The effect of value-based pricing strategies on the innovation performance of SMEs

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ABSTRACT,

The purpose of this paper is to study the effect of the degree of adoption of value-based pricing strategies (VBP) on the innovation performance of SMEs by comparing them to cost- (CBP) and competitor-based pricing (CoBP). The analysis has been carried out through the use of correlation coefficients and the gradients of the simple linear regression models presented throughout the paper. Additionally, scatterplots are used in order to control for the effect of control variables on the relationship. The primary analysis consisted of testing the main hypotheses of the paper. This is that the degree of adoption of VBP strategies will have a positive impact on the innovation performance of SMEs. Moreover, in a second stage, the paper addresses the potential effect that size and age may have on the relationship between pricing strategies and innovation performance. The results suggested that, although they have limited statistical validity due to the small sample size, VBP has a positive impact on the innovation performance. On the other hand, the findings indicated that competitor-based pricing strategies may have a negative or the least positive impact when adopted in SMEs compared to CBP and VBP. Furthermore, the secondary analysis produced some interesting results. Firstly, the finding suggested that the maximum positive impact that VBP strategies have on innovation performance is realized in medium firms. Moreover, the results indicated that small and new firms should rely on cost-based pricing strategies in order to have the greatest positive impact on their innovation performance.

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1. INTRODUCTION

This paper aims at studying the potential relationship between Value-based pricing (VBP) strategies and the innovation performance (IP) of small and medium enterprises (SMEs) by performing a deductive study. The importance of this research derives from the fact that nowadays the innovative development is extremely challenging for SMEs. This is because they are bounded by the limited resources and expertise (Grando & Belvedere 2006). Therefore, the relationship with marketing activities such as pricing may be helpful in order to better utilize their limited resources.

When considering the different pricing strategies present one could argue that that there are three dominant groups. These are namely, cost-based, competition-based and value-based pricing (Nagle & Hogan 2011). When adopting a cost-based pricing strategy(CBP), it can be stated that these kinds of financial decisions are inevitably founded on data provided through cost accounting. On the other hand, competition-based (CoBP) pricing utilizes a primary source of data the observed price levels of market competitors. Lastly, value-based pricing strategies are influenced by the value-in-use that the customer experiences via the product or service (Hinterhuber, 2008).

Several studies have concluded that VBP is the best strategy to be adopted (Docters et al.; Hinterhuber, 2008). However, it can be stated that companies are reluctant in adopting VBP strategies for numerous reasons. For instance: difficulties with market segmentation, difficulties in assessing value, difficulties with communicating value (Hinterhuber, 2008). As a consequence, it can be argued that it is important to extend the literature on the effectiveness of VBP, by testing the hypothesis stating that it positively influences the innovation performance. This will be done in order to stimulate practitioners to overcome the barriers that come with the adoption of these strategies. Additionally, it can be deduced, that companies adopting VBP strategies have deeper understanding of the customer needs. This is because, VBP is based on an Economic Value analysis, which identifies sources of value in a product for a specific customer group (Hinterhuber, 2004). In other words, what the customer values most in a product. Thus, leading to greater understanding of the customer wants and needs. As consequence, one could hypothesize that adopting VBP may lead to an improved innovation performance. Consequently, one could argue that they are better equipped to derive implications for product innovation. Furthermore, Laursen and Salter (2006) state that openness to external sources (i.e. customer insights) enable companies to extend the range of technological opportunities available to them thus increasing the likelihood of an increased innovation performance. Therefore, the following research questions is set forward:

RQ "To what extent does the degree of adoption of VBP strategies have an effect on the innovation performance of SMEs?"

