CLASSIFYING HIGH TECH NEW VENTURES BY PERFORMANCE: THE MARKET-TECHNOLOGICAL-ENTREPRENEURIAL MATRIX*

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WP-EC 98-13

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Editor: Instituto Valenciano de Investigaciones Económicas, S.A.
First Edition June 1998.
ISBN: 84-482-1818-3
Depósito Legal: V-2265-1998

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A B S T R A C T

This is an exploratory insight into the profile and prospects of growth and success attached to one category of firms, known as "New Technology Based Firms (NTBFs), the so-called high-tech and innovative new ventures. With this study we are willing to furnish a new methodological tool instrumental to position any firm characterised by being relatively recent and specialising in high-tech fields or at least, in activities with large scope for innovation. So, we intend to make a methodological contribution to theory in the entrepreneurship field, through an empirical exercise.

Analysis of our empirically based data leads us to a new Matrix we call Market-Technology-Entrepreneurial Matrix, whose 8 three-dimensional quadrants serve to classify high- tech new ventures by performance. A Factorial Analysis coupled with a Discriminate Analysis are the statistical tools employed in obtaining the M-T-E Matrix and incorporating predictive capacity to it.

Keywords: high-tech, performance, matrix.

R E S U M E N

El presente estudio, de carácter exploratorio, es una incursión en torno al perfil y perspectivas de crecimiento y éxito, asociados a una categoría de empresas conocidas como "New Technology Based Firms" (NTBFs), las cuales desarrollan actividades altamente innovadoras y habitualmente pertenecientes a sectores de tecnología avanzada. Nuestro propósito radica en desarrollar una nueva herramienta metodológica que resulte útil para posicionar competitivamente, de manera aproximada, a cualquier compañía con el perfil NTBF: reciente, innovadora e intensiva en tecnologías avanzadas.

Tras aplicar la técnica estadística del análisis factorial, hemos obtenido una Matriz que denominamos Matriz Mercado-Tecnología-Emprendedor, cuyos 8 cuadrantes tridimensionales posicionan las compañías high-tech según sus fortalezas y debilidades y perspectivas de competitividad. Finalmente, mediante el empleo de la técnica estadística del análisis discriminante, hemos podido incorporar capacidad predictiva a la Matriz.

Palabras clave: high tech, funcionamiento, matriz.

PURPOSE OF THE STUDY:

Our main expectations in this study and also our main goal, are placed on the possibility to furnish a new methodological model for classifying high-tech new venture profiles, under the shape of a three-dimensional matrix.

It is worth remarking this is an exploratory research or pilot study and the sample size is relatively small (only 30 firms). Nevertheless, we consider the methodology used is suitable for case-studies and the findings are consistent with those by other researchers.

This study stays in tune with others recently undertaken and targeting the profile of new venture founders in high-tech fields [1], but unlike most of them, this one seeks to provide managers with a tool to approximately position their firms with regards to a set of key factors explaining performance in new ventures specialising in high-tech and innovative fields. Several multivariate statistical methods will be used in order to obtain conclusions with predictive capacity.

The basic and final result of this study takes the form of a three-dimensional matrix we deem useful to classify new high technology ventures. Why is this useful? Justification for the development of this matrix comes from our belief the category of firms gathered under the high-tech label constitute an heterogeneous group much broader than believed in a wide set of issues, including also a disparate behaviour concerning global performance and future prospects and expectations.

Our proposition under the form of a matrix should be viewed as an attempt to classify performance so far and future prospects attached to high-tech or highly innovative recently founded firms, by only analysing behaviour exhibited in a relatively short set of variables. Here lies our second main purpose: to incorporate predictive capacity to our model.

In short, with this study we hope to arouse interest and reflection among practitioners and entrepreneurs running the so-called New Technology Based Firms.

[1] Among the very recent empirical studies concerning the entrepreneur profile are worth noting: An empirical study to 24 new technical ventures by STUART & ABETTI (1986), an empirical survey about research-entrepreneurs by DOUTRIAUX (1995), another empirical study to 20 engineers entrepreneurs by FAYOLE (1995). Also worth noting are the studies by COOPER (1995) and RIPOLLES (1995) and a survey to 100 top executives in entrepreneurial firms by HOOD & YOUNG (1993)

1. LITERATURE REVIEW ON THE FIELD

In this section we will briefly review some studies focused on the analysis of high-tech performance, which have highlighted similar issues than the ones outlined in our study.

As far as technology excellence and its remarkable contribution to the firm´s overall performance is concerned, a wide set of studies can be mentioned, such as the one by BOER (1991) who stressed the fact successful corporations view intellectual property and technology assets as a strategic resource for gaining world wide market advantage. Other studies remark the growing strategic importance attached to technology and its management implications, such as the study by DODGSON (1991) or the one by FRIAR and HORWITCH(1986). Both stress the need to strategically manage technology within the corporate strategy, like the study by KLIMSTRA and RAPHAEL (1992).

The recent study by HAMILTON (1997) comes to the conclusion very few firms have actually succeeded in managing their technologies in an optimal way, as strategic assets. Similarly to our final result in this study, the Market-Technology-Entrepreneurial Matrix, the strategic framework provided by Hamilton in his article takes the form of a three dimensional cube, whose 3 axis are: markets, technologies and products/services.

Our study stays also in tune with the one by SANDBERG and HOFER (1987), focused on the role of strategy, industry structure and the entrepreneur on the new venture performance.

On the other hand, the well-known study by WYNARCZYCK et al (1993) provides a diagram representing the relationship between strategy, performance and organisation. In their study, performance is shown to be dependent upon a number of variables and sub-variables.

Regarding the entrepreneurial team, a key issue in our empirical study, has been highlighted in several recent studies. KAMM et al (1990) state the team features directly affect the process of new venture creation and the firms performance, as shown in a number of studies that have been carried out on the level of existence of entrepreneurial teams.

No definitive conclusions can be drawn from the results arising from the literature recently published. For that reason, we judge our attempt to classify performance in high-tech firms might contribute to expand the set of studies focusing on determinants of performance in New Technology Based Firms recently founded, a category of firms with growing economic

and social impact nowadays. Here lies justification for the development of a three-dimensional matrix to classify new high-tech ventures, what might help to understanding theory through results emerging from the practice.

2. EMPIRICAL STUDY

The empirical fieldwork on which most of this study is based, was implemented in the region known as the Bay Area of San Francisco, urban agglomeration nearby the Silicon Valley, from June to September 1994.

The American style of life, widely believed to encourage individuals to become self employed and run their own business, is supposedly more suitable to raise entrepreneurial vocations.

Proximity to the core of the Silicon Valley as well as other locational conditions such as fluent linkages between University-Enterprises and availability of venture capital funds turn the Bay Area into an environment highly conducive to entrepreneurship and innovative activities. From our point of view, features shaping the entrepreneur profile could be better assessed in a region with high rates of innovative new venture generation.

