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# DISRUPTIVE INNOVATION PRACTICES ADOPTED BY COMPANIES IN RIO GRANDE DO SUL – BRAZIL

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## ABSTRACT

Companies innovate by improving their existing products and/or services, which would be incremental innovation, or by creating new products and/or services, which is radical innovation, as well as the conditions offered by the market where they operate. Companies can be motivated by the will to change the market where they operate, using disruptive innovation. Thus, this study aimed to identify the importance of the disruptive innovation practices, adopted by companies recognized by the Programa Gaúcho da Qualidade e Produtividade (PGQP), Brazil. The research conducted is characterized as quantitative research. The sampling was carried out in two stages, the first stage refers to the companies that participated in the research, which were chosen for easy access, i.e., 10 companies among the 76 awarded in PGQP-2014. The second stage refers to the employees, who were randomly selected proportionally to the total number of employees of the company. The total sample was 322 employees representing the 10 chosen companies. The data collection instrument was a questionnaire composed of five questions, an 11-point Likert scale was used, constructed from Sant'Anna (2002).



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## INTRODUCTION

Christensen (2006) states that disruptive innovation describes a process by which a product or service begins with simple applications at the bottom of a market and progressively moves "above the market", eventually displacing or eliminating established competitors. This model of innovation allows a large part of the population, which previously did not have access to certain products and services, to have access to them. A disruptive innovation is only consolidated when the improvements make the product, which previously did not satisfy the leaders' customers, present the functionalities that interest the leaders' customers, but with a cost advantage in relation to the dominant companies. At this point, the threat is perceived. When this trajectory is consolidated, consumers switch to the entrant's product, and the leaders lose their position. It is then, that the disruption can be seen to be complete and the leadership positions in the market change. (CHRISTENSEN, 1997). Thus, this study aimed to identify the importance of disruptive innovation practices, adopted by companies recognized by the Gaucho Quality and Productivity Program (PGQP), Brazil.

The companies that were part of this study are located in the Northeast Region of the State of Rio Grande do Sul, recognized by the Program, through the Quality Award RS (18th edition - year 2013 and 19th edition - year 2014).

## THEORETICAL BACKGROUND

**Innovation:** Innovation has been defined as the main impulse that originates and maintains the movement of capitalism arising from consumer goods, new forms of production and transportation, new markets, and the new forms of organization that firms create (SCHUMPETER, 1942). Schumpeter (1942) also states that innovation results from the new process, with the destruction of what is obsolete. In this way, innovation is the company's ability to overcome the competition, thus temporarily establishing a monopoly with the creation of a product. According to Drucker (1986), innovation, to be more productive, must be a differentiated product or service, providing new forms of satisfaction to the consumer, instead of offering only an improvement. Thus, innovation provides value generation. For Hamel and Prahalad (1994), to innovate is to make use of new technologies, with the intention of increasing the competitiveness of the company, always seeking to expand its market

share, so that it is more competitive in relation to the competition. Hamel (2000) considers innovation to be a strategic process, in which the business continuously goes through reinvention, obtaining new concepts and new forms, both strategically and in its management.

Innovation has become a major source of competitive advantage in the face of competition (RUBERA; KIRCA, 2012). In recent years, authors have analyzed how innovation contributes to improve the performance of organizations (ZAHRA; COVIN, 1995; SRINIVASAN; HANSSENS, 2009; CAMISÓN; LÓPEZ, 2010; ALIPOUR; KARIMI, 2011; RUBERA; KIRCA, 2012; CRUZ et al, 2012. In Drucker's (1986) view, innovation should not be restricted only to technological and economic aspects, but should also bring social innovations and change in the way the company manages its resources.