It is important to highlight the fact that no researcher or practitioner has ever studied the relationship between these two fundamental aspects of a business namely, pricing strategies and innovation performance. However, Hinterhuber (2004) makes an interesting statement: "Economic value analysis is a tool [...] that can also help in the new product development process" which links literature to the relationship that will be addressed in this paper. In addition, in a later study performed in 2008, Hinterhuber argues that aside from having a great impact on the profitability of a firm, which has also been confirmed in study performed by De Toni et al.,2017 concluding that VBP strategies positively affect the effectiveness of companies in designing solutions (Products or services) that meet the customer needs. Moreover, given that markets are constantly changing because of the continuous shifts in the customer's expectations, firms are called for a perpetual delivery of new products (Boehe, Milan, & De Toni, 2009). One could argue that this provides further motives to study this relationship given the criticality of innovations nowadays. Additionally, Liozu & Hinterhuber (2012) state that less than 2% of the articles in marketing journals are related to pricing preferences even though pricing has a great impact on the performance of a company (Avlonitis & Indounas, 2006). Additionally, the only causal study present which links is VBP to a performance indicator of a business (i.e. profitability) is the research performed by De Toni et al.,2017. As a consequence, one could argue that no study has been carried out to determine the impact of the adoption of VBP strategies on the innovation performance of a company. Therefore, one could conclude that there is the need for extending the available literature on the effectiveness of VBP strategies given that the benefits of the adoption are evident.

It is ever important to extend the available literature of VBP considering that pricing decision are the ones that have greater effect on the profitability of a company. Additionally, VBP is known to be, in research and in practice, the best pricing strategy to be adopted. However, many companies do not implement it because of the major hurdles (Difficulties in communicating value, etc.) that come with the adoption (Hinterhuber, 2008). As a consequence, it is important to prove this relationship because of the fact that adopting VBP strategies may lead to higher costs for the company (Hinterhuber, 2008). Therefore, the purpose of the study it to investigate if VBP aids to develop innovations that have a higher chance of satisfying the customer needs, thus, positively influencing innovation performance when compared to the other two dominant pricing strategies groups (i.e. cost- and competitor-based. In this way, one could argue that practitioners could view more clearly that the large investments to adopt VBP strategies will pay-off in different critical aspects of the business (e.g. innovation performance).

Interestingly, this relationship has not been studied in research nor in practice. However, Laursen and Salter (2006) argued that by increasing the openness of the company to external sources (i.e. customers), which is the basis for a successful implementation of VBP strategies (i.e. economic value analysis), the range of innovation opportunities would be wider and clearer consequently leading to an increased likelihood of having an improved innovation performance. Therefore, one could argue that by studying this relationship there will be contributions to both marketing and innovation domains given that the aim of this study is to link these two fundamental elements influencing business performance.

The target population for this paper is SMEs. These have been targeted because of the fact that it can be deduced that small and medium enterprises have less resources and know-how regarding the use of VBP strategies. As a consequence, it is important for managers in SMEs to have at their disposal more literature that outlines the benefits of the adoption of this pricing strategy. For study purposes, the sample of SMEs will be retrieved in the Euregio area (Netherlands and Germany).

The data collection process will retrieve primary data regarding the pricing strategy used and the innovation performance level of the company in question. For the independent variable the operationalization developed by De Toni et al.,2017 will be used to determine the degree of adoption of each pricing strategy. Furthermore, the dependent variable (i.e. innovation performance) will be operationalized through the use of the validated measurement tool set forward by He & Wong (2004) which measures for the degree of importance of explorative and exploitative innovation activities. However. the operationalization essentially observes the rate to which new or modified products are introduced in the market. Therefore, one

could argue that if companies score low on exploitative and explorative activities then their innovation performance will be low as well.

Given the nature of the research the empirical data will be analyzed through the use of one simple linear regression models and three scatter plots per strategy to assess the relationship between the variables of interest (Reiter, 2000). The dependent variable namely, innovation performance, will remain the same throughout the three models.

In an initial stage, the report will aim at conducting descriptive research. Meaning that it will focus on bundling into groups the SMEs present in the sample in relation to the pricing strategy adopted and the innovation performance level obtained by the unit of analysis. The second phase of the paper can be denominated as exploratory research given the lack of statistical generalizability of results. In this section the results of quantitative data analysis will be outlined and conclusion on the basis of the statistical evidence available will be made.

2. DEFINITION OF VARIABLES

2.1 Value-based pricing (VBP) IV1

A VBP strategy uses as core element for pricing the value that a product or services delivers to a pre-established customer segment (Hinterhuber, 2008). This value is quantified through the use of an Economic value analysis, which helps to identify and measure the different sources of value for potential customers in a product or service (Hinterhuber, 2004). Thus, it may be argued that companies adopting VBP strategies have a deeper understanding of the customer needs. Moreover, it can be stated that there is a positive relationship between the degree of adoption of VBP and the profit margins (De Toni et al., 2017). In addition, a study performed by Cannon and Morgan (1990) states that VBP is the strategy to be adopted if the objective of the company is profit maximization. Consequently, given the obvious benefits of this pricing strategy several researchers have identified it as the best method to be adopted (Ingenbleek et al, 2003; Docters et al, 2004; Hinterhuber, 2008).

