

Relationship between marketing innovation and other innovation types: an empirical analysis of Portuguese firms

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Abstract

Marketing innovations are a source of competitive advantages for companies. However, to obtain these advantages, is important to understand the relationship they have with the different types of innovations, such as product innovation, process innovation and organizational innovation. This study addresses the concept of marketing innovation and tries to understand its relationship with other types of innovation. Through the literature review carried out, it was possible to identify that there is a potential complementary relationship between marketing innovation, and its subtypes, and product, process, and organizational innovations. Afterwards, were defined research hypotheses, that were verified through a logistic regression model, logit, and using data related to the innovation of Portuguese companies from the Community Innovation Survey 2016 (CIS 2016), for the period between 2014 and 2016. The results show that marketing innovation has a positive effect on all other types of innovations. Regarding the subtypes of marketing innovation, product design innovation, promotional innovation, placement innovation and pricing innovation, these have been found to have a positive effect on both technological innovations and organizational innovations.

Keywords: Marketing innovation; non-technological innovation; technological innovation; CIS

1. Introduction

The following study is focused on marketing innovation and its relationship with the different types of innovations (product, process and organizational), defined by third edition of OECD's Oslo Manual. To conduct this study, it was used data from the Community Innovation Survey (CIS 2016) for the period between 2014 and 2016.

Even though it has been neglecting from the literature (Medrano-Sáez & Olarte-Pascual, 2016), marketing innovation has a great

importance for a firm to get competitive advantages (Ren et al., 2010). As Drucker said, only marketing and innovation are responsible for the creation of value, all the rest are costs (Drucker, 1954). Nevertheless, in order to take full advantage from the benefits of marketing innovation, it is important to understand its relationship with the other types of innovations (product, process and organizational).

Marketing innovation's interactions with the other types of innovations has not been widely explored in literature (Schubert, 2010) and therefore, there is not a consensus between the authors who studied it, with some of them defending that they are substitutes of other types of innovations and others that they are complements (Kijek, 2013; Medrano-Sáez & Olarte-Pascual, 2016).

2. Innovation, the process to transform ideas

Innovation is the set of tools and strategies responsible for the transformation of knowledge, that can be new or existent, into new products, services, or processes (Hauser et al., 2006; Kusiak, 2009; Popa et al. 2010) and is the main responsible for improvements in customer satisfaction, through the increase of products quality and decrease of prices (Hauser et al., 2006). Innovation should not be confused with creation, which consists of the process of generating new ideas, but innovation implies implementing these ideas to create or improve something (Ilić et al., 2014).

The third edition of OECD's Oslo Manual came with a more general definition, describing innovation as the "implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations." (OECD, 2005, p 49)

2.2 Types of innovation

2.2.1 Product innovation

Product innovation is the total or partial change of the main characteristics and functionalities of a product or service, to improve it. These changes can be done by applying new technologies or just by combining different and existent technologies (OECD, 2005).

2.2.2 Process innovation

Process Innovation consists in the introduction of a new, or an improved, production method or logistic channel to reduce costs or increase quality related to production and transportation processes. This may imply changing the equipment, software, or techniques for the main activities but also for ancillary support

activities like purchasing, accounting, computing, and maintenance (OECD, 2005).

2.2.3 Organizational innovation

An organizational innovation is the introduction of a new organizational method to reduce administrative costs, increase productivity (by improve workplace satisfaction) and reduce supply costs. There are three main types of new organizational methods: Innovations business practices; innovations in workplace organization; innovations in external relations

2.2.1 Marketing innovation

Many authors (Higgins, 1995; Bartoloni & Baussola, 2015; Ren et al. 2010; Rammer et al., 2008; Soltani et al., 2015; Medrano-Sáez & Olarte-Pascual, 2012; Szymańska, 2012; Bhaskaran, 2006; Gunday et al., 2011) are consensual when they state that marketing innovation is the set of tools and strategies that allows firms to obtain competitive advantages, permitting them to differentiate from the competition, attract customers and consequently increase their profits. The third edition of the OECD's Oslo Manual defines marketing innovation as the changes or improvements in terms of product's design or packaging, placement, promotion, or pricing. This is complemented by many authors, such as Higgins (1995), Ilić et al. (2014), Joueid & Coenders(2018), Shergill & Nargundkar (2005) and Gunday et al. (2011), defining it as the set of strategies responsible to introduce any change in one of the basic tools of marketing mix (product, price, promotion and placement).

