Marketing Innovation using CIS Portuguese Dataset

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Abstract—The recognized importance of innovation and the more and more determining role performed by the marketing have united in a way that makes innovation in marketing a question of great relevance for the economy. However, despite the importance of the marketing sector in the developed economies, the studies on innovation in this sector only gained relevance in the last twenty years. Until then, the researches and studies on innovation focused mainly on products (tangibles) and in the industrial sector, always considering marketing (and its services), and its components as "laggards" when referring to the innovation question. Based on a sample of 6160 Portuguese companies which replied the 2010 Community Innovation Survey, it has been used multivariate techniques as Factor Analysis (FA) and multivariate linear regression (MLR) which measured the factors associated with main contribution and the best innovative performance, mainly focused in the investment in marketing innovation.

Keywords—Innovation, marketing innovation, funding, determinants, investment, Factor Analysis, Multivariate Linear Regression.

I. INTRODUCTION

THE Community Innovation Survey (CIS) is part of the EU science and technology statistics. CIS surveys are carried out with two years' frequency by EU member states. CIS is a survey of innovation activity in enterprises. The harmonised survey is designed to provide information on the innovativeness of sectors by type of enterprises, on the different types of innovation and on various aspects of the development of an innovation, such as the objectives, the sources of information, the public funding, the innovation expenditures. etc. CIS provides statistics by country, type of innovation, economic activities and firms size.

In Portugal, several authors study innovation, for example Araújo and Costa in 2014 [1], Marques et al. in 2012 [12], Inhan et al. in 2013, [8] and Correia and Rua in 2016 [5] technology innovation, innovation within the cluster of Douro, innovation on the Portuguese healthcare sector organizations and innovation in knowledge intensive business services (KIBS) are addressed.

Braga et.al. in [2] argues that, KIBS facilitate innovation processes in the economy, including for sectors other than services. In this study the authors underlined the relationship between knowledge, cooperation and co-creation of innovation through knowledge-intensive business services (KIBS) and other organisations (i.e. clients, higher education institutions [HEIs] and other firms/institutions). Innovation is also seen as path to internationalization for Family Businesses by Braga et. al. in [3]. Determinants, Obstacles, Sources and Cooperation

to Innovation in Portuguese Firms, using CIS are studied by Correia et.a al. in [4].

According with Eurostat, statistics-explained, CIS is conducted in every European Union (EU) Member State to collect data on innovation activities in enterprises, i.e. on product innovation (goods or services) and process innovation (organisational and marketing aspects). The legal basis for CIS is Regulation 1450/2004 of 13 August 2004 carrying out Decision 1608/2003/EC on the production and development of Community statistics on innovation.

The main object of CIS is, as its denomination, about innovation, defined in the business dictionary as the process of translating an idea or invention into a good or service that creates value, or for which customers will pay. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers.

The definition of Innovation proposed by the OECD and the European Commission in the guidelines for the collection and interpretation of innovation data - Oslo Manual - says:

"Innovation is the implementation of a product (good or service), new or significantly improved, marketing process or methods, or a new organizational method in business practices, workplace or external relations".

The demanded minimum requirement for innovation is that every product / process / organizational method or method of marketing has to be new (or substantially improved) for the company. This means that the innovation has to be implemented and the engine of economic growth.

II. MARKETING INNOVATION AS MAIN SUBJECT

According to Oslo Manual, marketing innovation is the process of implementation of new marketing methods, involving significant improvements in product design, price packaging, distribution and promotion. Marketing innovation aims to orientate towards the needs of the consumer, opening new markets or repositioning the existing product with the aim of increasing sales. The distinctive feature of a marketing innovation, comparing with other changes in a company's marketing tools, is the implementation of a new concept or marketing strategy that represents breakthrough with previously used methods.

Therefore, it carries high and increasing levels of competition in most markets and replacement of mass markets for micromarkets as well the emergence of new segments.