Although small in a nation-wide scale, the whole Bay Area seemed to us too vast and large for our research purposes, to the extent we eventually focused on firms located in the Northeast side of the Bay Area, comprising the cities entailed between Richmond at North and Alameda at South.

Sample:

In this empirical study 18 innovative new ventures were selected.

Concerning the entrepreneurs [2], several are better qualified as inventor-entrepreneurs in the sense raised by HISRICH and PETERS (1995), MINER, SMITH & BRACKER (1992), SAMSON & GURDON (1993), usually coming from the University environment.

[2] In fact, more than 18, while some companies were founded by several individuals

Most have a sound technological background and only in a few of them the managerial skills prevail over the technical abilities.

The criteria to be met by new ventures were:

- Geographical proximity: Firms located within a radius of 20 kilometres embracing the cities of Richmond, Berkeley, Emeryville and Alameda.

- Recent date of foundation: All the firms were established after 1984, so they can be relatively defined as new ventures.

- High opportunity sectors. All the ventures are engaged in activities with high potential income generation, widely judged as market opportunity windows:

. Biotechnological or biomedical field (6 firms)

. Computing and software related activities (8 firms)

. Specialised advising activities in areas with growing market and social concern (4 firms).

- Firms in different stages of development. The sample was designed having in mind the need to cover firms at different stages of development in their life cycle. Hence, a wide range of ventures can be found: start-ups set up only few months ago, firms in the emerging phase and fast growing and consolidated ventures too, but no one having reached the maturity or harvest phase yet.

- Firms with diverging pattern of growth:

The purpose was to cover a wide range of growth possibilities. So, in the sample we find from ventures experiencing an accelerated growth, at annual rates over 100 %, to others facing stagnation in sales. A few biotechnological companies, still engaged in the research process, have not started to generate incomes yet by the time of the visit (late 1994).

- Firms with an outstanding innovative potential: To us, this innovative character could be described by the following innovative features:

High tech mastering, constant introduction of new products, continuous search for new markets, high rate of investment in R&D and other prior-to-launch activities, involved in what experts call opportunity areas and highly creative firms.

The research approach used to carry out this study was the personal interview to the entrepreneurs, founders of these 18 new ventures. In order to obtain comparable information, a structured and homogeneous questionnaire was prepared as the basis for these interviews.

A wide range of issues were treated in these meetings, by using basically closed-ended questions.

The sample of firms referred to the Berkeley Area are the only ones analysed empirically by us. Notwithstanding, this initial sample has been enlarged with 12 more firms coming from the Canadian region of Quebec, in order to gather a number of firms large enough to test out our hypothesis and to properly apply multivariate statistical methods. These 12 firms have been selected from the study by BLAIS and TOULOUSE (1992), initially composed by 17 companies, by being the ones fulfilling all the requirements to be comparable to the other sample.

The 12 firms analysed in Quebec were less than 10 year old by the time of the empirical study was carried out (1990), as a primary requirement to being also considered recent innovative start-up firms.

The remaining selection criteria requested to the Bay Area sample are also duly met by this second sample of firms:

Different stages of development, diverging rates of growth, innovative character, high opportunity sectors, small and medium size (less than 200 employees) [3].

Research variables:

Main goal sought in our study was to delve into the position and behaviour exhibited by our two samples of firms with regards to a wide set of variables.

On the whole, 53 variables [4] were finally selected to be analysed in both samples. Selection of these 53 variables, gathered into 5 wide areas as shown in Table 1, is justified by

the fact these are the ones employed by the professors Blais and Toulouse in several articles published in prestigious journals, and seemed to hold a direct relationship with performance and prospects at the firms level. We can find plenty of studies linking any of these variables to performance [5].

Table 1. Areas of Variables

1) ENTREPRENEUR: - Identity: . Ei(1): Age at foundation of the firm . Ei(2): Educational level . Ei(3): Educational specialisation - Experience: . Ex(1): Experience as entrepreneur . Ex(2): Technical and research experience . Ex(3): Managerial experience - Foundation: . Ef(1): Existence of an entrepreneurial team . Ef(2): Linkages between technology and market
2) ENTERPRISE: - Identity: . Zi(1): Sector of activity . Zi(2): Maturity of the firm . Zi(3): Stage of evolution . Zi(4): Number of employees - Technological culture: . Zc(1): Rate of technical personnel . Zc(2): % of personnel devoted to R&D . Zc(3): % of resources devoted to R&D - Organisation: . Zo(1): Level of formality . Zo(2): Level of centrality in the decision making process - Products: . Zp(1): Variety of products - Resources: . Zr(1): Capital resources . Zr(2): Equipment resources
3) ENVIRONMENT: - Industrial system: . Vs(1): Level of internationalisation . Vs(2): Level of concentration . Vs(3): Technological effervescence . Vs(4): Intensity of competition . Vs(5): Competitive factors

[3] To confirm this extent, see BLAIS and TOULOUSE (1992), section "identification des entreprises à étudier", pp 9-12

[4] This pool of variables is due to BLAIS and TOULOUSE (1992), although we have only taken 53 from the 64 initial variables employed by them in their original study. These 53 variables are the ones we could fulfil with the information gathered in our sample (Bay Area). A more detailed information about the original 64 variables can be found in BLAIS and TOULOUSE (1992a)

[5] Among these studies we could mention the ones by SANDBERG and HOFER (1987), WILLARD et al (1992), HAMILTON (1997), MARCH and YAGÜE (1997), KAM(1990) or the study by HISRICH and PETERS (1995)

- Markets:
    - . Vm(1): Rate of growth
    - . Vm(2): Relative size
    - . Vm(3): Heterogeneity
- Competition:
    - . Vc(1): Level of domination by the market leaders
    - . Vc(2): Number of international competitors
    - . Vc(3): Number of national competitors

4) STRATEGY:
- Strategic process:
    - . Sp(1): Planification
    - . Sp(2): Decisional horizon
- Strategic actions:
    - . Sa(1): Targeted markets
    - . Sa(2): Competitive advantage
    - . Sa(3): Interrelation R&D-Marketing
    - . Sa(4): Level of focus on the R&D
    - . Sa(5): Level of valorisation of marketing
    - . Sa(6): Effective rhythm of innovation
- Strategic attitude:
    - . St(1): Competitive position
    - . St(2): Innovative attitude
    - . St(3): Innovation strategy
    - . St(4): Production strategy
    - . St(5): Technological sources
    - . St(6): Risk taking

5) PERFORMANCE:
- Sales:
    - . Pv: Rate of average growth in sales
- Positioning:
    - . Pc(1): Technological innovation capacity
    - . Pc(2): Commercial innovation capacity
    - . Pc(3): Quality and reliability of products
    - . Pc(4): Managerial capacity
    - . Pc(5): Profits and financial soundness
- Market share:
    - . Pm(1): World position
    - . Pm(2): National position

3. EMPIRICAL RESULTS

3.1. STATISTICAL ANALYSIS

Once both samples were fully comparable next step in our study was to position each company with regards to the 53 variables above mentioned.