2.2 Cost-based pricing (CBP) IV2

It can be stated that Cost-based pricing strategies are the simplest ways of setting prices (Simon et al.,2008) The process needed for realizing the strategy involves the consideration of variable and fixed costs (Ingenbleek, 2003). Moreover, in relation to the profit objectives set by the firm, the profit margin is added on the calculated costs (De Toni et al., 2017). Several researchers have defined these pricing strategies as the least effective given that it focuses only on internal aspects (i.e. cost) and it can lead to substandard profitability. (Myers et al.,2002; Simon et al.,2003.)

2.3 Competitor-based pricing (CoBP) IV3

This pricing strategy uses as basis for setting prices the competitors' price levels (Liozu & Hinterhuber, 2012). However, at the same time, one could argue that it is also important to monitor the benefits and drawbacks of the competitor's products and how much they charge for it (Ingenbleek, 2003). Additionally, it can be stated that this strategy is the most widely adopted by practitioners (Hinterhuber, 2008).

2.4 Innovation performance (IP) DV1

One could argue that innovations range on a novelty continuum that goes from incremental to radical (Sher and Yang, 2005). Radical innovations are revolutionary developments in a product or service that require significant investments in order to launch and will most likely result in a lower average ROI compared to incremental innovations (Veryzer,1998). Interestingly, one could argue that innovations that are radical in nature are inevitably intertwined with exploration activities. This is because an explorative approach of a company leads to the creation of products with unknown demands as well as being in continuous search for new knowledge (Greve, 2007). Thus, increasing the likelihood of developing radical innovations.

On the other hand, incremental innovative developments refer to the products or service which have been renewed or improved, however, these are known in the market (Atuahene-Gima, 2005). In this case, there is a clear link with exploitative activities. As these have been defined as the use and refinement of existing knowledge, technologies, and products (Levinthal and March, 1993).

Conclusively, in order to successfully measure innovative performance, it can be argued that it is extremely important to take into account both radical and incremental innovations (Laursen and Salter, 2006).

3. HYPOTHESES DEVELOPMENT

In this section, the reasoning behind the development of the hypotheses is outlined.

3.1 VBP

When considering sources of innovation, one could argue that the openness of SMEs towards external resources (i.e. customer insights) has a positive impact on the variety of innovation opportunities that the company can exploit (Laursen & Salter, 2006). Moreover, it is arguable that at the basis of VBP strategies there are customer needs. This is because this strategy is based on the difference between perceived benefits and sacrifices the consumer experiences which can be defined as customer value (Simpson, Siguaw & Baker, 2001). Therefore, it can be discussed that companies adopting VBP strategies have a greater understanding of what the customer values the most. In addition, in a study performed in 2008, Hinterhuber argues that adopting VBP strategies may aid at improving the new product development process. Thus, the core hypothesis to be tested in this study is set forward:

H1 "An increase in the degree of adoption of value-based pricing strategies will positively influence the innovation performance of SMEs"



Figure 1. Conceptual model VBP

3.2 CBP

These pricing strategies are based solely on the unit cost of the product and the marketing objectives of the company (De Toni et al.,2017). Therefore, one could argue that companies adopting these strategies have very low openness to external sources of information. This will most likely result in them missing a wide

array of technological opportunities (Laursen & Salter, 2006). Thus, the following secondary hypothesis is proposed:

H2 "An increase in the degree of adoption Cost-based pricing strategies will have a negative impact on the innovation performance of SMEs".



