Innovation Process Under Different Marketing Objectives:

A Contingency View[1]

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Abstract

This article analyses how success in product innovation or process innovation is associated with different organizational characteristics and sources of innovation, under different marketing objectives. A contingency view was adopted. The study was based on a survey of 436 Portuguese industrial companies.

1. Introduction

The impact of innovation on organizational results has been so generally demonstrated in empirical studies (Damanpour, Szabat and Evan, 1989; Khan and Manopichetwattana, 1989; Nayak, 1991; Utterback, 1994), that it has become the object of a voluminous body of literature, in most disciplines of organization studies, namely marketing and organizational behavior. Innovation is an important means of survival in the face of the dynamic nature of competitive environments (Han, Kim and Srivastava, 1998), a form of organizational adaptation that has been propelled by several external forces: technological developments, deregulation, globalization, shortening of innovation cycles and new buyer needs (Cunha and Verhallen, 1998).

Organizational innovation is, therefore, intended to improve effectiveness as organizations respond to changes in their internal and external environments. As such, innovation creates uncertainty and requires coordination among organizational units. On the other hand, innovation may take different forms: the development or adoption of a new product or service, a new manufacturing process or technology, or a revised strategic orientation. Ideally, and on a pure rational decision making model, organizational innovations should differ according to the company's marketing objectives. As companies move from competing with the same products in the same markets to competing with new products in new markets, we may anticipate that the impact of innovation may be increasingly important. Analyzing the main sources of innovation that are associated with marketing objectives is, therefore, worth investigating.

Another line of research has been to identify organizational structures, processes and contextual variables relevant to the adoption and implementation of innovation. Organic or ahdocratic structural forms have been considered facilitators of innovation

(Burns and Stalker, 1961; Kanter, 1983; Mintzberg, 1979). The development of internal linking mechanisms, such as task forces, of consistent incentives and of open communication among organizational units has also been addressed in the literature (Tushman and Nadler, 1986; Ebadi and Utterback, 1984). Some of the contextual variables reported for driving innovation have been the degree of consumer sophistication, product life cycles and the degree of competition (Porter, 1980; Porter 1990; Moore and Tushman, 1982). Corporate culture, and in particular market orientation, has been equally considered to support organizational innovation (Han, Kim and Srivastava, 1998).

This research tends to consider these organizational characteristics as normative concepts i.e., these characteristics should facilitate the emergence of innovation. However as Cooper states "... there is no universal optimal culture that fits all organizations: it depends on mission and strategy" (Cooper, 1988, p.13). This means that the organizational characteristics that have been found to foster innovation are linked and must conform to strategic and marketing objectives.

This view suggests the development of a contingency view of organizational characteristics associated with successful innovation The strategic objectives will determine the characteristics of the more relevant innovation. On the other hand organizational variables such as corporate culture must also match the strategic objectives.

The purpose of this paper is to investigate, for different marketing objectives, which organizational variables are associated with successful innovation. We also explore, for different marketing objectives, what are the most relevant sources of successful innovation.

This paper is divided in 5 sections, In section 2 we explore the concept and types of innovation as well as characteristics that foster innovation. Based on this review the hypotheses will be raised. In section 3 we describe the data and methodology used to test these hypotheses. Results will be presented in section 4. Finally, in section 5, results are discussed.

2. Background

2.1 The concept of innovation

Innovation is often considered as a major change in the product characteristics or in the process of delivering it to customers. However most successful innovations result from incremental changes either in the product or in the process. In this paper we follow the definition of innovation as "the introduction of a new transaction flow between the organization and its environment and/or the adoption of new internal means or ends, in order to increase organizational efficiency and/or effectiveness" (Cunha and Verhallen, 1998, p. 6). This is a comprehensive definition that encompasses the diversity of innovation manifestations and that highlights the relevance of the organizational characteristics and of the relationships with the market.

