

XX IASP WORLD CONFERENCE ON SCIENCE AND TECHNOLOGY PARKS

June 1-4, 2003 - Lisbon, Portugal

**STRATEGIC ANALYSIS OF INNOVATION IN THE INFORMATICS ORGANIZATIONS**

**DUARTE ROCHA <sup>(a)</sup> ANA AMADO <sup>(a)</sup> MANUELA SARMENTO <sup>(b)</sup>**

<sup>(a)</sup> - Centre of Management Studies at Portuguese Management Association  
Rua Rodrigo da Fonseca, 182 – 2º Esq. 1070-243 Lisbon, Portugal  
Tel.: +351-965 489 825 Fax: +351-219 550 454  
[duarteprocha@hotmail.com](mailto:duarteprocha@hotmail.com), [amala@netcabo.pt](mailto:amala@netcabo.pt)

<sup>(b)</sup> - Centre of Management Studies at Technical University of Lisbon  
Av. Rovisco Pais, 1 1049-001 Lisbon, Portugal  
Tel.: +351-933 673 376 Fax: +351-213 020 160  
[msc@clix.pt](mailto:msc@clix.pt)

**ABSTRACT**

The European Union has been encouraging the companies to belong to the digital era through coordinate network activities that aim at interchanging about knowledge and best practices, in order to face globalization. Thus, the state-members had created “centres of reference” (networks built with the objective to supply information and support in different communitarian domains) in order to assist companies in the introduction and adoption of technological innovation strategies, mainly based in the Internet.

In this context, it becomes imperative to know the informatics sector’s state of art, as far as technological strategies incorporation is concerned. This investigation was based on a fieldwork that consisted in an inquiry and its statistical analysis. It evidenced the existence of six distinct companies groups, characterized by different strategies, as far as TIC's incorporation in the company is concerned. It also concluded that Portugal have been following the trend of international markets, associating the strategies based on the Internet, mainly to the marketing areas.

## **1. INTRODUCTION**

The economy globalization demands that organizations look to new technologies as a way of development and expansion of their activities, independently of their size and profits generated (Hutt and Speh, 2002).

The increasing of direct, indirect and related competitors, as well as, the more demanded customer's requirements and the use of information and communication technologies (TIC's), as a support to the enterprise management, are stimulating companies to internationalization (Woodruff and Gardial, 1996). In order to access to new markets or to defend the actual market segments, the organizations take advantage of technological innovations to develop new products and services, and to adapt their strategies to the information society (Ron and Connellan, 2000)

Innovation is a critical success factor in the development of any organization that allows the differentiation between the competitors and guarantees a sustained development (Zink and Shmid, 1999). In this context, it is useful to analyze how organizations are promoting innovative policies and taking into account the TIC's in their strategies, in order to realize in what way organizations are favorable fields to the innovation, or either, function as embryos of innovation.

## **2. OBJECTIVES AND METHODOLOGY**

The informatics sector is the most sensible to the technological advances and to its implementation. Since this sector is pioneer in the knowledge, it is expectable that e-business and the use of TIC's, present a great impact in this sector.

The need to deeply know the impact of e-business, the TIC's rate utilization, the characterization of the adopted strategies and the webization degree of the informatics sector, represent the object of this investigation, considering two main objectives:

- Identification of the main strategic factors that lead the technological innovations in the informatics sector (innovations based on the technologies with support in the Internet);
- Identification and characterization of companies groups with similar Internet based strategies.

To reach the investigation objectives, we made a national inquiry, which was validated and pre-tested. This inquiry was sent to all the informatics organizations presented on a database constructed in the scope of this investigation, which comprehends 960 companies. In order to maximize the number of answers, the inquiry was also provided in an Internet site.

A database was built with the answers to the inquiry. The statistical methods, namely multivariate and bivariate were applied using the SPSS 11.0 (Statistical Package Social Sciences). The sample has a size of 146 companies, implying that for the universe, the results are valid with a confidence level  $\lambda=95\%$ , and a precision level  $D=5,3\%$ .