The Community Innovation Survey (CIS), that is responsible for collecting data regarding European companies' innovation, also categorized marketing innovation in four different subtypes: Product Design Innovation; pricing strategy innovation; placement innovation; promotional methods innovation.

2.3 Relationships between marketing innovation and the other innovation types

There is a relationship between the different types of innovations (Damanpour et al., 1989) and it is important to study this relationship in order to understand how innovation strategies vary in different companies and also why their performance is not steady, even in similar companies. This way, it will be possible to take full advantage from the implementation of

innovations strategies and consequently help a company to become more efficient (Joueid & Coenders, 2018). Even though there is a lack of studies in the relationship between marketing innovation and other types of innovation (Rebane, 2018; Schubert 2010), the existing literature is divided. Some authors defend that marketing innovation allows replacing other types of innovation, others say that they behave as complements (Medrano-Sáez & Olarte-Pascual, 2016; Kijek 2013).

Some authors such as Rammer et al. (2008), Grimpe et al. (2017) and Bhaskaran (2006) suggest that smaller companies tend to invest less in internal R&D and more in marketing innovations since this type of innovation implies lower costs and allow companies to have the same results.

However, to Schubert (2010), for most researchers in management literature, the right approach is to consider that the relationship between marketing innovation and technological innovation is complementary. González-Blanco et al. (2018) emphasizes this idea, by saying that in an era that companies are customer-oriented, marketing resources make it possible to determine what the customer wants in advance, allowing to reduce the failure rate in the commercialization of new products. Similarly, promotion strategies allow to increase companies' sales. Additionally, a new pricing policy (pricing innovations) may require a company to implement process innovations to lower production costs. Therefore, for González-Blanco et al. (2018) is intuitive that the relationships between marketing innovation and product innovation and marketing innovation and process innovations is complementary. Even though the literature is scarce, some authors defend that this complementary relationship extends to organizational innovations. This is the case of Soltani et al. (2015) and Gunday et al. (2011).

2.5 Empirical Evidence

Several authors defend the complementarity relationship between marketing innovation and the other types of innovations, most of the collected studies had different motivations to carry out their studies, although they converge at one point. Schubert (2010); Mothe & Thi (2010, 2012); Bartoloni & Baussola (2015); Medrano-Sáez & Olarte-Pascual (2016); Joueid & Coenders (2018); Geldes et al., 2017; Soltani et al.

(2015); Rebane (2018); Kijek (2013), González-Blanco et al. (2018), Schubert (2010), Gunday et al. (2011) and Aksoy (2017) agree that marketing innovation and the other types of innovations somehow have a positive relationship

There are more papers focused on the relationship of marketing innovation and product innovation, when comparing to process innovation or organizational innovation. The reason for that is that the success of new products is directly related with marketing methods. Therefore, marketing innovations shape products innovations (Gunday et al., 2011; González-Blanco et al., 2018; Kijek, 2013). González-Blanco et al. (2018) studied the Spanish service sector and highlighted this relationship by proving that there is a positive relationship between marketing innovation and product innovation. This is in line with Mothe & Thi (2010, 2012), Joueid & Coenders (2018) Bartoloni & Baussola (2015), Kijek (2013), Rebane (2018), Schubert (2010), Gunday et al. (2011) and Aksoy (2017) findings.

On the other hand, regarding the other type of technological innovation, process innovation, there are fewer studies that focus on the relationship between marketing innovation and process innovation. Even though many authors defend that non-technological innovations, in general, benefit both types of technological innovations (Ali-Yrkkö & Martikainen, 2008; Schmidt & Rammer, 2007; Ferreira & Marques, 2013), when extend those studies to marketing innovation domain, only Medrano-Sáez & Olarte-Pascual (2016), in a context of Spanish companies, Soltani et al. (2015), for Iran's small companies, Schubert (2010) for German companies and Mothe & Thi (2010), for Luxembourg companies, studied and verified that marketing innovation is positively related with process innovations.