2.2. Types of Innovation

According to Tushman and Nadler (1986), the basic kinds of innovation are product innovation – changes in the product or service, and process innovation – change in the way a product is made or a service is provided. As mentioned above most of the innovations are incremental – new features or versions in products, small changes in the process – although radical innovations may also exist which are those that introduce discontinuous change in the products or processes. As it is known since the

work of Utterback and Abernathy (1975) both dycothomies should not be seen as opposites but rather complimentary courses of action, in order to face different market demands. In this paper we only distinguish product and process innovation.

2.3 Organizational Characteristics

Following Tushman and Nadler (1986), managers have to manage the current organization and prepare the conditions for innovation to be created, which assumes a congruence between organizational strategy and the work arrangements, structure, processes, individuals and, generally speaking, corporate culture. This congruence is a necessary condition for organizational effectiveness, but is not sufficient.

Innovation is increasingly becoming a predictor of organizational success, which implies that companies be sensitive to internal and external opportunities and effectively learn from the multiple available sources of information.

Several organizational characteristics have been reported to facilitate and enhance innovation.

Market orientation, as a corporate culture, which characterizes organizations that emphasize the creation of superior customer value, is one such variable (Slater and Narver, 1994; Han, Kim and Srivastava, 1998). Three behavioral components have been considered to be part of market orientation: customer orientation, competitor orientation and interfunctional coordination.

Customer orientation entails the understanding of the client's entire value chain, in the present and as it will evolve over time. Competitor orientation encompasses the analysis of current and potential competitors and interfunctional coordination implies the integration of different functions in the organization in order to improve problem-solving capabilities towards responsiveness to customers (Narver and Slater, 1990).

Multifunctional teams have also been reported to facilitate innovation, because it helps in the creation of trust between different organizational members, while improving information dissemination through the organization (Quinn, 1985; Eisenhardt and Tabrizi, 1995).

Having a consistent innovation reward system has been suggested to have an important effect on innovation, and particularly, product development (Gold, 1987; Gupta and Wilemon, 1990), associated with the establishment of clear innovation goals and feedback mechanisms.

Technology and technology management competencies must not be forgotten, in considering organizational characteristics that foster innovation (Nyström, 1985).

Finally, we also consider that a past history of successful innovation can, by itself, promote employees' efforts to actively seek for new products and services, or for better and more efficient ways to manufacture or deliver them. This history may be signaling openness to new ideas and the need to maintain the record of innovation success. It sets high standards for organizational members.

As we considered in section 1., a deterministic and prescriptive conceptualization of the organizational variables that foster innovation does not provide a valid theoretical model of innovation (Tushman and Nadler, 1986) because it fails to consider the contingencies of each individual company's strategic positioning.

We therefore intend to explore the links between organizational variables and successful innovation, for different marketing objectives, varying in level of uncertainty and complexity relative to the amount of knowledge and expertise required. The first and more basic level includes companies competing with the same products in the same markets. The second level includes companies competing with the same products, but entering new markets. In the third level, companies introduce

new products in current markets and the fourth level, the more complex one, includes companies introducing new products to new markets.

Although even in the first and simpler level – same product, same market, innovation may be essential, we assume that the complexity and depth of innovation activities will be larger as we move from simpler to more complex levels. We also assume that introducing new products requires more innovation than entering new markets, because the latter requires good information gathering about markets, whereas new products require a higher extent of product and/or process innovation.

Hypothesis 1 (H1): *Different organizational characteristics are linked with product or process innovation success in companies with different marketing objectives.*

2.4. Sources of Innovation

Having considered organizational characteristics that may enhance the innovation process, we will now briefly discuss the main sources of innovation used by companies, which are activities aimed at:

a) generating and enlarging market information, such as going to trade shows and conferences, acquiring specialized trade and scientific journals, establishing R&D departments or establishing joint R&D projects with research centers;

b) analyzing customer needs, such as the establishment of close relationships with customers and suppliers and the creation of interfunctional teams;

c) analyzing competitor practices, through benchmarking;

d) acquiring new technology;

e) developing internal competencies, such as training and development programs, use of external consultants and quality control circles.