However, when investing in Marketing and its innovation the result brings forward increased levels of sophistication on the part of consumers, and less tolerance to poor performance. This as a consequence of the globalization of the markets and the accelerated pace along with the technological changes. Meantime, with the Total Quality Management movement from the 80's some aspects are to be taken into account when dealing with this subject: Differentiation in service and soft elements of the marketing mix; Erosion of brand loyalty; Increasing power of distribution channels; Product life-cycle becoming shorter; The logic of marketing seeks balance between the company's goals and the market requirement. Emphasis on defining innovation; Continuous improvement; Nothing is definitely finished.

It is sometimes suggested that innovation is inherently impossible to quantify and to measure. While this is true for some aspects of innovation, its overall characteristics do not preclude measurement of key dimensions of processes and outputs. Peter Drucker [6] wrote "the business has two and only these two basic functions: marketing and innovation." Marketing and innovation produce results; all the rest are costs. This quotation expresses the central role of marketing and innovation in creating competitive companies and indeed competitive national economies. Neither marketing nor innovation is a simple process. It depends upon leadership from top management, the creation of the right culture and the focus on markets, which offer the potential to generate growth and profits. Successful innovation is about more successfully meeting the needs of customers. It is impossible to be continually innovative without creating a market – led orientation on the business. Successful marketing depends upon build effective cross – functional team, which work as a unit in creating value for customers. Innovation, too, is about forging partnerships with other organizations, which co-operate in building effective innovation processes. Innovation is the result of a complex set of processes. As the work shows, it depends upon the organization's marketing ability, its strategy, the resources, networks and processes it build, together with the culture and leadership in the firm. In more modern marketing, companies are beginning to feel the need to develop viable matching processes between objectives, experiences and resources and their opportunities in an ever-changing marketplace. Therefore, it is essential to plan all the resources of an organization to achieve quantified objectives in a given period of time. For Kotler, [10], this phase reveals itself when marketing is already concerned with the choice and analysis of important data, taking into account the choice of a certain strategic positioning, namely in a given product or service. The companies will have to make an analysis of the financial, human and technological capacities in order to evaluate the good implementation of the marketing plans. They should regularly do a critical review of their overall goals and marketing effectiveness as it is an area where the obsolescence of objectives, policies, strategies and programs represents a constant possibility.

The aim of this work is to perform a multivariate statistical analysis; therefore it will be used two statistic techniques, factor analysis and multiple linear regression. The data which has been used it result from the survey CIS 2010 in Por-

tugal. The survey covers areas such as new or significantly improved goods or services, and the introduction of new or significantly improved processes, logistics or distribution methods. It also gives information on the characteristics of innovation activity at the enterprise level, thereby creating a better understanding of the innovation process and the effects of innovation on the economy. The CIS produces a broad set of indicators on innovation activities, innovation spending, effects of innovation, public funding, innovation co-operation, sources of information for innovation, main obstacles on innovation activity and methods of protecting intellectual property rights.

This study is divided in four chapters: the first part is a short introduction concerning the context in which the work arose, the objectives to be achieved and the structure of it. In the second part it is made an initial analysis which aims to refer the sample, the the population under study, data collection, some of the variables, a descriptive analysis of the data and to study if there are associations between variables in study. Thirdly it is made a multivariate analysis using for this purpose the factor analysis and multiple linear regression. The final part concerns and presents the conclusions.

III. Population, Sample and Data Collection

CIS collects information on four types of innovation activities (product, process, organizational and marketing). The database used is concerned with firms located in Portugal, over a period of three years. Thus, taking the latest edition of the survey as an example, CIS 2010 gathered information on innovation activities in the period 2008-2010, being this as the reference year. CIS sample uses the following stratification variables to divide the sample into structured subgroups: the size of the enterprises (People in service: 10 to 49 persons employed; 50 to 249 persons employed and 250 or more persons employed); two-digit classification of economic activity (CAE) and Region (NUTS II). The sample was 8138 firms in which 6160 with valid answers which means a response rate of 76%; and 97% of companies responded to the survey by electronic submission.

IV. Variables and data analysis

This database contains 158 variables and the variables chosen for the study are related to funding sources in marketing innovation. At present, the investment in advertising and promotion continues to be large, denoting a considerable qualitative evolution. For Meidan, "the fact that companies attach great importance to advertising and promotion suggests the need for their continuity", [13]. According to Hughes in [7], this first stage defined by Kotler presents an uncertainty, still current, since "although tests can be made to evaluate the effectiveness of advertising campaigns, it is very difficult to relate them to the actual purchase or direct adhesion to the Advertised service". Marketing strategies presuppose a possible market segmentation, so this has assumed the role of cornerstone not only restricted the marketing level, but from the strategic management in general.