**Disruptive Innovation:** Disruptive innovation can be defined as a procedure adopted in products, services or business models that introduce significant change or disruption to the existing market (CHRISTENSEN, 1997; CHRISTENSEN; RAYNOR, 2003; CHRISTENSEN; RAYNOR; MCDONALD, 2015). A disruptive product or service begins its cycle by offering only core, low-cost attributes to new consumer markets, compared to mature, market-leading products. As this new market develops, the product or service follows this evolution, offering more value attributes until it reaches consumer satisfaction. (CHRISTENSEN, 1997). Christensen and Armstrong (1998) clarify that disruptive technologies introduce into the market a package of attributes different from those historically valued by the main consumers. Generally, they present, in their introductory phase, a very poor performance in some performance dimensions that are particularly important to them. They then make possible the emergence of new markets, composed of consumers interested in enjoying products or services that, although they present lower quality than the market leaders - to which they do not have access - present equivalent functionality and much more accessible and attractive values. According to Adner (2002), while improved, the performance of a disruptive technology remains inferior in relation to that offered by established technologies in the most significant markets. However, when the performance of the attributes provided by these technologies exceeds the performance and complexity that the market demands or can absorb, what Christensen (1997) calls performance overshoot occurs for over-served consumers, so that suppliers offer customers more than they need or are willing to pay. Given a growing share of marginal consumers, who do not have access to or interest in the increasingly complex set of attributes offered by a product or service, market disruption occurs when the disruptive technology becomes a substitute for the incumbent technology.

Christensen (1997) presents the distinction of two types of innovation: disruptive and sustaining. Sustaining innovations will result in products and services that meet the needs of customers in already established markets, allowing companies to increase their profit margin and sell products with higher quality, without having to take major risks, and that can be obtained by incremental innovations. Thus, in the context of organizational innovations, Christensen (1997) studied an aspect little addressed by neo-Schumpeterian theory, which focuses more on technological innovation - which he presented to the scientific community as the "innovator's dilemma". This dilemma consisted in understanding why some leading firms were surprised to the point of losing their leadership to smaller, less structured firms. The answers to this dilemma were worked out in depth in Christensen and Raynor (2003), developing what they called disruptive innovation. Disruptive innovation occurs when a company that dominates its markets conducts research with its customers and, based on this, promotes improvements in its products, seeking to increase its growth and profitability. For him, a company loses market position and fails when it does not adopt disruptive technologies in the industry. (CHRISTENSEN ,1997). Still, according to Christensen (1997), an important factor for the success of an organization is to be well managed, and for this to happen and for it not to be at risk of survival, its management must be guided by verifying its way of acting and perceiving the potential value that an innovation in disruptive technology brings to the success and maintenance of the business. For him, disruptive innovations change the market value propositions, even if they bring lower performance in relation to the attributes with which consumers are used to in innovations that are not disruptive. Christensen and Hart (2002) point out that developing countries are ideal target markets for disruptive technologies. Business models, which are forged in low-income markets, can be better applied than models set in high-income markets. It is much better to compete against non-consumption at the bottom of the pyramid and then migrate from that profitable base to successively more sophisticated customers and applications in global markets. Disruptive innovation states that it is not the technology itself that is disruptive, but how it affects the business model; therefore, disruptive innovations are those that cause a rupture in the old business model. They usually favor the emergence of new entrants (CHRISTENSEN et al., 2006). Thus, Govindarajan and Trimble (2004) put it that the life of any type of business is limited. For companies to stay in business, the drive for efficiency must be combined with excellence in entrepreneurship. Through the process of disruptive innovation, new businesses must emerge before old ones succumb. Christensen and Overdorf (2000) put it that disruptive innovations almost always promise lower profit margins per unit sold and are not attractive compared to the company's best product in the eyes of customers. Disruptive innovations allow a larger portion of the population with lower income to acquire cheaper products that could be purchased only by people from higher classes, according to Christensen and Hart (2002). These authors also point out that disruptive innovation is offering a product or service in a simple version, for people who would otherwise be totally excluded or poorly served by existing products. These customers are therefore quite happy to have a more modest version of a certain product, which was only available to the higher income class. They further maintain that companies gain attractive profit margins when they extend their luxury products to a less demanding stratum that has not yet enjoyed the current offerings. It is noteworthy that Govindarajan and Kopalle (2006), in their study, cite Christensen (1997), who states that disruptive technologies are typically simpler and cheaper. Authors Charitou and Markides (2003) and Gilbert (2003) also present three phases for disruptive innovations: (1) disruptive innovations starting with low profit margin for firms; (2) disruptive innovation introduces a different set of features and performance attributes, relative to existing products; (3) disruptive innovation is offered at a lower price. These factors are an attractive combination for low-income customers at the time of the new product introduction. Over time, subsequent developments raise the attributes of the new product to a level that is sufficient to satisfy mainstream customers.