It may be expected that the relevance of these sources of innovation will vary according to type of innovation – product or process, as well as according to company's marketing objectives.

Hypothesis 2 (H2): *For different marketing objectives, different sources of innovation will be relevant for product or process innovation.*

3. Methodology

3.1 Sample

In 1994, in the context of an international project coordinated by Henley-The College of Management (UK), a survey on innovation by Portuguese firms was carried out. The survey collected information on attitudes towards innovation of a sample of 652 Portuguese firms, covering all sectors of activity, distributed all over the country and with different sizes.

This sample is composed of 436 industrial companies. A classification of the respondent firms according to their size, measured by the number of employees, reveals that 7.1% are very small firms (less than 10 employees), 60% are small firms (between 10 and 99 employees), 27.5% are large (between 100 and 499) and 6.4% are very large (more than 500 workers).

3.2 Measurement Instrument

From this survey, we collected information about marketing objectives, performance on innovation, sources of product innovation, sources of process innovation and organizational characteristics.

Marketing objectives: The information on marketing objectives allowed us to divide the companies into four groups: 1-same product/same market, 2-same product/new market, 3-new product/same market and 4-new product/new market.

Innovation Performance: The questionnaire asked the respondents to evaluate, on a scale of 1 to 10 the company performance on innovation both in process and product. The companies were classified as high performers if the value was greater than 5 and low performers if the value was equal or below 5.

Sources of Product Innovation: a scale, originally composed of 13 items, asked the respondents to rate the relevance of sources of product innovation on a 4-point Likert scale ranging from not important to very important. We computed a factor analysis, with Varimax rotation, which produced 3 factors: Learning, with 4 items, concerned attendance of conferences, trade shows, membership in chambers of commerce and trade magazines, Cooperation with Market Forces, with 3 items, concerning relationships with customers, suppliers and competitors and R&D, with 2 items, concerning existence of an R&D department and relationships with external R&D departments.

Sources of Process Innovation: a scale, originally composed of 11 items, asked the respondents to rate the relevance of sources of process innovation on a 4-point Likert scale ranging from not important to very important. We computed a factor analysis, with Varimax rotation, which produced 3 factors: Internal Learning, with 5 items, concerning internal training efforts such as value analysis, existence of interfunctional teams, benchmarking and management information systems, External Learning, with 2 items, concerning external training and development programs and the use of external consultants and Cooperation with Market Forces, with 3 items, concerning relationships with customers, suppliers and competitors.

Organizational Characteristics: a scale, originally composed of 43 items, asked the respondents to rate different characteristics on a 5-point Likert scale ranging from absolutely disagree to absolutely agree. We computed a factor analysis, with Varimax rotation, which produced 6 factors: Innovation History, with 7 items, concerning historical innovation record and responsiveness to change in market needs as well as existence of innovation competencies, Innovation Strategy, composed of 6 items, concerning the existence of innovation objectives and feedback mechanisms as well as innovation manager, Task Culture, with 6 items, concerning the existence of performance appraisal systems, promotion from within, information on company performance, Innovation Reinforcement, with 5 items, concerning the encouragement of people to develop new ideas and challenge status quo as well as the recognition of innovative behavior, Market Orientation, with 6 items, concerning exploitation of new opportunities, proactive attitude, learning with past experience, and Technology, with 4 items, concerning the analysis of technology portfolios and technology impact, project management and the existence of technology know-how.

Reliability coefficients (Cronbach's alpha) for these factors are presented in Table 1. Most of these variables have a Cronbach's alpha above the .70 threshold recommended by Nunnaly (1978). However two of the Sources of Product Innovation – Cooperation with Market Forces and R&D, have an alpha of .63, which requires an extra care in the interpretation of the results. External Learning, one of the Sources of Process Innovation is just below the recommended threshold - .69, and was therefore accepted as a reliable measure.