Company size classification - SIZE_COD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10 to 49 employees	3751	60,9	60,9	60,9
	50 to 249 employees	945	15,3	15,3	76,2
	>50 and less than 250 employees	1082	17,6	17,6	93,8
	>= 250 employees	382	6,2	6,2	100,0
	Total	6160	100,0	100,0	

Fig. 1.   Company Size Classification

INPDGD- Introduction of new or improved goods by the company between 2008-2010

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	"No"	4342	70,5	70,5	70,5
	"Yes"	1818	29,5	29,5	100,0
	Total	6160	100,0	100,0	

Fig. 2.   Introduction of new or improved **goods** by the company between 2008-2010

V. DESCRIPTIVE ANALYSIS

Through the Statistical Package for Social Sciences (SPSS), it has been made a descriptive analysis of data to better understand the profile of companies in this study. In the descriptive analysis, it is the first phase in which it seeks to describe and study the sample, followed by a second phase with inductive analysis, which seeks to draw conclusions for the population. The descriptive analysis encompasses frequency tables; Descriptive measures; graphs and cross-information tables. To better understand the population sample, a descriptive analysis is performed on some variables. The first variable taken into account was CAE2_COD, which corresponds to the Economic Activities Classification – EAC (CAE). Almost 15% (846 answers) corresponds to the EAC 46 – Trade (commerce sector), followed by the EAC 25 – Metallurgical and metal products with roughly 10% (584 answers). Actually the two major activities sector in the Portuguese business panorama, that weight on the results of the CIS. Considering the size of the companies inquired (SIZE_COD), the results are in Fig. 1.

Fig. 1 shows that the majority of the companies participating are composed by 10 to 49 employees, which corresponds to 60,9% and followed, with a significant difference by the companies with more than 50 and less than 250 employees. This is the reflection and it is a real portrait of the Portuguese business matrix, majority composed by SME's (Small and Medium Enterprises). Thereafter and to resume this part of the work, it has also been analysed two variables just to verify their frequencies in terms of the answers and because it can be a bottom line for the rest of the analysis. The results are presented in Fig. 2 and Fig. 3.

INPDSV – Introduction of new or improved services by the company between 2008-2010

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	"No"	4738	76,9	76,9	76,9
	"Yes"	1422	23,1	23,1	100,0
	Total	6160	100,0	100,0	

Fig. 3.   Introduction of new or improved **services** by the company between 2008-2010

As for introduction of new or improved goods (INPDGD) and introduction of new or improved services (INPDSV), Fig. 2 and Fig. 3, it can been seen that the "no" in both cases is the answer with more and sustained answers (there is a difference of more than 50% between both). According to Kotler in [9], the development of new products is one of the most important activities for companies, since one of the factors that allows growth is "the ability to continually innovate new products", because of the competition and the ease that Services have to be copied, their life-cycle is getting shorter. However, companies should try to choose segments that are both attractive and for which the products and services they offer satisfy the target segment, also making the difference for the better in relation to the competition.

Our goal is to analyse if Organizational Innovation and Marketing Innovation dependent on public funding, or if will there be corporate awareness (New Generation Managers) for these areas of innovation.

VI. ASSOCIATION BETWEEN VARIABLES

Two variables were created for the study:

Innov_marketing – sum of image changes(MKTDGP) + new techniques / media (MKTPDP) + new distribution methods (MKTPDL) + new pricing policies (MKTPRI)

and

Public_endorsements - sum of public financial support received - local and regional (FUNLOC) + Central administration (FUNGMT) + European Union (FUNEU)

Considering the hypothesis:

H0 - the variables are independent

versus

H1 - variables are dependent

If $p < \alpha$, reject H0 being p the value of the proof and α the significance level (in this case 0,05). To detect either the above mentioned two variable have any relationship, it was performed the Pearson chi-square test; Pearson's chi-square test (χ^2) is a statistical test designed to evaluate whether categorical data sets related to contingency tables differ from chance.