Figure 2. Conceptual model CBP

3.3 CoBP

Taking into account the development of the hypothesis for Competitor-based pricing strategies it is important to consider the study performed by Laursen & Salter in 2006. It argues that the openness of companies to external insights (e.g. Competitor innovations) can lead to an opening of a wide range of opportunities. Thus, increasing the probability of having an increased innovation performance. On the other hand, it must be stated that one great limitation of this strategy is that it does not take the customer's perspective into account (Hinterhuber, 2008). Therefore, possibly limiting innovation performance of the firm. As a consequence, the following secondary hypothesis is set forward:

H3 "An increase the degree of adoption of Competitor-based pricing strategies will have a positive impact on the innovation performance of SMEs. However, the positive impact will be less than the one from VBP strategies"



Figure 3. Conceptual model CoBP

4. RESEARCH DESIGN

4.1 Sample and data collection

The data for the analysis will be collected through the use of an electronic survey that will be distributed to companies by email and shared on the professional social network LinkedIn. The questionnaire will be composed of 22 items. The final sample, as a result of the data collection, contains 13 companies operating in the Euregio area across 9 different industries. The firms vary in dimension from 1 to 320 employees and the age of these businesses ranges from 3 to 62 years.

The criteria used to define the sample were two: SMEs in the Euregio are. Small-medium enterprise were selected because of the limited resource at their disposal. Therefore, it would be interesting for managers at SMEs to discover that by investing in pricing strategies they will have a positive impact on fundamental aspects of a business such as the performance of innovations. The Euregio (The Netherlands and Germany) area has been selected for study purposes.

4.2 Independent variables measurement

The independent variables in this study are: Degree of adoption of Value-based pricing strategies (**IV1**), Degree of adoption of Cost-based strategies (**IV2**), degree of adoption of Competitor-based strategies (**IV3**). These variables will be measured using the validated operationalization set forward by De Toni et al., 2017.

The items that will aid to measuring the degree of adoption are as follows:

- Degree of adoption of Competition-based price:
 - 1. Price of our competitors
 - 2. Current pricing strategy of our competitors
 - 3. Degree of competition in the market
 - 4. Competitive advantages of competitors in the market
- Degree of adoption of Cost-Based pricing:
 - 1. Total cost of the product
 - 2. Profit margin percentage set by the company in relation to the price of the product
 - 3. Variables costs of the product

Degree of adoption of Value-based pricing strategies:

- 1. Advantages that the product offers to the customer
- 2. Perceived value of the product by the customer (benefit versus cost)
- 3. Balance between advantages of the products and its possible price
- 4. Advantages that the products offer compared to the competitors' products.

In order to determine the degree of adoption of the pricing strategy, each of the 11 items described above, will be included in an electronic survey powered by Google forms. These have to be evaluated by a practitioner in an SME, who will have to score each item using a Likert scale ranging from 1 to 7. Where 1=totally disregarded and 7=Fully considered. Once the grading is completed, each item will be averaged to obtain a final rating for each variable. Thus, each company will have a certain score for **IV1**, **IV2** and **IV3**. These scores will represent the degree of adoption of VBP, CBP, and CoBP strategies. The strategy with highest score is the one to be assumed to be majorly adopted by the company in question.

4.3 Dependent variable measurement

Considering the aim of the study, it can be stated that the dependent variable is innovation performance (**DV1**). In order to measure it, the validated operationalization set forward from He & Wong in 2004 measuring the degree of exploitation and exploration activities in a company will be used. This measurement tool can be utilized because of the nature of the outlined items in the paper. Essentially, they are measuring the rate to which the company brings new or modified products to the market. Therefore, it can be assumed, that if companies score low on these items, their innovation performance will be low as well. The items used for measurement are outlined below:

- 1. Introducing new generation of products
- 2. Extending product range
- 3. Opening up new markets
- 4. Enter new technology fields
- 5. Improve existing product quality
- 6. Improve production flexibility
- Reducing production cost
- 8. Improve yield or reduce material consumption

Each of the 8 statements described above will be evaluated by a practitioner, with regards to his company, from 1 to 7, where 1=Not important and 7=Very important. In order to obtain a final

score for innovation performance the scores of each item will be aggregated using a weighted average.

4.4 Control variable measurement

The control variable used in this paper are age (CV1) and size of the company (CV2). CV1 will be measured by subtracting the year of foundation of the company to the year in which the survey is filled out. Whereas, CV2 with the number of employees. These variables have been included in order control for their effects on innovation performance. For the sake of the analysis and due to the limited sample size, the control variables will be dichotomized in order to enable for the inclusion of the variables in the scatterplot to check for their effects on the studied relationship. The dichotomization will be done as presented below. For size, the categories have been defined using the definitions of small enterprises set forward by the OECD. On the other hand, for age, given that no official classification is available defining old and new companies, the categories have been subjectively defined by the author of the paper.