As far as the scores is concerned, a scale of Likert (1 to 5) was adopted in this qualitative exercise [6].

To start with, it is worth remarking the broadest divergences among firms have been observed in the Quebec sample, while the Bay Area firms display a more similar general position among them [7].

Once scored all our firms with regards to the whole set of variables, next step involves choosing the most suitable statistical method to analyse and further interpret the results emerging from our empirical study.

Given the number of cases (30 firms), the nature of the data available and the number of variables (53), we have agreed to employ the Factorial analysis method.

As a result of this Factorial analysis targeting the whole number of variables we have obtained 12 factors. In Annex 1 we have enclosed a more detailed information about each of these factors:

Table 2 summarises the 12 Factors obtained in our analysis.

[6] These scores are gathered in two Tables, not reproduced here for space reasons. The scale of scores ranges from 1: low fulfilment of presence of the variable of feature under analysis, to 5: high fulfilment or presence of the variable under analysis

[7] The average score for the Quebec sample ranges from a minimum of 2,1 to a maximum overall score of 4.8 for the best positioned firm. In exchange, the Bay Area sample only ranges from 2,6 to 3,6. Some Bay Area firms have not been scored in a few variables, due to lack of data. That is the case of variable Vs(1): Level of internationalisation, Pv: Rate of growth in sales, Pc(5) Profits and financial soundness, Pm(1): International position, and Pm(2): National position. The 7 firms with blanks in these variables are the ones not having started to commercialise their products yet, hence lacking from incomes.

TABLE 2

FACTOR 1: Index of commercial and managerial capacity
FACTOR 2: Index of leadership in international markets
FACTOR 3: Index of R&D intensity
FACTOR 4: Technicality index
FACTOR 5: Index of general entrepreneurial experience
FACTOR 6: Index of competitiveness based on technological leadership
FACTOR 7: Index of youth of entrepreneur at foundation
FACTOR 8: Index of non-technical experience of the entrepreneurial team
FACTOR 9: Index of market heterogeneity
FACTOR 10: Index of market size
FACTOR 11: Index of maturity of the firm
FACTOR 12: Index of intensity of competition in the market

METHODOLOGICAL REMARKS:

The Factorial analysis method serves us to summarise a large amount of variables into a few ones. In this study, the starting 53 variables have been reduced to 12.

In the Factorial analysis, Factors are ranged in a decreasing order. Therefore, Factor 1 is the one with the highest explaining power of the model (21,5% of the explained Variance), followed by Factor 2 (20,5%). Factor 3 with only 9,9% stays far from the first two sectors, and so on[8]. The 12 Factors together explain over 89 % of the total variance of the model.

In summary, by analysing the scores obtained by the firms with regards to these 12 factors we can characterise in detail the pattern of behaviour exhibited by a set of New Technology Based Firms in two different environments: the Canadian region of Quebec and the Bay Area of San Francisco.

[8] See Annex 1, with the statistical results arising from this Factorial analysis

As a major starting hypothesis or assumption for our study we assume a high score in any factor to be considered as a sign of good performance and good future prospects.

We are aware this assumption is subject to criticism as some of these factors do not seem to relate to individual firm performance, such as market heterogeneity (F9), market size (F10), competition in the market (F12), youth of the entrepreneur (F7), non-technical experience (F8) and maturity of the firm (F11). Notwithstanding, these 6 factors are precisely the ones appearing as the least influential [9]. More specifically, in our Factorial analysis, the 6 above referred factors recognised to be poorly related to firm performance, only explain 19,2% of the total variance of the model, as shown in first table in Annex 1. In contrast, the remaining 6 factors (from Factor 1 to Factor 6), the ones holding an undoubted and direct relationship with the firms performance, explain 70,1 % of the total variance of the model. From this figures, we can assume as a major starting hypothesis to be maintained through the study, a high score on the whole set of factors reveals good performance and good future prospects for the firm under analysis.

GROUPS OF FACTORS:

This section of the study is very significant to us, as it provides our original contribution and enables us to rise up several typologies of firms.

Due to the large number of Factors we believe they should be gathered by homogeneous groups. Factors are grouped together after deeply analysing the content and implications attached to each of them. To us, 3 groups clearly emerge from the initial set of 12 factors, both founded on the nature of these factors that inevitable leads to this classification and on the significance revealed by our literature review in search of a sufficient theoretical basis to support selection of these 3 groups:

. First group: Market performance

. Second group: Technological performance

. Third group: Entrepreneurial profile

[9] Here, it should be reminded the actual significance of the factors decreases from Factor 1 to the last one

First group of factors: market performance, emerges in our study as the most significant one in explaining the overall performance of the high-tech firms.

Selection of these three groups of factors is supported by the results obtained by Blais and Toulouse (1992), in which this study is somewhat inspired.

The study by Blais and Toulouse (1992) based on 21 technology intensive SMEs leads them to open up what they call the three strategic basis on with the strategy in technologically based SMEs is founded. These three axis are: technology, environment and entrepreneurial team [10]. Two of these three basic dimensions correspond to groups of factors in our study.

They also introduce three basic strategies mostly followed by SMEs specialising in high-tech fields. The commercialisation strategy is associated to the well-known market pull approach, by allocating to the market and the commercialisation skills the largest value for a satisfying firm´s performance. Both authors recognise the importance attached to the market related factors in the overall performance of many technologically-based firms.

On the other hand, the high-tech firms are not an exception within the entrepreneurial world, and therefore, some of the most outstanding keys for competitiveness and performance in conventional and traditional sectors also work for the category of firms specialising in high technologies. One of these key factors worldwide admitted of being of primary importance is the performance and position held in the marketplace. This reasoning has guided us to our first group of factors, the ones referred to the market performance. However, although the market orientation is openly believed as the main driving force in any firm, the high-tech firms find it hard to recognise the need to pay due attention to the market needs, mostly due to prevalence of a technology-driven approach. Some studies rise up the dangers associated to a neglect towards the market orientation in high-tech firms, such as failure in new products, a decrease in their competitive advantages or lower capacity to fulfil market opportunities [11].

In our review to the most recent analysis on the high-tech market field attention has been basically paid to the commercial strategies prevailing in high-technology firms, as well as to the marketing strategies usually developed by technical managers and engineers running high-tech firms. All these studies remark the key nature associated to the market related issues, which should never be neglected, regardless the sector of activity and the technological intensity of the firms.

[10] See BLAIS and TOULOUSE (1992: 345)

[11] These explanations are stated in the studies by CAHILL, THACH and WARSHAWSKY (1994) and ROBERTS (1990)

Both market and technology are granted a key role in the recent study by COHAN (1997), which contains a deep review to the keys for success in 20 top high-tech companies specialising exactly in the same fields than the companies taking part in our study: biotechnology, computer software and environmental services.