INSERT TABLE ONE HERE

Statistical Treatment

Hypotheses were tested by Multivariate Analysis of Variance (MANOVA). To test Hypothesis 1, we performed a MANOVA for each of the four marketing objectives, with success in product and process innovation as between-subjects factors. Organizational Characteristics were the dependent variables.

To test Hypothesis 2, we performed a MANOVA both for sources of product innovation and sources of process innovation, which are the dependent variables. The four marketing objectives are the between-subjects factor.

4. Results

In Hypothesis 1 (H1) we tried to explore which organizational characteristics are linked with success in product or process innovation, for each of the marketing objectives. Table 2 presents the data obtained for product innovation and table 3 presents the data obtained for process innovation.

INSERT TABLE TWO HERE

From table 2, we can see that as the complexity of marketing objectives increases, so does the number of relevant organizational characteristics increase. In fact, for the first marketing objective – same product, same market – only innovation history is associated with good performance in product innovation. For the second and third marketing objectives – same product, new market and new product, same market, respectively – four organizational characteristics are associated with better performance at product innovation. These characteristics are innovation history,

innovation strategy, innovation reinforcement and market orientation. In the more complex of the marketing objectives, the fourth – new product, new market – all six organizational characteristics are associated with better performance at product innovation.

INSERT TABLE THREE HERE

This pattern of increased significance of organizational characteristics for increasingly complex marketing objectives was not found, however, for process innovation (table 3). In the first marketing objective, only innovation strategy was associated with better performance at process innovation. The same characteristic was also the only significant one for the third marketing objective – new product, same market.

For objectives two and four, all organizational characteristics differentiate the high from the low performers in process innovation, with the exception of technology which was not found to be significant for the last marketing objective. This fact leads us to think that when the market is the same, regardless of the product, innovation strategy, that is, the existence of objectives aimed at innovation, feedback mechanisms and an innovation manager, is the most relevant variable for success. However, with new markets, innovation strategy alone is not sufficient and good performers differ from low performers in many other organizational characteristics. Since process innovation means doing things more efficiently, the importance of the competitors is greater for this kind of innovation. The coexistence of a greater number of differentiating organizational characteristics is therefore driving this type of innovation.

The next logical question should therefore be what sources of innovation companies in successful projects of innovation used. That was the objective of our second hypothesis (H2), which aimed at identifying the relevant sources of both product and process innovation, for each of the marketing objectives.

Table 4 presents the data obtained by the MANOVA we performed, regarding product innovation. Learning, cooperation with market forces and R&D are the sources of innovation, the dependent variables. Marketing objectives are the between-subjects factor. Differences between the four levels of the factor, for each of the dependent variables, were computed by difference contrasts.

INSERT TABLE FOUR HERE

While cooperation with market forces did not produce significant differences across marketing objectives, both Learning and R&D did. In table 5, the difference contrasts for the significantly different sources of innovation are presented and we may conclude that in product innovation, as new markets become part of the marketing objectives, learning increases significantly. R&D, on the other hand, is increasingly relevant, as we move from marketing objective 1 to marketing objective 4.

INSERT TABLE FIVE HERE

In what concerns process innovation, no significant differences were found in any of the three sources of innovation – Internal learning, external learning and cooperation with market forces. Results of the MANOVA will not, therefore, be presented.

5. Discussion

In this paper, we tried to explore the interrelationships between success in product and process innovation, on one hand, and both the organizational characteristics and the marketing objectives. We also tried to see which sources of innovation were more relevant for successful innovation projects, in companies with different marketing objectives. The rationale for this study was that a deterministic view of the process of innovation and the organizational context variables should not be taken, but instead a contingency view, whereby different organizational characteristics and different company marketing objectives will be associated with different performance in both product and process innovation.