## **3. INVESTIGATION RESULTS**

This investigation allowed us to obtain conclusions about the main strategic factors that lead technological innovations in informatics sector, and through the clusters analysis, the companies groups with similar Internet based strategies.

### 3.1. Strategic Factors Determination

Based on the main components factorial analysis applied to the inquiry results, we have obtained the main strategic factors that are on the basis of the technological innovations incorporation with support in the Internet.

The following table presents the strategic factors, its designation (that was attributed in order to summarize the strategies orientation followed by the informatics companies) and the interpretation of each factor got in function of the interconnection of the strategic variables that compound it.

Strategic Factor	Factor Designation	Strategic Variables	Factor Interpretation
Factor 1	The Internet as a way of increasing revenues and reducing costs	<ul style="list-style-type: none"> <li>- Internet increases popularity and company image</li> <li>- Internet contributes for the company development</li> <li>- Internet increases sales volume</li> <li>- Internet allows a more efficient and complete customer service</li> <li>- Internet provides a wide market independently of company size</li> <li>- Internet reduces the cost to access to the global market</li> <li>- Internet improves the communication with suppliers</li> </ul>	<p>The companies believe in the Internet contribution for the business expansion, through an increase of the sales volume and notability, a reduction of costs and an easy communication with suppliers.</p> <p>Internet makes available to the companies, independently of their sizes, a wider market and a more complete and efficient set of customer services.</p>
Factor 2	Customer oriented site	<ul style="list-style-type: none"> <li>- ROI for the site implementation is positive</li> <li>- Site success is based on a strategic plan</li> <li>- Site accomplishes the objectives</li> <li>- Internet allows an increase of the customer satisfaction</li> <li>- Internet allows an increase of the customer loyalty</li> </ul>	<p>When elaborate the site strategic plan, companies emphasis the increase of customer satisfaction in order to increment profit.</p>
Factor 3	The Internet as catalyst of the value chain	<ul style="list-style-type: none"> <li>- Internet allows narrowing the relationship with suppliers</li> <li>- Internet allows the conquest of new market segments</li> <li>- Internet allows the conquest of new geographic markets</li> <li>- Internet allows narrowing the relationship with customers</li> <li>- Internet makes possible a deeper knowledge of customers</li> <li>- Internet allows narrowing the relationship with distributors</li> <li>- Internet is modifying the way how companies are doing business</li> </ul>	<p>Internet modifies the way how companies are doing businesses namely, narrowing the relationship with partners (customers, suppliers and distributors) and simplifying the new markets conquest.</p>
Factor 4	Customer relationship management	<ul style="list-style-type: none"> <li>- Company stores data of customers purchase</li> <li>- Company stores the customer profile</li> <li>- Company uses analysis tools on customer data</li> <li>- Company makes personalized publicity campaigns</li> </ul>	<p>Companies elaborate their strategy focused on the customer. Thus, they store and use analysis tools on the customer personalize data, namely, in publicity campaigns (CRM).</p>