Technological potential is directly linked to product performance and overall firm´s performance not only in high-tech firms but in most companies nowadays. The study by IANSITI (1997) develops a methodology to analyse a product´s characteristics and the overall firm´s performance in terms of its "technological potential". According to this author, technological potential is associated with access to specialized research, experimentation capacity and the influence of the project leader, in tune with what we understand by technological performance in our study.

In a recent study, HAMILTON (1997) also remarks the key character associated to the technology related assets in explaining the growth and success in any kind of firm, specially in the most technology intensive [12].

Finally, we could also mention the study by HOWELLS (1997) in which the discussion over the market pull and technology push approaches introduced by MOWERY and ROSENBERG (1979) are revisited. Market demand, need, use and intended use, are concepts deeply analysed in his study as well as their connection to the firm´s performance, and the implications to performance by the technology push approach.

Our third group of factors has been also highlighted as a key dimension for performance in several studies. We could start by mentioning the book by CHELL, HAWORTH and BREARLEY (1991) in which the entrepreneurial personality is thoroughly analysed. More focused on the entrepreneurial team are the studies by O´GORMAN (1997) which reports on behaviours of entrepreneurs in the Irish software industry, and the one by GANNON (1997), targeting the importance for the firm´s prospects attached to the personal networks built up by the entrepreneurial team. Also remarkable is the study by MARCH and YAGÜE (1997), focused on the innovative entrepreneur.

On their hand, studies like the one by COOPER and GIMENO (1992) and that from CHANDLER and JANSEN (1992), draw a direct linkage between the high-tech firm performance and the process of founding of the new venture and the entrepreneurs personal traits.

[12] In this line we can also mention the study by DODGSON (1991)

In addition to the evidence coming from the study by Blais and Toulouse and the other studies just referred, the nature of the 12 factors on themselves leads us almost inevitably to grouping them in the above referred way.

After this section intended to theoretically support selection of the three groups of factors above mentioned, we now outline the factors taking part in each group.

Group 1) Market performance:

As far as the factors associated to this first group is concerned, these are the ones we judge to be closely related to market performance [13]:

Factor 1: Commercial and managerial performance
Factor 2: Leadership in international markets
Factor 9: Market heterogeneity
Factor 10: Market size
Factor 12: Competition in the market.

These 5 factors explain 50,5% of the whole variance of the model [14], being by far the most significant set of factors.

Group 2) Technological performance:

Position in this second group of factors shows the firm´s performance and prospects in technological and R&D issues. Factors included within this second group are as follows:

Factor 3: R&D intensity
Factor 4: Technicality index
Factor 6: Competitiveness based on technological leadership

These three factors explain 22,3% of the whole model, less than half of the percentage explained by first group of factors.

[13] Factors have been gathered into the three groups following our own criteria, having in mind the nature and implicacions of the three groups. We are aware other analysts might have arranged the groups of factors in a different way.
[14] Take into account this is 50,5% of 89,3%, which is the total percentage explained by the 12 factors obtained in the Factorial analysis

Group 3) Entrepreneurial profile:

Finally, third group gathers the 4 factors related to the entrepreneurial team founding the new ventures under study:

Factor 5: General entrepreneurial experience
Factor 7: Youth of the entrepreneur at foundation of the firm
Factor 8: Non-Technical experience of the entrepreneurial team
Factor 11: Maturity of the firm

These 4 factors explain 16,5% of the whole variance of the model.

This is the group of factors whose behaviour seems less associated to firm performances, as it contains 3 factors earlier considered as poorly related to performance: factor 7, 8 and 11. In any case, and having this limitation in mind, we still deem useful to take this third group into account.

4. EMPIRICAL CONCLUSIONS

4.1. THE MARKET / TECHNOLOGICAL / ENTREPRENEURIAL MATRIX [15]

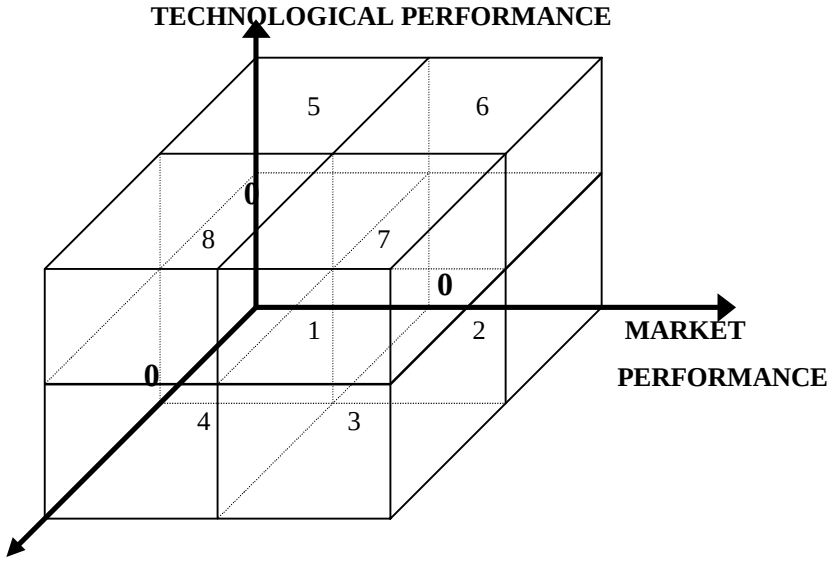
In this final and key section of the study we will furnish a three dimensional Matrix in which the 30 firms under study and any other in high-tech fields could be positioned with regards to the three groups of factors. This Matrix represents a methodological approach to approximately test out the overall expected performance in highly innovative new ventures.

By making use of our major starting hypothesis before introduced, we believe the M-T-E Matrix may serve as an operational tool to classify new ventures into different typologies and to show up their strengths and weaknesses in three basic dimensions: market, technological and entrepreneurial potential.

This Matrix summarises our empirically based attempt to advance theory and help practitioners. A strength is represented by a positive score in one of the 3 groups of factors, whereas the negative scores are categorised as weaknesses.

[15] From now on we call it the M-T-E Matrix

M-T-E MATRIX



The 3 axis of the M-T-E Matrix give rise to 8 three-dimensional areas or cubes, by dividing each one into negative (scores under 0 in the respective group of factors) and positive scores (scores above 0 in the respective group of factors).

Now, we will explain the meaning attached to each of these 8 quadrants or cubes, one by one.

Leadership is represented by positive scores in any axis. So, positive scores in the technological axis reveal a leadership position in the technological field, and similarly in the other two axis. Negative scores indicate a challenging or non-leader position in the respective axis.

- Cube 1: Total challengers

This cube exemplifies the worst possible situation in the M-T-E Matrix:

. Scores under 0 in managerial market performance
. Scores under 0 in technological performance

. Scores under 0 in entrepreneurial performance

High-tech new ventures falling into this cube display a challenger situation in all the senses. Uncertain prospects surround these firms as no leadership has been attained in any of the three M-T-E axis, included the most essential one, the market leadership.