The literature on the relationship between non-technological innovations has not been much explored. Even though there are not many papers that focus on the possible positive relationship between marketing innovation and organizational innovation, Medrano-Sáez & Olarte-Pascual (2016) and Soltani et al. (2015) could get some satisfactory results. They stated that both have a cause-effect relationship. In a similar way, Gunday et al. (2011) refer that organizational innovation is a driver of marketing innovation, reinforcing the signs

of a possible positive link between both types of innovations.

It should be highlighted that the results across papers are not uniform. For example, regarding the relationship between marketing innovations and process innovation, Kijek (2013) findings for Polish manufacturing firms (could not prove complementarity) are different from the ones of Medrano-Sáez & Olarte-Pascual (2016), Soltani et al. (2015), Schubert (2010) and Mothe & Thi (2010), that studied different countries, sectors and time intervals and used different approaches, models, and databases. Some papers also point to the differences of results between sectors. In the context of Estonian companies, Rebane (2018), who studied the relationship between marketing innovation and product innovation, has only succeeded in proving their positive behavior in the services sector. Rebane explains that this relationship is stronger in the service industry because incremental innovations and marketing activities are more important to the company's performance in service sector than in the manufacturing industry. This is in line with Mothe & Thi (2012) findings, that marketing innovation has greater impact on products innovations in service sector rather than manufacturing sector. This shows that the relationships positive relationships evidenced by empirical studies should not be generalized as they may vary according to countries, sectors of activity and time (Rebane, 2018; Ferreira & Marques, 2013).

If the studies regarding marketing innovations are limited, the studies that highlight the different types of marketing innovations are even limited. Only Medrano-Sáez & Olarte-Pascual (2016), Mothe & Thi (2012) and Kijek (2013) used the four different types of marketing innovation defined by Oslo Manual as variables. On the one hand, Medrano-Sáez & Olarte-Pascual (2016), could prove a full positive relationship between the subtypes of marketing innovation and organizational innovations, but not for technological innovations, where only product design innovations affected positively technological innovations. On other hand, Kijek (2013) could prove this positive relationship only for product innovation but not for process innovation. Finally, Mothe & Thi (2010) only studied and proved that two of the four different types of marketing innovation (product design and placement innovations) increase the propensity to innovate.

Although the different types of marketing innovation are not widely explored in the empirical field, is important to understand how they affect the other types of innovations. Mothe & Thi (2012) stated that the impact of marketing innovation on product innovation was different across sectors because that different types of marketing innovation have on product innovation. According to Mothe & Thi (2012), design and promotion innovations are more relevant to product innovations while placement innovations are more relevant to services innovations.

Medrano-Sáez & Olarte-Pascual (2016), in a context of 2008 economic crisis, also found that the propensity to introduce any one of the different types of marketing innovation across the different sectors is not the same. According to them, Spanish manufacturing firms tend to innovate more in design and packaging while service firms tend to innovate more in placement, promotion, and pricing. This means that, statistically, there are differences in the probability of a firm to implement marketing innovations.

In terms of databases used, not all the collected empirical studies use necessarily the CIS. This is the case of Medrano-Sáez & Olarte-Pascual (2016) and González-Blanco et al. (2018) that resorted to PITEC (Spanish Technological Innovation Panel), that consists in a CIS type database, developed by the Spanish National Statistics Institute (INE) alongside with the Spanish Foundation for Science and Technology (FECYT) and the Foundation for Technical Innovation (COTEC) and which consists of collecting data on innovation activities for Spanish companies. Other studies used own databases, for example, Ali-Yrkkö & Martikainen (2008) studied Finnish software companies by merging data from OSKARI questionnaire and Statistics Finland, while Soltani et al. (2015) used a Census Sampling Method to collect data for Iranian companies.

Considering the empirical studies collected, it is possible to make some observations regarding the similarities of some papers. However, it must be borne in mind that studies can vary from country to country, sector to sector and over time (Rebane, 2018) and therefore the results obtained can be different from the collected papers.