<b>Strategic Factor</b>	<b>Factor Designation</b>	<b>Strategic Variables</b>	<b>Factor Interpretation</b>
Factor 5	Online assistance (24x7)	<ul style="list-style-type: none"> <li>- Internet allows a permanent and immediate online support to distributors</li> <li>- Internet allows an immediate online support to suppliers</li> <li>- Internet allows an immediate online support to customers</li> </ul>	Companies recognize the Internet potential to online support customers, suppliers and distributors.
Factor 6	The innovation as an answer to market demands	<ul style="list-style-type: none"> <li>- Company competition has Internet site</li> <li>- Economic conjuncture influenced the decision making of the company site</li> <li>- Company's customers demand an Internet site</li> </ul>	Companies answer to the market demands, giving emphasis to their positioning and taking into account the competitors, answering to their customers' needs.
Factor 7	Online commercialization of goods and services	<ul style="list-style-type: none"> <li>- Company's goods and services are appropriate to be sold through the Internet</li> <li>- Internet allows a reduction of commercial costs</li> <li>- Internet is an easier way of access and penetrate in new markets</li> </ul>	Companies give emphasis to the commercialization of goods and services through Internet that allows the penetration in new markets and the reduction of commercial costs.
Factor 8	Online dissemination of internal and external information	<ul style="list-style-type: none"> <li>- Internet facilitates the deployment of institutional actualized information</li> <li>- Internet originates difficulties in the company internal processes</li> <li>- Internet allows offering new services</li> <li>- Internet allows transmitting an innovative and modern image</li> </ul>	Companies recognize the Internet as a privileged way of dissemination of institutional actualized information and simplification of internal processes, what allows the company to transmit an innovative and modern image.
Factor 9	Products commercialization in e-marketplaces	<ul style="list-style-type: none"> <li>- Products commercialization through an online purchase central (e-marketplace)</li> <li>- Products commercialization through a virtual commercial center</li> </ul>	The companies commercialize their products via Internet, through an online purchase central (e-marketplace) or through a virtual commercial center.

Table 1. Main strategic factors of informatics companies and its interpretation.

The analysis of the strategic factors evidenced by the informatics organizations, allowed us to conclude that it is possible to establish a correspondence between each factor and the business intervening entities (Figure 1).

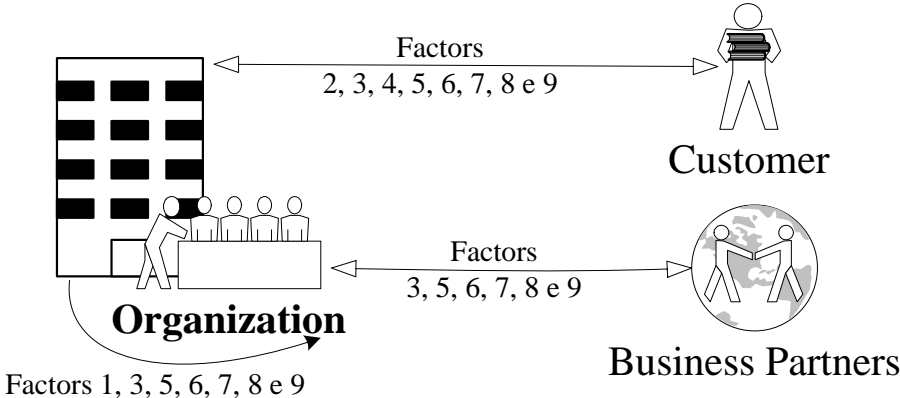


Figure 1. The main strategic factors as an approach to optimize the relationships between the business intervening agents.

The main strategic factors that lead technological innovations with support in the Internet, essentially aim at optimizing the relationship between the business intervening agents: companies, customers and partners, with the inherent advantages to the resources optimization and the increasing of productivity.

**3.2. Characterization of the Strategic Groups of the Informatics Companies**

To aggregate the informatics companies in homogeneous groups characterized by the use of similar Internet strategies, we have applied cluster analysis and afterwards the groups were validated applying oneway analysis of variance. Figure 2 shows the sample percent distribution of the six strategic groups.

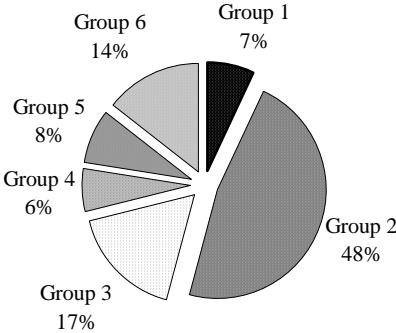


Figure 2. Informatics companies strategic groups.

The strategic orientation lines of each group and its classification are presented below:

**Group 1 - Mediocre level**

This group represents 6.85% of the sample and is essentially constituted by national companies of small size with predominance of distributors. The majority of companies are located in Lisbon and Tagus Valley region, and North.