- CV1: >49 Small 50> Medium
- **CV2:** >15 New 16> Old

4.5 Data analysis process

The data analysis process will be divided in two sections. Firstly, it will be descriptive in nature. This is because the aim of this first stage of the analysis is to map the companies in the sample in relation to each pricing strategy. By doing so it is possible to get an overview of which pricing strategy is dominant in the sample. In addition, the distribution of the dependent variables will be considered in order to check if the data is well spread of the scale. This will be done in order to assess the feasibility of the analysis.

In the second stage of the analysis, the causal nature of this paper will be addressed. Therefore, in order to determine the impact of pricing strategies on innovation performance, 3 different linear regression models will be constructed (Reiter, 2000). One per each strategy. In this way, it will be possible to assess the individual impact that the different pricing strategies have on DV1 and to avoid issues with multicollinearity within the independent variables. However, due to the limited sample size, the hypotheses will be tested through the interpretation of scatterplots and correlation coefficients produced by the simple linear regression models. Moreover, in order to control for the effect of size and age on the addressed relationship, these variables will be included in the scatterplots as sub-groups. As a result, the scatter plots with the control variables included will have two lines of best fit. However, due to the lack of statistical significance caused by the limited sample size, the control variables will not be included in the linear regression models.

The models that will be utilized in order to perform the analysis are outlined below:

Value-based pricing regression models:

• DV1=c+IV1*x1

Cost-based pricing regression models:

• DV1=c+IV2*x1

Competitor-based pricing regression models:

• DV1=c+IV3*x1

5. RESULTS

5.1 Data collection process

As stated in the methodology section, the data has been collected through the use of an electronic survey powered by Google forms. It has been distributed to potential respondents in two different ways. Firstly, it was published on the professional social network, LinkedIn. Where it was viewed by 281 potential respondents. In order ensure that the sample of companies obtained through LinkedIn are firms in the Netherlands, the headline of the article has been written in Dutch. Secondly, it has been distributed through the use of an email list provided by the University of Twente containing 751 SMEs operating in the Euregio area (Netherlands and Germany). Unfortunately, given the limited time-span in which the data was collected, that was of three weeks, the total number of respondents was 13 and the response rate was of about 1%.

5.2 Preliminary data management

Once the data has been collected on Google forms, it was easily transferred into an excel sheet. In this stage, the data was checked for missing values. After performing the review of the data, it could be concluded that all 13 responses were complete and relevant for the analysis. Moreover, in order to obtain scores for the variables of each respondent, the responses have been aggregated by calculating an average of the items defined in the methodology. In sum, 4 items for IV1, 3 items for IV2, 4 items for IV3, and 8 items for DV1. Through these calculations, the variables used for the analysis have been generated. At this point, the data has been imported into the Statistical Package for the Social Sciences (SPSS) in order to perform the analysis. The first step within SPSS was to prepare the data for the analysis. As a consequence, the two control variables, originally continuous in nature, have been recoded into dichotomous variables namely, 'New Old' for age and 'Small Medium' for size.

5.3 Descriptive statistics of the sample

The sample is composed by companies operating in 9 different industries. The average size of the companies in the sample is 73 employees. Furthermore, of the total 13 respondents, it has been observed that 4 firms are adopting value-based pricing strategies with an average degree of adoption of 5.05 and an innovation performance level of 5.03 out of 7. Moreover, only 1 company has been identified as an adopter of cost-based pricing strategy with 5.25 in degree of adoption and a 4.44 in innovation performance level. Lastly, the majority of the businesses in the sample have adopted a competitor-based pricing strategy. These results confirm that these strategies are the most widely adopted in practice as stated by Hinterhuber in 2008. This is demonstrated by the 7 respondents adopting CoBP with an average degree of adoption of 5.51 and an average innovation performance level of 4.62 (See figure 4).