Our first hypothesis had to do with organizational characteristics associated with both types of innovation for different marketing objectives. The results confirmed our hypothesis. For product innovation, high performers present more of the organizational characteristics that are usually considered to facilitate innovation. These characteristics increase in number, as companies adopt more complex marketing objectives, i.e., as companies enter new markets and introduce new products, we found significant differences in a larger number of organizational characteristics.

For process innovation, innovative companies also present significant differences in organizational characteristics. However, the presence of these facilitating variables is higher for companies entering new markets. This could probably mean that, as process innovation aims at efficiency gains, and not new product development, companies try to beat their competitors in quality and costs; thus, greater innovation requirements are associated with the entrance in new, unknown markets.

In our second hypothesis, we tried to explore whether there are differences in the use of different sources of either product and process innovation, depending on the company marketing objectives. We could only find significant differences in two of the sources of product innovation, learning and R&D. Learning was defined as the efforts spent in obtaining information from trade shows, conferences, journals, membership in chambers of commerce, etc.. R&D was defined as the existence of an R&D department and the establishment of relationships with external research departments. While the relevance of these two sources of innovation is easily understandable, we cannot explain why the other sources failed to produce any significant results. One possible explanation has to with the way the questions were formulated. Respondents were asked to consider a recent successful project of product and of process innovation and rate the relevance of the different sources. Social desirability might be an important biasing factor, since we cannot assume all companies to have had recent successful innovation projects.

5. 1 *Limitations of the study*

One of the main limitations of this study derives from the survey questionnaire. In fact, the classification between high and low innovation performers was made based on self-reports and not on objective criteria. The sources of innovation referred to a previous (but recent) successful innovation project, which might never have existed. We may also point to the lower reliability coefficients obtained for the sources of innovation scales, some of them below the 0.7 threshold.

A second limitation has to do with the fact that we did not have objective data on financial performance of the companies.

5.2 *Conclusion*

The results obtained in this study point to the need to further investigate the contingencies of the innovation process. These contingencies have to do with company objectives and competitive strategies, which may greatly influence the structural variables, but also with types of innovation: product versus process innovation, technical versus administrative versus ancillary innovation, etc..

The stage in the innovation process, from idea generation to diffusion/adoption, the types of organizations (for example, private versus public, for-profit versus not-for-profit) or market dynamics may be other variables affecting the innovation process (Cunha and Verhallen, 1998). Research on types of innovation best suited for these variables will certainly enrich the knowledge of this field and contribute to a more comprehensive understanding of the phenomenon. The impact of innovation on organizational performance is, by itself, a driving force in this kind of research.

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Table 1 – Reliability Coefficients for the measurement instruments

Measurement Instruments	Cronbach's α
Organizational Characteristics	
Innovation History	.87
Innovation Strategy	.89
Task Culture	.83
Innovation Reinforcement	.81
Market Orientation	.78
Technology	.84
Sources of Product Innovation	
Learning	.71
Cooperation with Market Forces	.63
R&D	.63
Sources of Process Innovation	
Internal Learning	.77
External Learning	.69
Cooperation with Market Forces	.75

Table 2 – Differences in organizational characteristics linked with success in product innovation, for each of the marketing objectives – MANOVA