# METHODOLOGY

This research is characterized as quantitative research, which, according to Marconi and Lakatos (2006), is especially designed to generate accurate and reliable measures that allow for statistical analysis. Quantitative research is appropriate for measuring impacts, opinions, attitudes and preferences as well as behaviors. The companies that were part of this study are located in the Northeast Region of the State of Rio Grande do Sul, recognized by the Gaucho Program for Quality and Productivity (PGQP), through the Quality Award RS (18th edition - year 2013 and 19th edition - year 2014). The Gaucho Program for Quality and Productivity (PGQP) recognizes organizations from the State of Rio Grande do Sul that stand out in the area of Quality Management, recognizing the efforts for excellence management. By participating in the Quality Award Rio Grande do Sul (RS), organizations receive an external, impartial evaluation of their management system, using internationally recognized criteria. The model developed by PGQP provides a systemic evaluation, generating a formal feedback. At the end of the process, upon receiving the Evaluation Report, the leaders of the participating organizations receive the strengths and opportunities for improvement, from which a consistent plan for improvement of management practices can be structured. The sampling was conducted

in two stages, the first stage refers to the companies that participated in the research, which were chosen for easy access, i.e., 10 companies among the 76 awarded in PGQP- RS- 2014. The 10 companies selected for this study were: 1) Castertech Fundição e Tecnologia Ltda. (Caxias do Sul); 2) Jost Brasil Sistemas Automotivos Ltda. (Caxias do Sul); 3) Swan Tower Caxias do Sul (Caxias do Sul); 4) FTSG - Faculdade de Tecnologia da Serra Gaúcha (Caxias do Sul); 5) SENAC Caxias do Sul (Caxias do Sul); 6) SENAC Farroupilha (Farroupilha); 7) SESC Bento Gonçalves (Bento Gonçalves); 8) UNIMED Vale das Antas RS - Cooperativa de Assistência à Saúde Ltda (Nova Prata); 9) Metalúrgica Golden Art's Ltda. (Veranópolis); 10) Hyva do Brasil Hidráulica Ltda. (Caxias do Sul).

# RESULTS AND DISCUSSION

This section presents the results obtained in the survey, as well as the discussion of the results in light of the literature consulted. Table 1 shows the descriptive statistics of the variables used in the analysis, that is, the answers given by the companies participating in the survey regarding disruptive innovation. Considering the descriptive analysis of the questions that evaluate the disruptive innovation, in general, the indicator P3: the technology used favors the interaction between people and areas, with 7.02, has the highest average points.

**Table 1. Descriptive analysis of the items that assess disruptive innovation, overall**

| Disruptive Innovation Items | Descriptive measures | | |
|---|---|---|---|
| | Mean | Standard Deviation | Coefficient of Variation |
| P1: the company balances appropriately the concern with financial results, with people and with innovation | 6,68 | 2,344 | 35,09 |
| P2: the company combines in a balanced way the use of advanced technologies with people's creativity | 6,84 | 2,058 | 30,09 |
| P3: the technology employed favors the interaction between people and áreas | 7,02 | 2,067 | 29,44 |
| P4: the company stimulates in its employees the ability to learn new technologies quickly | 6,78 | 2,080 | 30,68 |
| P5: the company stimulates in its employees the search for new technical knowledge associated with the job or position held | 6,89 | 2,411 | 34,99 |