Figure 4. pricing strategies and their relative innovation performance

Moreover, when taking into account the dependent variable, one could argue that it is important to determine whether or not the data is well spread on the scale. The reasoning is that if the data was concentrated at one point on the scale then the analysis would be worthless. Therefore, the following frequency distribution diagram is set forward:



Figure 5. Frequency distribution IP

By observing figure 5, it can be argued that the distribution of the variable, which is well spread over the scale, is indicating that there is space for an analysis. This is because it outlines the need for explaining what the causes of such different levels of innovation performance in the sample are.

5.4 Statistical analysis

5.4.1 Hypothesis 1

The hypothesis stating that value-based pricing strategies have a positive effect on the innovation performance of SMEs is the first one that has been tested. When taking into account Pearson's correlation coefficient of the relationship between **DV1** and **IV1** of 0.097 it shows that there is a very weak correlation between the two variables. However, when taking into consideration the visual interpretation of this simple scatter (Appendix 8.1), that has a line of best fit with a slope of 0.35, it gives an indication that a higher degree of adoption of VBP strategies would have a positive effect on the innovation performance levels.

Interestingly, when including 'New_Old' in the scatterplots as sub-groups, the gradient for old companies (older than 15 years) is 0.25 whereas the slope of the line representing new firms is 0.03. These results suggest that the age has an effect on this relationship. Moreover, considering figure 6, it is visually clear





Figure 6. Scatter plot IP-VBP with control variable age

Furthermore, the same has been done for the variable 'Small_Medium'. The output of the scatter plot (Appendix 8.2) indicates that size does not have an important influence on the relationship given the minimal difference in the gradients of the line of best fit for the two sub-groups (Small:0.39 and Medium 0.26).

Lastly, the simple regression output (Appendix 8.3) has been taking into account. The equation of the regression line is as follows:

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• DV1=3.155+IV1* 0.345
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The results of this simple regression analysis indicate that the degree of adoption of VBP strategies is not a significant predictor of innovation performance given that the level of significance of .299 is above the alpha level of 0.05 and considering the explained variance of only 9.7%. However, it is important to state that the regression equation indicates that there is a positive relationship between the two variables as suggested by the positive gradient of .345 indicating that adoption of VBP may have a positive impact on IP. Thus, one could argue, although they have limited statistical validity due to the small sample size, that these results support **H1**.

5.4.2 Hypothesis 2

The second hypothesis to be addressed in the paper states that the degree of adoption of cost-based pricing strategies will have a negative effect on the innovation performance of SMEs. When taking into account the simple scatterplot (Appendix 8.4), it is important to outline how it visually demonstrates that **IV2** positively correlates with **DV1** (Rsquare=.253).

Moreover, the control variable 'Small_Medium' has been included in the scatterplot (Figure 7).



Figure 7. Scatter plot IP-CBP with control variable size

Considering the slopes (Small=0.73 and Medium=0.03) it can be stated that the age of the company has an effect on the studied relationship. This is also confirmed by the correlation coefficients. It is interesting to see that, R Squared indicates that for small firms (0.536) there is moderate positive linear correlation and for medium enterprises the coefficient is 7.271E-4 indicating that, in this case, no correlation is present between **IV2** and **DV1**.

Furthermore, the variable 'New_Old' has been included in the scatter plot as sub-groups (Appendix 8.5) The line of best fit representing old firms has a slope of .34 and new enterprises had a gradient of .31. In both cases, the results clearly clash with the hypothesis as they both indicate that an increase in the degree of adoption of CBP will have a positive impact on innovation performance. Moreover, this scatterplot also shows that age has an effect on the relationship between **DV1** and **IV2**. As the correlation coefficient of new companies is 0.030 whereas old firms interestingly show an R squared of .209.

Lastly, the output of the simple linear regression analysis has been taken into account (Appendix 8.6) The equation is as follows:

• DV1=2.614+IV2*.493

It can be observed that the degree of adoption of cost-based pricing strategies is not a significant predictor of innovation performance. This can be said due to the level of significance of .80 which is higher than alpha of 0.05. Additionally, **IV2** explain 25.3% of the variance of the dependent variable. Considering the slope of the regression line (.493), one could argue that is clashes with **H2** given that it is positive.

5.4.3 Hypothesis 3

The last hypothesis to be tested states that the degree of adoption of competitor-based pricing strategies has a positive effect on the innovation performance of SMEs. However, it is expected to have a smaller effect compared to value-based pricing strategies. By observing the simple scatter plot (Appendix 8.7), one can argue that there is a weak positive linear relationship considering the Pearson's correlation coefficient of 0.010.