- Cube 2: Technological-entrepreneurial challengers

. Positive scores in managerial market performance

. Negative scores in technological and entrepreneurial performance

Firms positioned in this second cube show up a leadership position in the market axis, whereas they behave as challengers in the other two dimensions.

A remarkable market strength has been raised despite a technological and entrepreneurial position due to improve. Ability to rapidly fulfil a market opportunity in the right moment following a niche-based strategy is probably the most reasonable explanation for the market success attained by these firms.

- Cube 3: Technological challengers:

. Positive scores in both market and entrepreneurial performance

. Negative scores in technological performance

Only the technological performance stays sub-optimal in this cube under l. Further efforts in the R&D, engineering and overall technological capabilities should enable firms placed in this cube to jump to a total leadership situation.

- Cube 4: Technological-market challengers:

This cube is the second worst, just after cube 1.

. Negative scores in both basic axis, technological and market performance

. Positive scores only in the third and least significant axis, the entrepreneurial performance

A balanced and experienced entrepreneurial team is not enough to guide firms within this cube to leadership positions in market and technology.

- Cube 5: Market-entrepreneurial challengers:

The only distinction between this cube and cube 1 is the leadership reached in the technological dimension.

. Positive scores in technological performance
. Negative scores in market and entrepreneurial performance

This area is expected to host firms exhibiting a distinct technology push approach, in which R&D and technological issues clearly prevail over market and managerial capabilities. A recurrent feature in these firms is the strong dominance exerted by technically-driven individuals over the managerial ones, or even the total lack of managerially-skilled personnel.

- Cube 6: Entrepreneurial challengers:

This is a quasi-optimal situation as firms placed on this cube only lack leadership in the least relevant dimension, the entrepreneurial performance.

. Positive scores in market and technological performance
. Negative scores in entrepreneurial performance

A total leadership position can be easily attained by recruiting personnel with managerial experience able to complement the abilities held by the founders, whose initial skills are no longer sufficient to properly run a top-market and top-technology new venture.

- Cube 7: Total leaders:

This is the optimal situation for any high-tech new venture, as it represents leadership in the three dimensions that explain the overall performance and prospects of this category of firms.

. Positive scores in the three axis

First-class in technology, market and entrepreneurial capacity is not easy to gather in one firm to the extent very few firms will fall into this optimal cube. In our empirical study, only 5 from the 30 surveyed firms.

Cube 7 symbolises in principle the final target for any high-tech new venture with leadership expectations.

- Cube 8: Market challengers:

In this last cube only the market leadership is out of reach.

. Positive scores in technological and entrepreneurial performance
. Negative scores in market performance

Probably, an insufficient attention to the market and user needs lies behind this sub-optimal position, despite leadership in the other two dimensions.

As a conclusion in this section, we recognise the three issues shaping the M-T-E Matrix seem rather straightforward and not very original. Either the market capacity and the technological excellence as the entrepreneurial experience are expected to take part in any attempt to classify high-tech firms prospects. In spite of this, we judge useful this Matrix in the sense each axis is not equally significant to the other ones. Hence, the market capacity holds the highest weight in the Matrix, as much as half of it, followed by the technological excellence and finally, the entrepreneurial experience. In order to properly represent this bias towards the market capacity, the M-T-E matrix should be drawn in an irregular form, allocating more space to the market axis, giving rise to an extremely complex graphic out of reach with our actual drawing skills. In any case, in the analysis of the 8 cubes of the matrix, we should bear in mind falling into cubes 2,3,6 and 7 represents, on the whole, a positive firm´s position as the market leadership is ensured.

The extent to which this matrix and the process of classifying firms into it represents a contribution, arises from the fact any firm fulfilling the requirement of being a relatively recent high-tech or highly innovative venture, could position itself in the Matrix. Depending on the cube it falls, the firm will need to improve in one, two, three or none of the 3 axis defining the M-T-E Matrix . Therefore, the M-T-E Matrix could work as a tool to confirm challenges and

strengths, as well as a first approach to the firm internal situation that might help managers in their process of strategy formulation.

All these applications of the M-T-E Matrix result from the method for predicting the high-tech new venture prospects we introduce in the next section as the main outcome of our study.

4.2. A METHOD FOR PREDICTING THE HIGH-TECH NEW VENTURE PROSPECTS

In this second part of the empirical conclusions we will explain the method employed for incorporating predictive capacity to the M-T-E Matrix.

Using the M-T-E Matrix for predictive purposes is probably the most practical application of this study, as it will let us position any other new venture specialising in high-tech or innovative fields in its corresponding cube, by only scoring a few of the original 53 variables.

The statistical method we have employed to incorporate predictive capacity to the M-T-E Matrix is known as the DISCRIMINATE ANALYSIS.
This is a multivariate statistical technique perfectly applicable to this study as it intends to classify several individuals in groups, by analysing the scores obtained by those individuals in a set of variables.

This is in short our final purpose, to be able to duly position new firms in its corresponding group of individuals, represented by each cube of the M-T-E Matrix.

Falling under one or another group, ultimately depends on the value attained by the categorical variable introduced in the analysis, that may take as many distinct values as different groups (eight in this case).

In this study, the categorical or fictitious variable originates from the information disclosed by the Factorial Analysis implemented in the first stages of the study.
It seems helpful to recall the Factorial analysis has enabled us to reduce the initial 53 variables into 12 Factors explaining 89 % of the total variance of the model.

Next, we have gathered these 12 Factors into 3 homogeneous groups giving rise to the market group of factors, the technological group of factors and the entrepreneurial set of factors.

The 8 cubes of the M-T-E Matrix represent all the possible combinations of signs for the three groups of factors, as displayed in Table 5.

TABLE 5

CUBE	SIGNS[16]
CUBE 1	- - -
CUBE 2	+ - -
CUBE 3	+ - +
CUBE 4	- - +
CUBE 5	- + -
CUBE 6	+ + -
CUBE 7	+ + +
CUBE 8	- + +

Table 5 is the basis for obtaining the fictitious variable.

The type of Discriminate Analysis we have followed is the one known as Multiple, the only applicable when there are more than 2 classifying groups. The 8 Fisher´s linear discriminate functions that will let us classify new firms are contained in Annex 2[17]. Only 22 of the original 53 variables appear in the Fisher functions.

As a way of example, we reproduce here the first Fisher function:

F1 = -656,55 EF1 - 21,88 EF2 + 514,29 EI1 + 585,80 EI2 - 100,77 EI3 + 117,96 EX1+ 413,37 EX2 - 331,90 EX3 - 1605,24 PC1 + 739,05 PC2 + 1971,00 PC3 + 341,48 PC4 + 615,15 SA1 + 144,41 SA2 + 888,35 SA3 + 400,62 SA4 - 2,91 SA5 - 204,36 SA6- 447,15 SP1 + 710,38 SP2 + 302,82 ST1 - 19,10 ST3 - 8384,91

Annex 2 also provides a table from which we can ensure the high reliability of the method employed as the number of cases correctly classified in the original sample of 33 firms is 100 %.