2.7 Hypotheses:

Considering the studies of Mothe & Thi (2010, 2012), Joueid & Coenders (2018), Bartoloni & Baussola (2015), Kijek (2013), Rebane (2018), Schubert (2010) and Gunday et al. (2011) that refer that there is a positive effect of marketing innovation and product innovations, and taking into account the information of Kijek (2013), Rebane (2018) and Mothe & Thi (2012) that say that the results may vary from one sector to another, the following hypotheses were defined:

H1: *Marketing innovation is positively related with product innovation* **H2:** *Marketing innovation is positively related with service innovation*

H2: *Marketing innovation is positively related with service innovation*

Soltani et al. (2015), Schubert (2010) and Mothe and Thi (2010) studies allow to expect that there is a positive relationship between marketing innovation and process innovation. Therefore, the following hypothesis was defined:

H3: *Marketing innovation is positively related with process innovation*

Regarding the study of the relationship between marketing innovation and organizational innovations, the number of empirical studies is much smaller when comparing to the other types of innovation. However, taking into account the studies of Medrano-Sáez & Olarte-Pascual (2016), Soltani (2015) and Gunday et al. (2011), that suggest that there is a potential positive relationship between both types of innovation, the following hypothesis was defined:

H4: *Marketing innovation is positively related with organizational innovation*

The number of empirical studies that analyze the relation that the four different types of marketing innovation, defined by OECD, have on the other types of innovation is limited. But even though there is not much empirical evidence to support the idea that there is a possible positive relationship between different types of marketing innovation and other types of innovation (technological and organizational), it would be interesting to study how they are related. This way it will be possible to obtain a clearer view and help to fill this gap in the lack of studies on the impact that different types of

marketing innovation have on other types of innovation. Thus, taking into account the studies carried by Medrano-Sáez & Olarte-Pascual (2016), Mothe & Thi (2012) and Kijek (2013), that used the different types of marketing innovation as variables, the following hypotheses were defined:

H5: *Product design Innovation is positive related with technological and non-technological innovations*

H5A: *Product Design Innovation is positively related with Technological Innovation*

H5B: *Product Design Innovation is positively related with Organizational Innovation*

H6: *Promotional methods Innovation is positive related with technological and non-technological innovations*

H6A: *Promotional methods Innovation is positively related with Technological Innovation*

H6B: *Promotional methods Innovation is positively related with Organizational Innovation*

H7: *Placement Innovation is positive related with technological and non-technological innovations*

H7A: *Placement Innovation is positively related with Technological Innovation*

H7B: *Placement Innovation is positively related with Organizational Innovation*

H8: *Pricing Strategy Innovation is positive related with technological and non-technological innovations*

H8A: *Pricing Strategy Innovation is positively related with Technological Innovation*

H8B: *Pricing Strategy Innovation is positively related with Organizational Innovation*

3. Data and methodology

For this study, it was used data from CIS 2016. This database follows the methodological guidelines provided by the OECD in the Oslo Manual and refers exclusively to Portuguese companies for the periods between 2014 and 2016. According to DGEEC (2016), for the construction of this

sample, were validated 6775 responses in 8934 firms, which corresponds to a response rate of 75.8%. However, from these 6775 observations, it was only considered 6766 due to the lack of some responses.

After processing the data, it was performed logistic regressions in STATA in order to estimate the marginal effects. This way it was possible to verify all the defined research hypotheses.

4. Results

Six sets of models were developed to test the eight research hypotheses. The first four groups of models are regarding the first four hypothesis (H1, H2, H3 and H4), where is studied the effects that marketing innovation (independent variable) has in product, service, process and organizational innovation (dependent variables). The last two groups of models are related with the remain hypotheses and is studied the impacts that the different subtypes of marketing innovation have on non-technological innovation. It should also be noted that, due to some errors in the estimation of some models on STATA, caused by conflicts of some control variables, it was not possible to use all proposed control variables. This happened because, according to the CIS, some variables could only be used exclusively if a company introduced a particular type of innovation and, therefore, could not be used as control variables for all types of innovation.