According with Fig. 4 p-value ¡ 0.337 and it is greater than $\alpha = 5\%$. Then H0 (variables are independents) is not rejected, which means that the variable are independent. As we are treating ordinal by ordinal variables, it has also been performed the Kendall's tau b and Kendall's tau c tests, as well the Spearman test to measure the intensity of the association of the variables. A weak relationship between the variables

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13,455ª	12	,337
Likelihood Ratio	14,180	12	,289
Linear-by-Linear Association	2,308	1	,129
N of Valid Cases	312		

a. 5 cells (25,0%) have expected count less than 5. The minimum expected count is ,21.

Fig. 4.   Chi- Square tests for Ordinal Variables

was observed, since the value of the coefficients is close to zero and statistically not significant because their p-value ¿ 0.05.

Then we concluded that Marketing Innovation is not correlated with Public endorsements.

VII.   MULTIVARIATE ANALYSIS

A. Factor analysis

As soon as all the companies have adhered to the new philosophy "We are witnessing the creation of a pleasant and welcoming atmosphere" of action of marketing, quickly this new attraction is no longer a critical factor of success. The division of the market into groups of customers with relatively homogeneous characteristics and needs and the creation of new products and services for each target segment is a new competitive tool found by companies. Marketing strategies presuppose a possible segmentation of the market, so it has assumed the role of a cornerstone not only in the restricted scope of marketing, but also of strategic management itself in general.

After analysing the database were collected some variables to try to understand the correlation between some important points in the study with similarity of behaviour of some factors about others in an attempt to understand which set of themes that can influence the innovation in Marketing, therefore the variables collected for the multivariate study are:

1. SGALA – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of graphics, layout and advertising".

2. SDOS – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of Product/ Object Design".

3. SMED – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of multimedia (audio, graphic, text, photography, animation, video)".

4. SWDS– "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of web design".

5. SSWD – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of software development".

6. SMKR – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of market research".

7. SENAP – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of Engineering or Sciences".

8. SMSDM – "In my country, during 2008-2010 the innovation in Marketing is related with the hiring or subcontracted service of Mathematics, Statistics, Database Management".

9. MBRST – "In my country, during 2008-2010 the innovation in Marketing is related with the application of Brainstorming Sessions".

10. MMDCF – "In my country, during 2008-2010 the innovation in Marketing is related with the creation of Multitask and multidisciplinary work-groups".

11. MJBRT – "In my country, during 2008-2010 the innovation in Marketing is related with the rotation of employees to other departments or to other companies in the group".

12. MFIN – "In my country, during 2008-2010 the innovation in Marketing is related with the Financial incentives for employees to develop new ideas".

13. MNFIN – "In my country, during 2008-2010 the innovation in Marketing is related with the non Financial incentives for employees to develop new ideas, such as free time, acknowledgement, interesting tasks".

14. MTREM – "In my country, during 2008-2010 the innovation in Marketing is related with the employees training in order for them to obtain new/more ideas, creativity".

The objective is to represent or describe a number of initial variables from a smaller number of hypothetical variables (latent variables or constructs), according to Marôco [11].

In more modern marketing, companies are beginning to feel the need to develop viable matching processes between objectives, experiences and resources and their opportunities in an ever-changing marketplace. Therefore, it is essential to plan all the resources of an organization to achieve quantified objectives in a given period of time. Because of that adequate statistical methods must be applied to support decision making.

The measure of adequacy of the sample to FA implementation is the KMO measure. The KMO value recommended for the FA is between 0,8 - 0,9 [being GOOD]. The homogeneity of the variance that compares the simple correlations with the partial correlations, observed between the variables must also be observed.