[16] The order of signs is as follows: 1: Market group of factors, 2: technological group of factors, 3: entrepreneurial group of factors. As an example, the + + - combination means positive scores in the two first groups of factors and negative scores in the entrepreneurial set of factors.

[17] The variables that appear in the formulae for each function are some of the 53 original ones

The predictive power of the model and its main usefulness lies in the fact a new firm can be easily classified in each of the 8 cubes of the M-T-E Matrix by only scoring the 22 variables [18] risen up in the Fisher functions and applying the formulae gathered in Annex 2.

These 22 variables can be named *"Discriminate variables"* as the scores attained by any firm on them are the only needed to determine its final position on the M-T-E Matrix.

In order to situate any new firm into the corresponding cube, the model works as follows: We start by assigning scores for the 22 variables present in the Fisher functions (see Annex 2). Next step consists of solving the 8 Fisher functions representing each of the cubes of the M-T-E Matrix, obtaining one score for each of them. Finally, we will select the function on which the firm obtains the highest positive score. Consequently, the firm under analysis will be placed on the cube corresponding to the Fisher function reaching the highest score.

We have successfully proved reliability of this predictive model as our expected result based on the knowledge of the firms has been entirely consistent with that obtained by applying this technique. However, we are aware the statistically based models are not always valid nor applicable, to the extent we can always find cases in which our personal perceptions will lead us to position a firm in one cube of the M-T-E matrix other than the one suggested by our model based on the Discriminate analysis. In our view, the personal criteria should prevail in these cases.

Although hopefully sometimes the personal criteria is enough to classify a firm into the 8 categories displayed by the M-T-E Matrix and there is no need for further analysis, in other situations the original information about firms might be controversial or just incomplete to directly place those firms in one or another cube. In such a cases, this predictive model might become an approximate tool for classifying new ventures by performance and prospects, provided we assume our starting hypothesis introduced earlier.

In any case, we must keep in mind our main original purpose was to obtain a Matrix that could offer a new way to classify high-tech new ventures by performance and prospects of growth and consolidation in their markets. Our attempt to incorporate predictive capacity to the matrix through the Discriminate Analysis technique is only an extension of this basic goal and should be taken as an exercise to be duly tested with larger samples.

[18] With the Likert scale ranging from 1: low fulfilment to 5: high, total fulfilment

ANNEX 1:

Final Statistics:

Factor	Eigenvalue	Pct of Var	Cum Pct
1	11,19884	21,5	21,5
2	10,68025	20,5	42,1
3	5,12842	9,9	51,9
4	3,81173	7,3	59,3
5	3,00031	5,8	65,0
6	2,63830	5,1	70,1
7	2,32838	4,5	74,6
8	1,94461	3,7	78,3
9	1,90179	3,7	82,0
10	1,45660	2,8	84,8
11	1,30252	2,5	87,3
12	1,03858	2,0	89,3

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
EF1	,17118	,11255	-,02621	-,02107	-,10775
EF2	,31959	,70349	-,08891	,23399	-,10726
EI1	-,01770	,10009	-,32300	-,32392	,03611
EI2	-,26974	,09536	,16241	,12690	,18072
EI3	-,00510	,50135	-,05481	,55030	,34106
EX1	,24262	,14444	,10694	,24228	,11594
EX2	,03992	,30168	,73383	-,04452	-,09685
EX3	,44160	-,09870	-,01966	-,36353	-,05254
PC1	,21955	,61601	,36599	,40832	,12872
PC2	,90876	,06560	-,06120	,02590	-,05534
PC3	,43368	,51740	,02182	-,16122	-,09414
PC4	,76502	,16878	-,06882	-,17939	-,01030
PC5	,79214	,22300	,04288	,00176	-,04426
PM1	,11599	,81973	,07570	,16438	,20912
PM2	,28131	,77311	,14774	-,12125	,34386
SA1	,10943	,85347	,35174	,01622	,10210
SA2	-,18796	-,04500	-,14899	,12710	,38586
SA3	,71877	,21612	-,25123	,30479	-,25478
SA4	,02532	,20137	-,38498	,04545	-,15364
SA5	,57630	,10541	-,51466	-,26899	-,19502
SA6	,46523	-,52482	-,26224	,11502	-,26196
SP1	,64752	,42105	-,01376	-,05137	-,01935
SP2	,11109	,36829	,53734	,10948	,12930
ST1	-,18668	,32712	-,15040	,00027	,82610
ST2	-,14527	,23704	,36066	,38731	,56298
ST3	,62903	-,28536	-,52717	,03323	-,09674
ST4	,19342	,12327	-,27985	-,05327	,07796
ST5	-,10717	-,00370	-,05097	,23243	-,06187
ST6	-,21915	,22048	,64351	,29526	,31594
VC1	-,14543	,48548	,11851	-,10570	,57125
VC2	,10477	-,76397	,11814	-,37376	,08107
VC3	-,13177	-,68293	-,07068	,15877	-,26719
VM1	,53370	,07400	-,04268	,43934	,18800
VM2	,45046	,11775	,27339	-,28836	,15257
VM3	,18258	-,28764	,21423	,38889	,00566
VS1	,40662	,78186	,22458	,00436	-,04481
VS2	,11062	,52321	,16839	-,10400	,27792
VS3	,22714	,22532	,56236	,51404	,32061
VS4	,02967	-,06144	,15026	,01846	-,01223
VS5	,05389	,02845	,14022	,17880	,88199

ZC1	-,12991	,10642	,30190	,77434	,12268
ZC2	-,26373	,19509	,84119	,18734	-,00939
ZC3	-,13404	,04561	,92887	,02738	,05119
ZI1	,10648	-,01522	-,04617	,77631	,16747
ZI2	,14845	-,08015	-,26361	-,25420	-,09959
ZI3	,45650	,10256	-,39971	-,07966	-,43123
ZI4	,66531	,33755	,02674	-,24974	,24935
ZO1	-,71316	-,16477	,41912	,12211	,10984
ZO2	-,76656	,06657	,37639	,09636	,13060
ZP1	,30312	,01534	-,27170	-,70387	,07515
ZR1	,67124	-,00057	,15290	,07041	,13203
ZR2	,70450	,22022	,37257	,16771	,02716