Organizational characteristics by marketing objective	Mean		F ratio	Signif. of F ratio
	High performers	Low performers		
1-Same product, same market				
Innovation History	3.08	3.72	8.98	0.004
Innovation Strategy	3.67	3.83	0.65	0.422
Task Culture	3.61	3.72	0.38	0.539
Innovation Reinforcement	3.75	4.00	1.36	0.249
Market Orientation	4.03	4.17	0.78	0.382
Technology	3.33	3.28	0.06	0.806
2-Same product, new market				
Innovation History	3.06	3.69	10.54	0.002
Innovation Strategy	3.21	3.88	10.10	0.002
Task Culture	3.35	3.52	0.75	0.388
Innovation Reinforcement	3.50	3.93	6.16	0.015
Market Orientation	3.77	4.14	5.73	0.019
Technology	3.04	3.39	2.99	0.087
3-New product, same market				
Innovation History	3.19	3.67	5.51	0.021
Innovation Strategy	3.25	3.98	9.93	0.002
Task Culture	3.19	3.52	2.80	0.097
Innovation Reinforcement	3.56	3.93	4.45	0.037
Market Orientation	3.62	4.10	7.84	0.006
Technology	2.88	3.20	1.68	0.198
4-New product, new market				
Innovation History	3.05	3.89	21.24	0.000
Innovation Strategy	3.57	4.12	7.05	0.009
Task Culture	3.29	3.74	8.69	0.004
Innovation Reinforcement	3.48	4.13	16.15	0.000
Market Orientation	3.76	4.27	10.41	0.002
Technology	3.05	3.48	4.22	0.042

Table 3 – Differences in organizational characteristics linked with success in process innovation, for each of the marketing objectives – MANOVA

Organizational characteristics by marketing objective	Mean		F ratio	Signif. of F ratio
	High performers	Low performers		
1-Same product, same market				
Innovation History	3.14	3.39	1.30	0.260
Innovation Strategy	3.38	3.94	9.12	0.004
Task Culture	3.38	3.82	7.14	0.100
Innovation Reinforcement	3.76	3.88	0.31	0.580
Market Orientation	4.05	4.09	0.80	0.779
Technology	3.24	3.36	0.33	0.566
2-Same product, new market				
Innovation History	3.00	3.50	5.22	0.025
Innovation Strategy	2.96	3.75	11.63	0.001
Task Culture	3.12	3.56	4.49	0.037
Innovation Reinforcement	3.38	3.83	5.40	0.022
Market Orientation	3.65	4.06	5.70	0.019
Technology	2.77	3.38	8.34	0.005
3-New product, same market				
Innovation History	3.48	3.65	0.95	0.331
Innovation Strategy	3.52	3.92	5.57	0.020
Task Culture	3.24	3.55	3.90	0.051
Innovation Reinforcement	3.69	3.94	3.27	0.073
Market Orientation	3.93	4.07	0.99	0.321
Technology	2.97	3.22	1.62	0.206
4-New product, new market				
Innovation History	3.30	3.82	7.08	0.009
Innovation Strategy	3.60	4.11	7.07	0.009
Task Culture	3.25	3.75	8.04	0.005
Innovation Reinforcement	3.70	4.08	4.65	0.033
Market Orientation	3.75	4.26	10.39	0.002
Technology	3.20	3.44	1.23	0.271

Table 4 – Relevance of the sources of product innovation, by marketing objective

Sources of product innovation by marketing objective	Mean	F ratio	Signif. of F ratio
Learning			
1-Same product, same market	1.37		
2-Same product, new market	1.58	5.84	0.001
3-New product, same market	1.53		
4-New product, new market	1.67		
Cooperation with market forces			
1-Same product, same market	1.05		
2-Same product, new market	1.05	0.78	0.505
3-New product, same market	1.02		
4-New product, new market	1.06		
R&D			
1-Same product, same market	1.47		
2-Same product, new market	1.70	8.90	0.000
3-New product, same market	1.75		
4-New product, new market	1.82		

Table 5 – Difference contrasts for the significantly different sources of innovation, across the marketing objectives

Sources of Innovation	Objective 2 vs objective 1		Objective 3 vs objective 2		Objective 4 vs objective 3	
	Coeffic.	Signif.	Coeffic.	Signif.	Coeffic.	Signif.
Product innovation						
Learning	0.22	0.007	0.00	0.377	0.183	0.000
R&D	0.24	0.001	0.16	0.002	0.18	0.000