Through the Fig. 5, KMO, which studies the correlations in their totality, as the value 0.88, being considered "GOOD". The Barlett's sphericity test gives a χ^2 value of 25017.439, with 91 df, and a significance level approximately 0.000 ¡ 0.05, so it is clear that the null hypothesis is rejected. That is, the variables are correlated, which is a recommendation to use FA. This analysis should be completed by observing the diagonal values of the matrix of anti-image correlations, which all variables have values above 0.5, and it is not necessary to remove any variable. The remaining values of the matrix

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,889
Bartlett's Test of Sphericity	Approx. Chi-Square	25017,439
	df	91
	Sig.	,000

Fig. 5.   KMO and Bartlett's Test
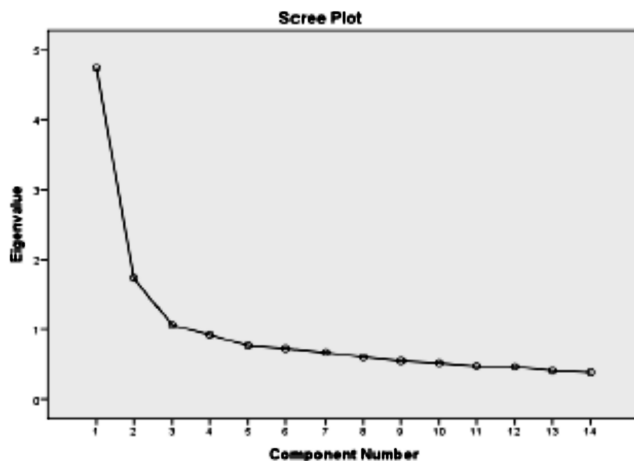
Fig. 6.   Scree Plot – Factorial Analysis

Rotated Component Matrix[a]			
	Component		
	1	2	3
SGALA – graphic/ layout	,800		
SDOS – obj.services design	,773		
SWDS – web design	,770		
SMED - multimedia	,762		
SSWD – software developm	,513		,411
MNFIN – non financ. incent		,720	
MFIN – financ. incentives		,674	
MTREM - training		,593	
MJBRT – employees rotation		,575	
MBRST		,562	,364
MMDCF		,562	,404
SENAP – eng./sciences			,765
SMSDM – maths/statistic/da			,741
SMKR –market research	,387		,557
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.[a]			
a. Rotation converged in 5 iterations.			

Fig. 7.   Rotated Component Matrix

Total Variance Explained			
	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	3,010	21,501	21,501
2	2,412	17,227	38,728
3	2,109	15,064	53,792
Extraction Method: Principal Component Analysis.			

Fig. 8.   Rotated Component Matrix

represent the partial correlations between the variables, which are all low values, the ideal for factorial analysis.

Analyzing the Communalities values, which are the amount of the total variance of the original variable, explained by the common factors, it is noticed that the percentage of the variance of each variable explained by the common factors extracted is greater than 50% for the total variances. The variables MJBRT (Employes rotation) and MTREM (employees training) are the variables that have less in common with the other variables (less than 50 %), however, they are maintained in FA since they are considered important for the study.

We have then extracted three using Principal Components Analysis (eigenvalues greater than 1, Figure 6) and with varimax rotation technique.

Fig. [?] is the Rotated Component Matrix (factors extracted). Taking into account the specification of each variable and the way they got ensembles after the extraction, we have divided and renamed three new variables/ factors: **Technical Abilities** – ensemble of all techniques related to the Marketing area (SGALA+ SDOS+ SWDS+ SMED+ SSWD); **Stimulation Methods** – Social activities that contribute for the Marketing development (MNFIN+ MFIN+ MTREM+ MJBRT) and **Scientific abilities** – the science based behind the Marketing subject (SENAP+ SMSDM+ SMKR).

The 3 components obtained explains 53.792% of the total variance, which can be verified in the Fig. 8.

Firms will have to make an analysis of the financial, human and technological capacities in order to evaluate the good implementation of the marketing plans. They should regularly do a critical review of their overall goals and marketing effectiveness as it is an area where the obsolescence of objectives, policies, strategies and programs represents a constant possibility.

To finalize this chapter we have also performed the Reliability of a measure that refers to the ability of this to be consistent. If a measuring instrument always gives the same results when applied to structurally equal targets, we can trust the meaning of the measure and say that the measure is reliable, [11]. Calculating the Cronbach's Alpha value allows us to analyse the internal consistency of the factors. The Cronbach Alpha test - or Cronbach's Alpha - allows you to determine the lower limit of the internal consistency of a group of variables or items. The alpha value should be positive, taking values from 0 to 1. In this case Factor 1 – Tecnhical abilities shown a value of 0.831 (good); Factor 2 – Stimulation Methods – 0.612 (acceptable) and Factor 3 – Scientific abilities – 0.710 (acceptable).