This group believes in the Internet contribution for the business expansion, through an increase of the sales volume and a reduction of costs. This group also considers, that Internet allows companies to offer a more complete and efficient service. However, it does not evidence implementation projects in order to use the referred potentialities in its business, having disclosed a total absence of strategies.

**Group 2 - Low medium level**

This group represents 47.26% of the sample and is essentially constituted by national companies of small size mainly located in Lisbon and Tagus Valley region.

This companies group is fit in a pursuing strategy relatively to the existing market innovations. The group emphasis its positioning, in order to face the competitors and to answer customer's requirements. However, since the group does not explore all the Internet potentialities as a new commercialization channel, it does not recognize the Internet contribution for its development, for an increasing of business volume, nor for costs reduction. The group still does not have conscience that Internet modifies the way how companies do business, since it does not gave particular importance to the site strategic plan, nor have delineated strategies that would allow an increase of the customer satisfaction. In this sequence, it is not odd to find out that these companies group denote low profitability of the investment.

**Group 3 - High medium level**

This group represents 17.12% of the sample and is essentially constituted by national companies of small size with predominance of retailers. The majority of companies are located in North and in Lisbon and Tagus Valley region.

The group considers that in the geneses of its Internet use strategies was present the idea of an improvement in the quality and quantity of the customers services, in detriment of the competitors accompaniment or the fulfillment of customers requirements. This group of companies has already got an Internet page for a long time, positioning themselves in the market with an advanced vision in comparison to the competitors. This group does not recognize the Internet contribution for the increase of its business volume, nor for the costs reduction, because the only purpose of its Internet strategy is the customer satisfaction. The group also evidences, an improvement of the relation with all the business intervening agents, recognizing potentialities in the Internet support technologies in order to simplify the way of communication with suppliers.

#### **Group 4 - Good level**

This group represents 6.16% of the sample and is mainly constituted by national companies of average size with predominance of distributors. The majority of companies are located in Lisbon and Tagus Valley, and North region.

The group evidences a strong wager in the online products commercialization through an online purchase central (e-marketplace), in order to penetrate in new markets, to reduce the commercialization costs, as well as, to remove eventual inefficiencies in the supply chain. However, the group evidences the not profitability of the investment, which allows us to conclude about the great difficulties that faces e-marketplaces at this moment. The companies recognize the Internet potential, as a way of immediate and permanent online support to their business partners, particularly to customer. In this context, the companies elaborated its strategy focused on customers and in the satisfaction of its expectations, taking particular attention to customer's data analysis in order to provide a better service. This group evidences, that in the geneses of its Internet strategies, was present the intention of increasing the customer's requirements satisfaction.

#### **Group 5 - Very good level**

This group represents 8.23% of the sample and is essentially constituted by micro and small national companies with predominance of manufacturers. The great majority of companies are located in Lisbon and Tagus Valley region.

The group is already using the Internet potential as a new commercialization channel of goods/services. This companies group elaborated a good strategic plan for the Internet site, focused on the customer and in the satisfaction of his needs. In this context, companies store and use, pro-actively, analysis tools on the customer personalize data, namely, in publicity campaigns. The group still evidences, the Internet impact in the business expansion and in the increasing of company profitability, through an increase of business volume and costs reduction, particularly, the commercial costs. The group also recognizes that Internet is a privileged way of dissemination of institutional actualized information and simplification of company internal processes. However, the group does not use the Internet potentialities as a privileged vehicle of communication with all the business intervening agents, since it does not provide permanent online support.

#### **Group 6 - Excellent level**

This group represents 14.83% of the sample and is essentially constituted by micro and small national companies with predominance of distributors and manufacturers. The great majority of companies are located in Lisbon and Tagus Valley region.