The results obtained from the first four sets of models showed that, overall, the introduction of marketing innovation had significant and positive impacts in all types of innovations (product, service and organizational innovation). The last two sets of models also showed that all subtypes of marketing innovation (product design, pricing strategy) had positive and significant effects in both technological and non-technological innovations. These results allowed to validate all hypotheses.

To evaluate the models' goodness of fit it was used the overall p-value of the model, pseudo R² and % of correctly classified. The overall p-values were 0 for all models, the pseudo R²s were between 0.1 and 0.17 and the % of correctly classified varied from 59% to 71%. This indicates that the estimated models were better than null models, indicating this way that they were significant.

The obtained results from all hypothesis testing are summarized in the table below:

Hypothesis	Results
H1: Marketing innovation is positively related with product innovation	Validated
H2: Marketing innovation is positively related with service innovation	Validated
H3: Marketing innovation is positively related with process innovation	Validated
H4: Marketing innovation is positively related with organizational innovation	Validated
H5A: Product Design Innovation is positively related with Technological Innovation	Validated
H5B: Product Design Innovation is positively related with Organizational Innovation	Validated
H6A: Promotional methods Innovation is positively related with Technological Innovation	Validated
H6B: Promotional methods Innovation is positively related with Organizational Innovation	Validated
H7A: Placement Innovation is positively related with Technological Innovation	Validated
H7B: Placement Innovation is positively related with Organizational Innovation	Validated
H8A: Pricing Strategy Innovation is positively related with Technological Innovation	Validated
H8B: Pricing Strategy Innovation is positively related with Organizational Innovation	Validated

5. Conclusions:

Due to the positive impacts that marketing innovation have on firms, is important to study its relationship with the other types of innovations, in order to take advantage from it (Rebane, 2018; Joueid & Coenders, 2018). To understand its behavior in general it is necessary to perform recurrent studies, in several regions and sectors. However, there are not many studies regarding marketing innovation (Medrano-Sáez & Olarte-Pascual, 2016) and Portugal is not an exception. Therefore, to contribute to this

issue, the main objective of this study was to understand how marketing innovation and its subtypes are related with product, process, and organizational innovations.

The literature review carried out allowed to find that there is a division between authors in the how marketing innovation and the other types of innovations are related. While some authors defend that they might be complementary, others defend that they might act as substitutes. Nevertheless, the majority of the collected studies were more favorable to a complementary relationship between marketing innovation and both technological (product and process) and non-technological innovations (organizational), being Schubert (2010); Mothe & Thi (2010, 2012); Bartoloni & Baussola (2015); Medrano-Sáez & Olarte-Pascual (2016); Joueid & Coenders (2018); Geldes et al., 2017; Soltani et al. (2015); Rebane (2018); Kijek (2013), González-Blanco et al. (2018), Schubert (2010), Gunday et al. (2011) and Aksoy (2017) some of the main studies on it.

To study the relationship between marketing innovation and product, process and organizational innovations, in Portuguese companies, it was used data from the Portuguese Community Innovation Survey for the periods between 2014 and 2016 – CIS 2016 and it was performed a logit model since all the dependent variables were dichotomous (i.e., only assume two values). The results obtained through logistic regression models performed, suggest that overall, Portuguese companies, from 2014 to 2016, presented a positive relationship between the introduction of marketing innovations and product, service, process, and organizational innovations.

This study should not be considered conclusive, but a starting point to future and recurrent works, for different countries, sectors and time intervals in order to understand the concept of marketing innovation in its entirety. This work can also help managers and administrators in making decisions regarding the introduction of innovations, given the benefits in obtaining competitive advantages through its implementation.

When focused only on the relationship between marketing innovation and product innovation, the results obtained are in line with the researches of Mothe & Thi (2010, 2012), Joueid & Coenders (2018), Bartoloni & Baussola (2015), Kijek (2013), Rebane

(2018), Schubert (2010) and Gunday et al. (2011). It must be reminded that, the decision of including service innovation was based in the division proposed by CIS, where product innovation is also composed by service innovation and the collected studies do not consider that division, therefore there is no basis for comparison the obtained results.