B. Multiple regression

Using the scores obtained in the last analysis, a multivariate linear regression is considered in order to verify the extent to which innovation in Marketing is affected by technical abilities, stimulation methods and/or scientific abilities.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2202,346	3	734,115	707,618	,000^b
	Residual	6386,517	6156	1,037		
	Total	8588,863	6159			

a. Dependent Variable: Inov_Mark
b. Predictors: (Constant), Scientific_Abilities_F3, Stimul_Methods_F2, Tech_abilities_F1

Fig. 9.   ANOVA test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	,135	,019		6,950	,000					
	Tech_abilities_F1	,109	,004	,371	27,179	,000	,475	,327	,299	,647	1,547
	Stimul_Methods_F2	,094	,007	,151	12,870	,000	,298	,162	,141	,877	1,141
	Scientific_Abilities_F3	,057	,008	,097	7,136	,000	,359	,091	,078	,648	1,543

a. Dependent Variable: Inov_Mark

Fig. 10.   Model Coefficients

Fig. 11.   Histogram

Fig. 12.   Normal P-P Plot of Regression Standardized Residual

Taking into account the dependent variable "In my country, Marketing innovation is related to the allocation of public financial support (including incentives/ tax benefits, subsidies, subsidized loans, bank guarantees)", the three factors mentioned before are the independent variables.

Therefore the hypothesis to be tested are:

H1. Marketing innovation is related to the investment in the Tecnhical Abilities (Graphic/layout, Product Design, Multimendia, Software development).

H2. Marketing innovation is related to the investment in the Stimulation Methods (non financial incentives, financial incentives, training, employees rotation).

H3. Marketing innovation is related to the investment in the Scientific Abilities (Engineering and Sciences, Maths and Statistics and Market Research).

It was applied a linear regression on the CIS database, using the Enter estimation method, then all the variable were considered.

The adjusted R square is $R_a^2 = 25,6\%$, which means that the 3 independent variables/factors, explain 25,6% of the variations on the dependent variable.

Durbin-Watson is very close to 2 (1,975) indicating that errors are not correlated.

The significance of the model is depicted in Fig. 9, with the ANOVA test. P-value is approximately 0, then the decision is reject the null hypothesis, which means that we have an highly significant model. Then at least one independent variable has significant effect on the variation of the dependent variable – "Innovation of Marketing".

The variable Technical abilities_F1 is the largest contributor to explain the variable dependent behaviour, Innovation Marketing, according with the standardized coefficients of the model in Fig. 10.