	Factor 6	**Factor 7**	**Factor 8**	**Factor 9**	**Factor 10**
EF1	,03175	,80690	,37014	,06425	-,09258
EF2	-,20468	,14784	,26764	,07812	-,11004
EI1	,28567	-,11598	-,40553	-,30842	,07793
EI2	,84379	,08291	-,10214	,09756	,11417
EI3	,24844	,42173	,07401	,03368	,06867
EX1	-,05515	,16691	-,01781	,04515	-,13092
EX2	-,28826	-,14518	-,02913	-,15056	,12743
EX3	,08352	-,25866	-,07086	,16030	,15916
PC1	,02526	,19010	,27289	,13111	,01861
PC2	-,09079	,03712	,25363	-,12006	-,06278
PC3	-,37995	,34667	-,13201	,28187	,15329
PC4	-,07843	,37425	,13208	,04207	-,00856
PC5	-,05479	,26477	,06465	,17188	-,27917
PM1	,11005	,01439	,14637	,20798	-,34782
PM2	-,15304	,07716	-,16667	-,06855	-,19656
SA1	,10531	,08226	,13193	,12651	,02168
SA2	-,73324	-,05197	-,11885	,16323	-,06414
SA3	-,10184	-,06378	,17422	,19189	,12912
SA4	-,49959	-,11546	,17745	,24122	,31050
SA5	-,11860	,06493	,39982	-,09166	,00045
SA6	-,11609	,16628	,17206	-,03676	-,25085
SP1	,15418	-,02228	,05725	,05633	,06727
SP2	,37757	,13974	,08658	-,44840	-,06073
ST1	-,01804	-,01682	,19333	-,00276	-,07320
ST2	-,10668	-,16102	-,07151	-,01547	,00826
ST3	-,10058	,10024	,24718	,30542	,02694
ST4	-,01383	,32172	,79249	-,07975	-,01513
ST5	-,03576	,06632	-,03716	,88935	-,09051
ST6	,27363	-,02624	,11638	-,12840	,11369
VC1	,24390	-,06656	-,37417	-,02771	,03235
VC2	-,05806	-,20644	,13154	,29854	-,20435
VC3	-,06407	,19511	,22514	,22290	-,23973
VM1	,08380	,56630	-,06100	-,00975	-,14370
VM2	,12437	,42207	-,07724	-,34109	,43883
VM3	-,58683	,18901	,20423	,14646	,15435
VS1	,06062	,01283	,12597	-,16347	,02299
VS2	,26347	-,03171	-,34523	-,29745	-,30374
VS3	,09499	,20217	-,02937	-,04808	,31433
VS4	,02475	-,09680	-,01312	-,05055	,92924
VS5	,00010	,05007	-,05175	-,08726	,03995
ZC1	,27330	,16089	-,11395	,08212	-,10673
ZC2	,07097	,04832	-,15124	,02509	-,01615
ZC3	,18092	-,01998	-,11721	,03257	,08090
ZI1	-,23015	-,18522	,15294	,32003	,25491
ZI2	-,05309	-,11131	,11925	-,00164	-,04706
ZI3	-,08531	-,07866	-,06552	-,03852	,03102

ZI4	-,07435	-,32389	,00206	,01933	,16389
ZO1	,14275	,06001	,05031	,14167	-,17091
ZO2	,00301	,02184	,04071	,15173	-,14570
ZP1	,25131	,11851	,10689	-,05681	,28846
ZR1	,20528	,17116	-,29243	-,29264	-,09417
ZR2	-,00883	,13237	-,32259	-,24347	,11370

	Factor 11	**Factor 12**
EF1	,07551	,04319
EF2	,03977	,28773
EI1	,42671	-,28206
EI2	,04265	,07997
EI3	,11478	-,07170
EX1	,14977	,84258
EX2	,00273	,09297
EX3	,12885	,62178
PC1	-,02286	,28714
PC2	-,02292	,04516
PC3	-,09122	-,04535
PC4	-,18477	,06031
PC5	-,08885	,00443
PM1	-,04237	-,02136
PM2	,17369	-,12755
SA1	,00556	,03048
SA2	-,18933	,17600
SA3	-,15394	,10838
SA4	,48279	-,10167
SA5	-,06657	-,12295
SA6	-,24463	,09824
SP1	,39340	,09467
SP2	,17716	,32089
ST1	,08250	-,02747
ST2	,14483	,25496
ST3	,13814	-,02219
ST4	-,04310	-,04213
ST5	,05157	,11845
ST6	,24051	,26200
VC1	,04496	,18670
VC2	,04902	,04496
VC3	-,06058	,05518
VM1	,01945	,07960
VM2	,00896	,12165
VM3	,31869	,02825
VS1	-,00786	,11902
VS2	,00987	,07077
VS3	,05157	,12855
VS4	,07214	-,05302
VS5	-,02736	-,01681
ZC1	,12957	,10984
ZC2	,10711	-,04855
ZC3	,03089	-,04417
ZI1	-,04241	,07306
ZI2	-,77424	-,28317
ZI3	-,54893	-,19345
ZI4	-,03147	-,00603
ZO1	-,05535	-,14595
ZO2	-,11068	-,21173
ZP1	-,14374	,06257
ZR1	-,34496	,13765
ZR2	-,12764	-,03598

- FACTOR 1:

This factor is basically explained by the following variables [19]:

. Pc (2): (0.9271): Commercial innovation capacity

. Pc (4): (0.8123): Managerial capacity.

. Sa (3): (0.783): Interrelation R&D-marketing.

. Sa (5): (0.7649): Level of valorisation of marketing.

. Zo (1): (-0.7874)[20]: Level of formality.

. Zo (2): (-0.66): Level of centrality in the decision process (low)

As a result of these correlations we agree to call this factor:

Index of commercial and managerial performance.

- FACTOR 2:

This factor presents a direct correlation, either positive or negative with the following variables:

. Sa (1): (0.7674): Targeted market.(Strategic actions).

. Vc (2): (-0.80): Number of international competitors (few).

. Vc (3): (-0.80): Number of national competitors (few).

The nature of the variables involved in the explanation of this factor lead us to name Factor 2 as: ***Index of leadership in international markets.***

- FACTOR 3:

This factor is directly correlated to:

. Sp (2): (0.7056): Decisional horizon (strategic process).

. Zc (2) (0.8097): % of personal devoted to R&D

. Zc (3): (0.8186): % of resources to R&D.

Taking into account the blend of variables shaping this factor, we call Factor 3: ***Index of R&D intensity.***

- FACTOR 4:

Direct correlation has been found with:

. Ei (3): (0.7839): Educational specialisation. (Identity).

. Vm(1): (0.8017): Rate of growth(markets: environment).

. Vs(3): (0.6198): Technological effervescence. (Industrial system).

. Zc (1): (0.6704): Index/Rate of technical personal

Consequently, we call this factor as: ***Technicality index***

- FACTOR 5:

This factor shows a weak correlation with all the variables. Notwithstanding, the ones more correlated with it are:

. Ex (1): (0.7892): Experience as entrepreneur.

. Ex (3): (0.6422): Managerial experience.

. St (2): (0.5529): Innovative attitude.

After analysing the composition of variables to some extent correlated to this factor, we agree to name Factor 5: ***Index of general entrepreneurial experience.***

- FACTOR 6:

Only two variables are clearly correlated to this factor, although negatively:

. Sa (2): (0.6533): Competitive advantage (strategic actions).

. St (1): (0.7877): Competitive position.

We agree to call this factor: ***Index of competitiveness based on technological leadership.***

[19] In brackets the score of the factorial analysis for each variable. A positive value indicates direct correlation between factor and variable. A negative value indicates a contrary correlation.

