response dimension they resort to a lesser extent than would be desirable to the use of analytical Marketing techniques, in fact they only obtain better scores than Cluster 2 in the study of the product life cycle and in the use of perception and positioning maps. Nevertheless, in the importance attributed to the Marketing tools proposed, this group does not centre its interest on communication - whereas Cluster 2 focuses especially on this aspect together with patents, essential in the pharmaceutical market-, to emphasize the good image and reputation of products, service, broad product lines and incorporating the latest technology to the innovation -in accordance with the fact that in this group greater importance is attributed to innovation for competitiveness-. However, Marketing does not receive so many responsibilities of an exclusive character as would be expected, although these companies operate especially on the basis of a close collaboration between Marketing and R + D, using the widest variety and number of initiatives to achieve this end. In addition, in this cluster the functional area of Marketing occupies, to a greater extent, a position in the company's organizational scheme which is superior to that of Production. There also exists a greater concern for anticipating the future evolution of customer and market requirements.

In this strategic group, medium-term planning is slightly preferred to long-term, whereas in Cluster 2 long-term predominated. Furthermore, the companies in Cluster 3 are very concerned about planning the new product development process, which is highly indicative that, at least in the most market-oriented companies, size does not impede planning. This planning initiative would be advisable if besides confirming that it was a more usual practice in companies with a greater degree of market orientation, we could establish that this type of companies obtain better results. This involves developing an analysis related to the testing of the second section of the second hypothesis, the subject of the following heading.

4. RELATION BETWEEN MARKET ORIENTATION AND THE PERFORMANCE OF HIGH TECHNOLOGY COMPANIES.

This section attempts to determine to what extent the greater or lesser market orientation of companies in the sample enables us to establish differences in their overall results and the degree of success of the innovations they commercialize. Hence, two variables were used as indicators of the company's behaviour: the sales figure -as an indicator of general results- and the degree of contribution of the new products to the company's financial results⁶ -at the innovation level-.

With this information input, a discriminant analysis was first carried out in order to try and establish if sales differed significantly between the companies of the groups studied. The results obtained -see Figure 7-, are not significant at an acceptable degree of reliability so that if the business results are measured according to sales volume we should reject the first part of the second hypothesis: the companies which have adopted the Marketing philosophy to a greater degree obtain better results than the rest of the companies at the overall-business-level. Nevertheless, exclusively using sales figures as an indicator of the business result may prove to be limited. On the one hand, the overall result of a company can be measured in terms of multiple variables -market share, investment returns, return on own assets-, so that the greater the number of variables considered, the wider and more precise the view of reality that can be obtained. On the other hand, the use of relative measures - for example, in relation to the sector average or the averages of the closest competitors enables, in turn, the enrichment of information. Although, it was attempted to obtain data of this nature by means of the questionnaire, in the pre-test we detected the respondents' reluctance to provide data on the indicators measured, and in the sample as a whole we consider that the total number of responses

⁶ The innovation outcome was measured on a scale of -5 to +5 in terms of the innovation's contribution to the financial results.

obtained is not sufficiently representative to perform an analysis in relation to these. Among the lines of future research which may follow on from this research work, is obtaining reliable multidimensional information from these companies concerning their results, if possible forming a panel enabling us to analyse both the dynamic evolution of market orientation together with results, in order to thus attempt to determine the possible existence of causal relations between both variables.

Figure 7
DIFFERENCES IN THE GLOBAL RESULT OF HIGH TECHNOLOGY COMPANIES IN TERMS OF THE DEGREE OF MARKET ORIENTATION.

ADJUSTMENT									
FCN	Eigen-value	% Variance	Cumulated Percent	Canonical Correlation	After FCN	Wilk's Lambda	Chi Square	DF	Significance
1	0.0435	100.00	100.00	0.204231	0	0.95828	3.1101	2	0.2112

We now go on to establish if the companies in the sample which are more market-oriented have greater success levels and lower failure levels in the innovations commercialized than the companies in transition and those not market- oriented. In this sense, just as shown in Figure 8, we were able to check that, effectively, the more market oriented companies obtain significantly better results in their innovations, fully confirming the second hypothesis.

Figure 8
DIFFERENCES IN THE RESULT OF INNOVATION IN TERMS OF THE DEGREE OF MARKET ORIENTATION OF HIGH TECHNOLOGY COMPANIES.

SUCCESS LEVEL	CLUSTER			Total per Row
	1	2	3	
2	69.2		30.8	16.7
	32.1		10.8	
3	42.3	23.1	34.6	33.3
	39.3	46.2	24.3	
4	23.1	11.5	65.4	33.3
	21.4	23.1	45.9	
5	15.4	30.8	53.8	16.7
	7.1	30.8	18.9	
Total per Column	35.9	16.7	47.4	100.0

Chi-Square	Value	Degrees of Freedom	Significance
Pearson	15.34549	6	0.01773

FAILURE LEVEL	CLUSTER			Total per Row
	1	2	3	
-5	100 15.4			5.7
-4	71.4 19.2	28.6 18.8		10
-3	39.3 42.3	10.7 27.3	50 42.4	40
-2	18.8 11.5	18.8 27.3	62.5 30.3	22.9
-1	20 11.5	20 27.3	60 27.3	21.4
Total per Column	37.1	15.7	47.1	100

Chi- Square	Value	Degrees of Freedom	Significance
Pearson	17.78919	8	0.02286

5. CONCLUSIONS.

The present article has tested the existence of strategic groups of high technology companies with different degrees of market orientation. The most market-oriented companies are characterised by strengthening the dimensions termed Marketing Intelligence Information, Information Dissemination and Organizational Response. We have also been able to confirm that greater market orientation is not exclusive to large companies, but rather that there exists a considerable percentage of companies of less than 100 employees who are comprised in this category. One of the empirical questions posed at the present time is whether the most profitable companies which are market oriented owe their profitability to this circumstance or if, alternatively, the greater levels of profitability facilitate the allocation of resources to market orientation. Evidently, this question is beyond the scope of this work and would require a dynamic study. Nevertheless, we have obtained empirical evidence which confirms that the most market oriented companies obtain better results in the innovations they develop, although we have not been able to confirm this hypothesis in relation to business results measured in terms of total sales volume. In this sense, it is necessary to comment on two aspects which constitute a limitation to this research work: sales in absolute terms are a partial indicator of the business result, it being necessary to resort to profitability data. In any case, we consider it to be encouraging to have checked that the smaller companies which normally have less resources available, present, as mentioned, high levels of market orientation. This could support the origin of causality in market orientation.

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