1) Validation of assumptions: To verify the absence of correlation between independent variables, we can see through the Fig. 10, which regardi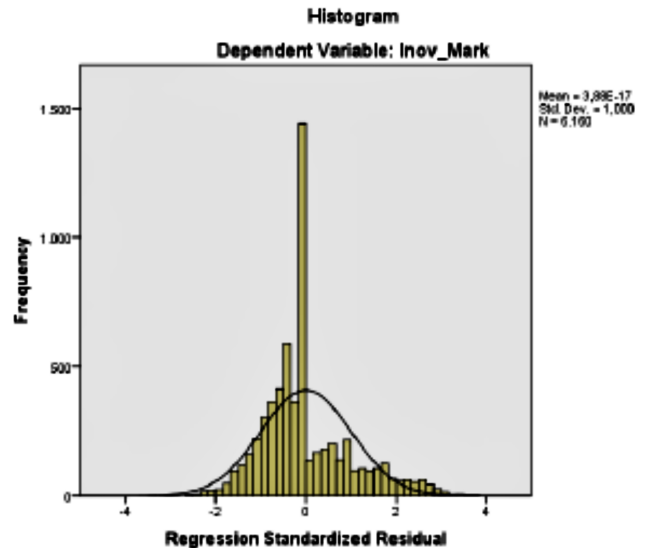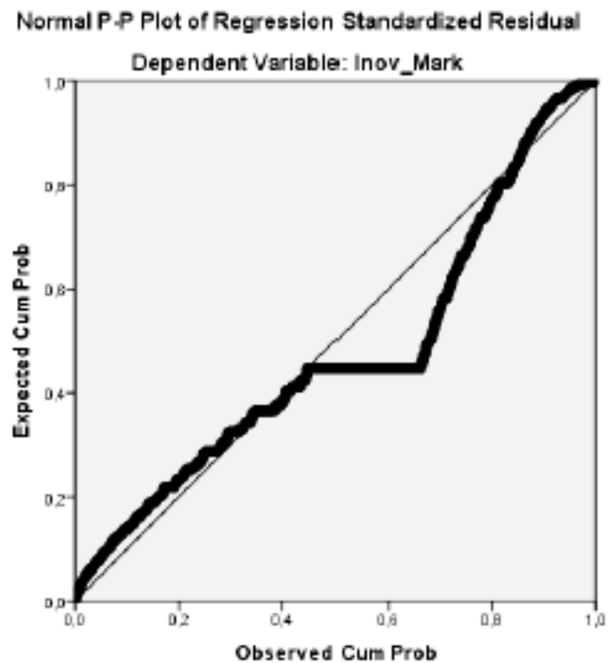ng tolerance (T) at the level of multicollinearity model presents a problem since the T values are not close to 0. About Inflation Variance Factor (VIF), there is the absence of multicollinearity since the values are below 5. Through histogram, Fig. 11, it is seen that the residues appear to have a normal distribution thus this assumption is validate.

Through the Normal P-P Plot of Regression Standardized Residual in Fig. 12 we can see that the points are relatively close to the diagonal, in spite of some deviation seen in the middle of the line, so it is expected that residues exhibit an approximately normal distribution.

The dispersion of the residues are around the average value (zero) and upper values with problems that can be derived from
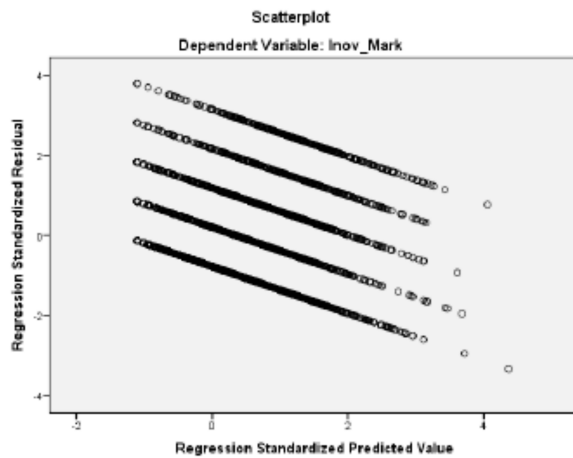
Fig. 13.   ScatterPlot

the ordinal variables used and not quantitative which results in rounding problems, Fig. 13. The negative slope can explain that as the predicted values are increasing, the residues will decrease thereby identifying a pattern, which is not expected.

VIII. CONCLUSION

In this work the main subject was Marketing Innovation.

Using the χ^2 association variables test we concluded that, contrary to what was expected, Marketing Innovation is not correlated with Public endorsements.

Then, from 14 variables, related with these two concepts, Marketing Innovation and Public Support, three new variables/ factors are defined, using Factor Analisys: Technical Abilities – ensemble of all techniques related to the Marketing area (SGALA+ SDOS+ SWDS+ SMED+ SSWD); Stimulation Methods – Social activities that contribute for the Marketing development (MNFIN+ MFIN+ MTREM+ MJBRT) and Scientific abilities – the science based behind the Marketing subject (SENAP+ SMSDM+ SMKR).

These 3 components explains 53.792% of the total variance.

Hereafter, these factors are used as independent variables in a Multivariate Linear Regression Model, in order to explain Marketing innovation.

It is concluded that the model is significant, explaining 25,6% of the variation of Marketing innovation. The variable Technical abilities_F1 had the largest contribution to explain their behaviour, fallowed by Stimulation Methods and lastly Scientific abilities.

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