The group recognizes the Internet potential as a way of permanent and immediate online support to the business partners and to the customer. In this sequence, practices a management turns into the customer relationship improvement and delineates strategies that allow the storage and the employment of analysis tools on the customer data. This group wishes to transmit an innovative and modern image by offering new services, supplying institutional actualized information and simplifying its internal processes, in order to increase company efficiency. The group evidences the necessity to answer his customer's requirements and to follow the competitor's projects, through an improvement of the company services. In this sequence, the group considers that Internet site will

profit well the investment if the customers recognize that it was implemented to proportionate them a better service.

In order to get a graphic visualization of each group profile, as well as a faster understanding of the maturity degree of TIC's, the strategic factors had been grouped in four main categories: (1) Potentialities recognition; (2) Internet presence; (3) Online Commercialization and (4) Improvement of business partners relationship.

Figure 3 illustrates each group profile in function of the four main enunciated categories. Analyzing the figure we conclude that the groups present different profiles:

Groups 1 and 2 got inferior classifications and show huge potentiality recognition of Internet in detriment of the remaining categories, presenting an immaturity Internet degree, once they have not projects for an effective exploitation of these potentialities.

Groups 3, 4, 5 and 6 show a more Internet mature position, since they implement Internet potentialities, namely through e-business and e-commerce with all partners (customers, suppliers and distributors)

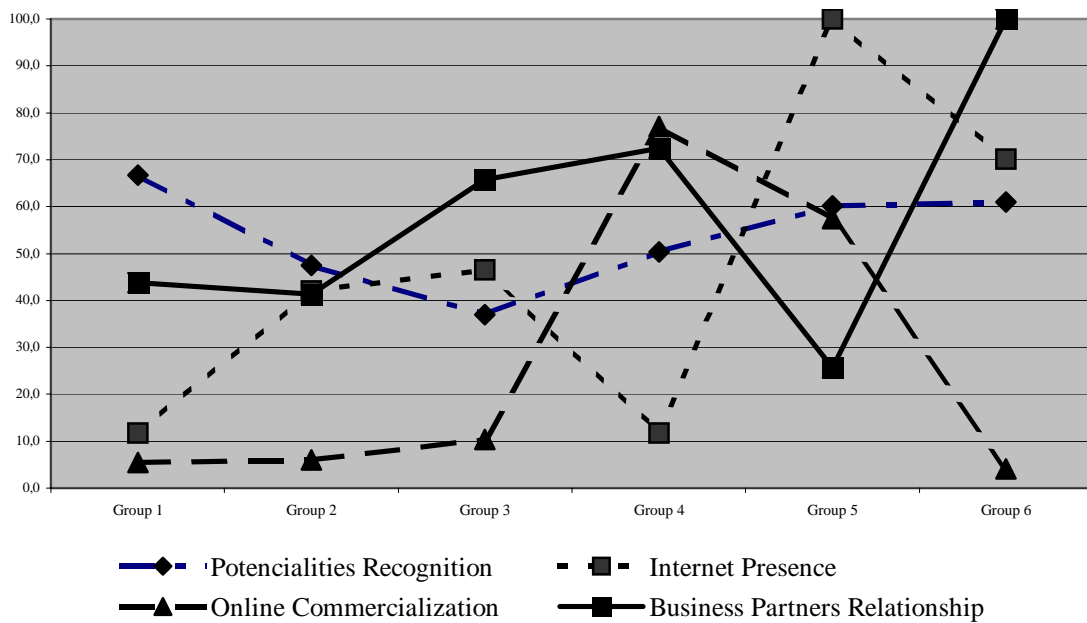


Figure 3. Profile of the informatics sector companies strategic groups.



Figure 4 presents a comparative study between the innovation degree (x-axis) and the importance attributed for each group for the referred main categories (y-axis). The bubbles size represents the importance attributed by the groups to each dimensions of innovation.

Analyzing the figure it is possible to conclude that innovation degree is bigger in the groups that show an effective exploitation of the Internet potentialities, and smaller on those that just evidence potentialities recognition.