Source: Survey data, SPSS output

**Table 2. Degree of importance of each of the indicators of disruptive innovation**

| Disruptive Innovation Indicators | Mean | Rank |
|---|---|---|
| P1: the company balances appropriately the concern with financial results, with people and with innovation | 6.68 | 4º |
| P2: the company combines in a balanced way the use of advanced technologies with people's creativity | 6.84 | 3º |
| P3: the technology employed favors the interaction between people and áreas | 7.02 | 1º |
| P4: the company stimulates in its employees the ability to learn new technologies quickly | 6.78 | 5º |
| P5: the company stimulates in its employees the search for new technical knowledge associated with the job or position held | 6.89 | 2º |

Source: Survey data, SPSS output

**Table 3 - Disruptive Innovation Index**

| Variable | Descriptive measures | | | |
|---|---|---|---|---|
| | Minimum | Maximum | Mean | Standard Deviation |
| Disruptive Innovation | 6,68 | 7,02 | 6,84 | 0,13 |

Source: Survey data, SPSS output

O critério utilizado para a escolha das empresas foi por estarem localizadas na Região Nordeste do Estado do Rio Grande do Sul, que contempla uma população de 1.009.66 habitantes. Sua área é de 25.749,128 km². São 53 municípios agrupados em três microrregiões: Caxias do Sul, Guaporé e Vacaria. The criterion used to choose the companies was for being located in the Northeast Region of the State of Rio Grande do Sul, which has a population of 1,009,66 inhabitants. Its area is 25,749.128 km². There are 53 municipalities grouped into three microregions: Caxias do Sul, Guaporé and Vacaria. The second stage of sampling refers to the choice of employees, who were randomly selected. The number of employees chosen was proportional to the total number of employees of the company. The final sample consisted of 322 employees representing the 10 chosen companies. The data collection instrument was a questionnaire consisting of five questions on an 11-point Likert scale, constructed according to Sant'Anna (2002).

The questions used were: P1: the company appropriately balances concern for financial results, people and innovation; P2: the company balances the use of advanced technologies with people's creativity; P3: the technology employed favors the interaction between people and areas; P4: the company stimulates in its employees the ability to learn new technologies quickly; P5: the company stimulates in its employees the search for new technical knowledge associated with the exercise of the position or function occupied.The data treatment was performed using descriptive statistics, operationalized in the SPSS computer program.

For Christensen (1997), disruptive innovation occurs when a company that dominates its markets conducts research with its customers and, based on this, promotes improvements in its products, seeking to increase its growth and profitability. For him, a company loses market position and fails when it does not adopt disruptive technologies in the sector. Still, according to Christensen (1997), an important factor for the success of an organization is to be well managed, and for this to happen, its management must be guided in verifying its way of acting and perceiving the potential value that an innovation in disruptive technology brings to the success and maintenance of the business. It is said that it is not the technology itself that is disruptive, but how it affects the business model; then, disruptive innovations are those that cause a disruption in the old business model. (CHRISTENSEN, 2006). Sant'Anna (2002) developed a table with indicators for measuring the Organizational Modernity Degree, which includes, among others, the practice of disruptive innovation highlighted in this stage of the study: technology used favors the interaction between people and areas. Thus, Sant'Anna (2002) structured a model of Organizational Modernity, so as to conjugate a possibility for improving management practices, based on the factors called administrative modernity, and of people management practices, political modernity, and cultural modernity. The administrative modernity and of the people management practices refers to a set of measures that allow visualizing the commitment of the organization with continuous improvement, seeking the balance between quantitative resources, technological innovation, and human resources. In Table 2 is reported the degree of importance of each of the indicators referring to disruptive innovation as a function of the average scores obtained.