[20] Negative scores mean the variable affects the Factor in a inverse way, representing a low or few presence of such variable in front of a high presence of those variables with positive scores

- FACTOR 7:

This factor is poorly correlated to the variables of the study. We can only mention:

. Ei (1): (-0.86): Age at the foundation of the firm (youth).

We call this factor: ***Index of youth of entrepreneur at foundation.***

- FACTOR 8:

This is a factor shortly correlated to the original variables. The most outstanding relations take place with :

. Ef (1): (0.5381): Existence of an entrepreneurial team.

. Ex (2): (-0.51): Technical and research experience (low).

We agree to name this factor as: ***Index of non-technical experience of the entrepreneurial team.***

- FACTOR 9:

. Sa (4): (0.55): Level of focus on the R&D

. Vm (3): (0.84): Heterogeneity. (Environment markets).

. Vs (2): (-0.5815): Level of concentration. (Industrial system) (low).

This factor is logically called: ***Index of market heterogeneity.***

- FACTOR 10:

Only a slight correlation has been found between this factor and the most related variables:

. Vm (2) (0.8095): Relative size (environment:market).

. Zp (1) (0.6308): Variety of products

This factor has been called: ***Index of market size.***

- FACTOR 11:

Variables correlated to some extent with this factor are:

. Sa(4): (-0.5614): Level of focus on the R&D (loose R&D focus).

. Zi (2): (0.8069): Maturity of the firm (Enterprise identity).

. Zi (3): (0.5139): Stage of evolution (Enterprise identity).

. Zr (1): (0.6207): Capital resources (Enterprise resources).

This factor has been called ***Index of maturity of the firm.***

- FACTOR 12:

. Vs (4): (0.9111): Intensity of competition (Industrial system).

This factor has been called ***Index of intensity of competition in the market.***

ANNEX 2:

Classification function coefficients

(Fisher's linear discriminant functions)

FICTICIA=	1	2	3	4
EF1	-656,5561780	-658,6634296	-708,3984066	-446,6505185
EF2	-21,8885362	20,5042698	12,7201496	-42,4568598
EI1	514,2918702	513,4004561	573,5199941	373,2382016
EI2	585,8025238	574,4282999	573,1390196	419,0129037
EI3	-100,7743931	-118,4601792	-92,9188597	-66,0524670
EX1	117,9636537	74,9579319	77,0980961	98,0816631
EX2	413,3761834	407,9834041	483,3803112	301,0701835
EX3	-331,9071390	-340,6372446	-356,0552715	-216,9878230
PC1	-1605,2424459	-1597,3395178	-1820,2255187	-1089,0774532
PC2	739,0549039	797,1108651	733,5504544	446,2077737
PC3	1971,0072112	1977,7262334	2153,0549675	1338,5653092
PC4	341,4819053	362,0302542	426,3332673	228,5955798
SA1	615,1566541	619,5154625	656,2435795	407,5708715
SA2	144,4133837	138,3907986	177,4599712	100,4747376
SA3	888,3547878	885,8338852	1011,3346538	641,7577511
SA4	400,6237349	380,3938671	432,2554708	292,6150267
SA5	-2,9127577	-75,7346932	3,2313567	38,9705927
SA6	-204,3699138	-260,2334752	-306,7154896	-87,0442330
SP1	-447,1525984	-434,4564482	-460,6696871	-321,8641568
SP2	710,3877842	675,8371504	752,7560416	517,5126536
ST1	302,8228505	276,3162315	281,4215016	238,1234691
ST3	-19,1099394	-,1909652	-21,7121522	-27,2292157
(Constant)	-8384,9125850	-8053,9770351	-9515,6606941	-4416,0522645

FICTICIA=	5	6	7	8
EF1	-444,7535158	-424,6947791	-527,3413181	-525,9834598
EF2	-24,5568213	-39,2446382	8,2089765	-34,7397063
EI1	355,8250937	339,1127881	427,6745523	411,7149156
EI2	418,8998389	419,8094087	452,8106175	491,1331103
EI3	-66,5716129	-67,8621484	-80,4410711	-71,5030203
EX1	87,8469030	102,7121218	59,3237314	113,9162965
EX2	289,1375023	266,1036223	351,3315425	336,2247251
EX3	-220,7527045	-210,5467109	-265,9082819	-259,9094161
PC1	-1084,0564066	-1004,5779712	-1317,8646726	-1279,5208269
PC2	483,5678945	472,9927447	576,5189620	572,9617674
PC3	1329,7861422	1260,1386746	1596,8472383	1561,5589713
PC4	229,0292930	201,6819320	303,6873214	265,1594305
SA1	414,6147883	396,8292336	490,6440376	487,8901921
SA2	104,6226837	94,7223681	127,8872288	118,1008159
SA3	606,2819831	567,1822581	739,9710082	706,3179699
SA4	280,1743323	270,8172037	319,4428116	334,0710651
SA5	19,3905212	23,7528952	-10,7803264	24,5805175
SA6	-111,1845645	-71,9474482	-202,9298614	-126,5391111
SP1	-306,1444317	-302,7974467	-350,0361226	-362,2100233
SP2	494,8254820	484,1229017	563,0759442	583,4651681
ST1	218,0837991	227,9918010	222,9757364	257,1264373
ST3	-19,6926330	-19,8974856	-14,7297074	-26,3935225
(Constant)	-4138,6161898	-4001,4283082	-5399,6602189	-5667,1686707

Classification results -

		No. of	Predicted Group Membership			
Actual Group		Cases	1	2	3	4
Group	1	5	5	0	0	0
			100,0%	,0%	,0%	,0%
Group	2	3	0	3	0	0
			,0%	100,0%	,0%	,0%
Group	3	5	0	0	5	0
			,0%	,0%	100,0%	,0%
Group	4	2	0	0	0	2
			,0%	,0%	,0%	100,0%
Group	5	6	0	0	0	0
			,0%	,0%	,0%	,0%
Group	6	2	0	0	0	0
			,0%	,0%	,0%	,0%
Group	7	1	0	0	0	0
			,0%	,0%	,0%	,0%
Group	8	6	0	0	0	0
			,0%	,0%	,0%	,0%

No. of	Predicted Group Membership			
Actual Group	Cases	5	6	7	8
Group 1	5	0	0	0	0
		,0%	,0%	,0%	,0%
Group 2	3	0	0	0	0
		,0%	,0%	,0%	,0%
Group 3	5	0	0	0	0
		,0%	,0%	,0%	,0%
Group 4	2	0	0	0	0
		,0%	,0%	,0%	,0%
Group 5	6	6	0	0	0
		100,0%	,0%	,0%	,0%
Group 6	2	0	2	0	0
		,0%	100,0%	,0%	,0%
Group 7	1	0	0	1	0
		,0%	,0%	100,0%	,0%
Group 8	6	0	0	0	6
		,0%	,0%	,0%	100,0%

Percent of "grouped" cases correctly classified: 100,00%

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