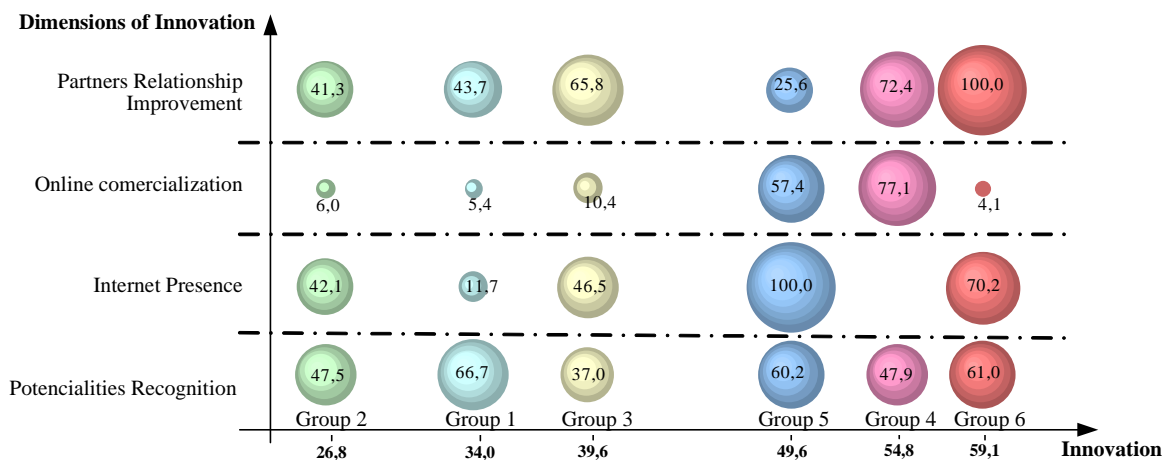


Figure 4. Strategic groups characterization of the Informatics sector.

#### 4. CONCLUSIONS

The opportunities to penetrate in new markets, to achieve a better position in the new distributing channels, to increase the services quality, to improve sales volumes and project their image were, among others, strong arguments that enforced the companies to adopt progressively the Internet based technologies.

Based on this investigation it was possible to:

- Verify the existence of nine main strategic factors that motivate the incorporation of technological innovation strategies in the informatics companies.
- Identify and characterize homogeneous groups of companies that implement similar Internet strategies. These groups have allowed us to conclude the market maturity state, as well as, a detailed characterization of the applied strategies.

We have also concluded that the informatics sector, as far as TIC's incorporation is concerned in the company's strategy, is still in an immature level, because although the majority of the companies recognized the Internet potentialities or even implemented some of the Internet facilities, they are not exploring the entire available Internet potential. On the other hand, companies have already the conscience that customer's demands are growing and the only way to answer these requirements is through the implementation of innovative strategies based in TIC's.

The strategic groups that fit in a more innovative strategy are those that evidence an effective exploitation of the Internet potentialities. In this sequence, companies should plan the TIC's incorporation based on the nine main strategic factors evidenced in the present investigation that aim at improving the relations among all business agents.

## 5. REFERENCES

HUTT, M. and SPEH, T. (2002), *Business Marketing Management – A Strategic View of Industrial and Organizational Markets*, 7.<sup>th</sup> Edition, Harcourt, New York, USA.

RON, Z. and CONNELLAN, T. (2000), *E-Service: 24 Ways to Keep your Customers - When the Competition is Just a Click Away*, 1.<sup>th</sup> Edition, Amacom, New York, USA.

WOODRUFF, R. and GARDIAL, S. (1996), *Know your customer: new approaches to understanding customer value and satisfaction*, 1.<sup>th</sup> Edition, Blackwell Publishers, Cambridge, Massachusetts, USA.

ZINK, K. e SCHMID A. (1999), *Best Practices in Total Quality*, ESTIEM TQM, Germany.