According to Table 2, in the answers given by the companies regarding the degree of importance of each of the dimensions related to disruptive innovation, the most important aspects are: the technology favors the interaction between people and areas, the company combines the use of technology with people's creativity, and the company encourages its employees to seek knowledge of new technologies. Thus, it is relevant to point out that technology applied in companies contributes to a greater engagement of people, and even improves communication between and within areas. Managers and teams tend to work better when communication is fluid and happens more naturally. The technological tools are also excellent for the development of people, because with them it is possible to map skills and competencies, providing the opportunity to relate and work points of improvement for each professional. Thus, it is possible to infer that such benefits (interaction between people and areas, creativity for the work, search for new knowledge in terms of technologies, engagement of people, more spontaneous communication, mapping of skills and competencies, construction of individual development plan that has for scope, opportunities for improvement in terms of technical and behavioral skills) bring, in many opportunities, the application by the professionals, of forms of disruptive innovation to their companies, causing organizational modernity. (SANT'ANNA, 2002; CHRISTENSEN, 2006; ADNER, 2002; MARRAS, 2002; FRANÇA, 2009; ZARIFIAN, 2008). Table 3 presents the disruptive innovation index found for the total sample. The average index for disruptive innovation practices, found for the surveyed sample, was 6.84, with a standard deviation of 0.13, which represents a relative variability of 1.90%. Thus, this shows that the average index for disruptive innovation practices, found for the researched sample, presents a relative variability of 1.90%, considered very low, according to Pimentel-Gomes (2005) and also according to Garcia (1989). Thus, it is considered important for having high precision and accuracy; thus, it presents validity in the analysis. (PIMENTEL-GOMES, 1985; GARCIA, 1989).

# FINAL CONSIDERATIONS

Companies can innovate through disruptive innovation. A trajectory is only considered disruptive when it originates at the bottom of the market, at its lowest point, i.e. it describes a process whereby a product or service starts with simple applications at the bottom of a market. It does not initially appeal to the mainstream consumer. At first, it is considered inferior to what exists in the market, and only as it evolves when the quality of the product/service reaches the mainstream standard of the market do consumers accept the change, and progressively the company moves to "above the market," eventually displacing or eliminating established competitors. (CHRISTENSEN, 1997). Thus, this study aimed to identify the importance of disruptive innovation practices, adopted by companies recognized by the Gaucho Quality and Productivity Program (PGQP), Brazil. The companies that were part of this study are located in the Northeast Region of the State of Rio Grande do Sul, recognized by the Program, through the Quality Award RS (18th edition - year 2013 and 19th edition - year 2014). It recognizes organizations from Rio Grande do Sul that stand out in the area of Quality Management, recognizing the efforts for excellence management. A quantitative methodology was employed. For data collection, a 5-question questionnaire was used, applied to 322 employees randomly chosen from the companies participating in the study. The data treatment was carried out through descriptive statistics, operationalized in the SPSS program.

The scope of the questions sought to find out if the companies adequately balance the concern with financial results, with people, and with innovation; if they combine in a balanced way the use of advanced technologies with people's creativity; if the technology employed favors the interaction between people and areas; if they stimulate in their employees the ability to quickly learn new technologies, and if they encourage in their employees the search for new technical knowledge associated with the job or function held. In this way, the most significant initial results of the study that relate to the answers given by the human resources managers of the participating companies regarding the importance of the disruptive innovation practices adopted, in general, show that the dimension focused on the technology employed that favors the interaction between people and areas has the highest average score. Next, the degree of importance of each of the dimensions related to disruptive innovation adopted by the companies was surveyed. The most highlighted aspects were, again, in first place, that technology favors the interaction between people and areas. Also, that the companies combine the use of technology with people's creativity, and that the companies encourage their employees to seek knowledge of new technologies. And finally, it was found an average index for disruptive innovation practices of 6.84, with a standard deviation of 0.13, which represents a relative variability of 1.90%, considered very low, according to Pimentel-Gomes (2005) and also according to Garcia (1989). Therefore, it is considered important for having high precision and accuracy, obtaining validity in the analysis. (PIMENTEL-GOMES, 1985; GARCIA, 1989). Thus, it is possible to conclude that there is a significant importance on the part of the companies surveyed, in relation to the application of disruptive innovation tools, because it is present in their processes, the positive relationship between "technology and interaction between people and areas", "technology and increased creativity of people" and "technology and search for greater specific technical knowledge". Such results are corroborated by the studies of several authors, who highlight an assertive connection, that is, a link that brings favorable results among technology, people, creativity, knowledge, learning, generating innovation, growth, and development of people and companies. (CHRISTENSEN, 2006; ADNER, 2002; MARRAS, 2002; FRANÇA, 2009; ZARIFIAN, 2008).

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