When and about process innovations, the obtained results are in line with the findings of Soltani et al. (2015), for Iran, Schubert (2010), for Germany, and Mothe and Thi (2010), for Luxemburg. Portuguese companies that introduced marketing innovations were more willing to introduce process innovations.

Regarding the relationship between marketing innovations and organizational innovations, this work could obtain the same conclusions as the studies developed by Medrano-Sáez & Olarte-Pascual (2016), Soltani (2015) and Gunday et al. (2011), where is hinted that there is a positive relationship between both.

For different types of marketing innovations, it was shown that product design innovation, promotional innovation, placement innovation and pricing innovation are positively related with both technological and organizational innovations. However, these results cannot be compared since the literature centered in the effects of different types of marketing innovation is somehow limited. The only existing studies that separated marketing innovation in different subtypes and expected their positive relationship with both technological and non-technological innovations, could not prove it at all. Medrano-Sáez & Olarte-Pascual (2016), proved a fully positive relationship between the types of marketing innovation and organizational innovations, but a very limited for technological innovations, where only product design innovations affected positively technological innovations. Kijek (2013) on the other hand proved the existence of a positive relationship between the subtypes of marketing innovation and product innovation but not for process innovation. Finally, Mothe & Thi (2010) only used two of the four different types of marketing innovation (product design and placement) as variables.

However, it should be reminded that the conclusions of this study should never be generalized. Since, according to Rebane (2018), there is not absolute truths when

studying the interactions between innovations, since their relationship may vary across countries, sectors and overtime, what can potentially explain the discrepancies with other authors, that defend a substitute relationship between marketing innovation and the other types of innovations such as Rammer et al. (2008), Grimpe et al. (2017) and Bhaskaran (2006).

In carrying out this study, some limitations were found. The first one, that was already pointed out in results' presentation, is associated with the not inclusion of some control variables for this analysis. Some variables related to firm's characteristics and technological activities were excluded from this analysis, since, according to CIS, those variables were dependent in the implementation of or product or technological innovations. Due to this condition, it was not possible to use all innovation drivers, defined in the literature review, as control variables, which, in a certain way, could somewhat limit the predictive capacity of the models. There was also a limitation regarding to the direction of the analysis, since this study only explores the effect of marketing innovation in the other types of innovation, but not the effect of the other types of innovation in marketing innovation. The use of a database already defined as CIS also has some drawbacks. The utilization of just a yes or no question may not be the best way to measure the implementation of marketing innovation, since, as defined in the literature review, it is a vast concept and as such a binary question may be ambiguous for a company to answer. The used data correspond only to the period between 2014 and 2016, so the time frame effect on the relationship between marketing innovation and other types of innovation could not have been studied. Also, these relationships are made only for all sectors, in general, without distinguishing between the services and industry sectors. According to Rebane (2018), the results vary over time and across sectors. Finally, although the estimated models have a high rate of correct predictions, the values of pseudo-R2 were between 10% and 17%, which according to McFadden (1977), indicates that they are close, but not in the optimal adjustment range. This may be due to the fact that most variables are categorical (Laitila, 1993).

For the future continuity of this study, suggestions are left, which respond eventually to the limitations faced in its performance. In future researches, it would

be interesting to see if the relationship between marketing innovation and the other types of innovation is positive in both directions, that is, if marketing innovation increases the propensity of the other types of innovation and vice versa. This way, it would be possible to have an in-depth knowledge of how marketing innovations behave and as such, it would be possible for companies to take greater advantage of the benefits of their implementation. Finally, following an approach like Rebane (2018) and Pinto et al. (2019), in order to understand how the time frame effect influences the relationship between marketing innovation and other types of innovation, more CIS waves can be used. Also, to try to understand how these interactions vary across different sectors, it can be done an approach similar to Mothe & Thi (2010), where separated analysis is made for both services and industry sectors. This knowledge could give an idea of how results can vary over time and sectors. These recommendations have as objective bring new proof on how the introduction of marketing innovations can affect the decision of a firm to innovate.

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