Interestingly, size had an important impact on the relationship between **DV1** and **IV3** as can be seen in the scatterplot (Figure 8.).



Figure 8. Scatter plot IP-CoBP with control variable size

It showed that for small companies, the degree of adoption of competitor-based pricing has positive impact on the innovation performance as suggested by the slope of the line of best fit of .55. Moreover, it could be observed that correlation coefficient is of .278, indicating a positive correlation. On the other hand, medium-sized companies had quite the opposite results. As a matter of fact, the slope of the related line of best fit is of -.36 and a correlation coefficient of .287, suggesting that for these firms adopting competitor-based pricing strategies may have negative impact on their innovation performance.

Furthermore, another scatter plot has been generated including as subgroups the variable 'New_Old' (Appendix 8.8). The results suggest that new companies adopting CoBP strategies may have a negative impact on the innovation performance as shown by the negative slope of the line of best fit of -.17. Additionally, the visual interpretation of the plot suggests that the direction of the data indicates a negative correlation. On the other hand, old companies have very weak positive correlation as demonstrated the direction of the data in plot and an R squared of 0.011.

Lastly, the output of a simple linear regression analysis has been considered (Appendix 9.9). The equation is the following:

It is important to outline that **IV3** is not a significant predictor of **DV1** given that the significance level of .740 which was greater than alpha set at 5%. In addition, the degree of adoption of CoBP strategies explains only 1% of the variance of the dependent variable. However, considering the slope of the regression line of .087, one could argue that, in the studied sample, an increase in **IV3** will possibly have a positive effect on the innovation performance.

6. LIMITATIONS, DISCUSSION AND CONCLUSION 6.1 Limitations and future research

It is important to keep in mind when reading the discussion and conclusions that this study has faced several limitations. However, these can be interesting points to start with for future research. First of all, the most pressing limitation of this research, has been the lack of respondents that inevitably hindered the statistical analysis. As a consequence, the methodology had to be adapted to the limited sample size. Eventually, this has undoubtedly limited the statistical generalizability of the paper. Therefore, it is not possible to infer the results of the analysis to the target population. Thus, future research should replicate this study using the ideal methodology for the analysis and with an appropriate sample size. This is multiple linear regression where all the independent and control variables are included in the model in order to observe their effect on the dependent variable as well as their interaction effect.

In addition, it could be interesting for future research to control for the effect of R&D intensity on the studied relationship given that one could argue that a higher investment in R&D will lead to a higher likelihood of having an increased innovation performance. This variable has not been included in the study considering that the ideal operationalization set forward by Laursen & Salter in 2006 requires absolute values for the accurate measurement of R&D intensity. These items have not been included in order to increase the response rates.

Moreover, another important limitation has been the social response bias that practitioner could have experienced while answering the questionnaire. This is because, respondents were requested to score their own company's innovation performance on a scale. This is to say that respondents may have had the tendency to indicating a higher innovation performance than the actual level achieved by the company. As a consequence, it would be interesting for future research, to replicate this study by substituting the scale items in the questionnaire with the operationalization set forward by Laursen and Salter (2006) that uses financial absolute values to measure innovation performance.

Furthermore, another limitation of the study was the fact that the industry's in which companies operate were not considered. This would have been important due to the fact that variable and fixed costs vary significantly across different sectors as well as the degree of competition (Ingenbleek, 2003). These aspects will inevitably have an effect on the type of pricing decisions that are done in a company. Therefore, it would be interesting for future research to extend the validity of the study by replicating it in specific industries.

6.2 Discussion

The objective of this study was to extend the available literature on the effectiveness VBP strategies by comparing the effect that the three dominant pricing strategies have on the innovation performance level of SMEs. The goal of this section is to outline and explain the most interesting findings that were the result of the analysis.

A preliminary consideration of the results suggests that Valuebased pricing strategies have a greater positive impact when compared to competitor-based strategies. This claim is supported by the descriptive statistics of the sample. These show that the average innovation performance of companies adopting VBP in the sample is higher than enterprises that rely on CoBP and CBP strategies. Additionally, the findings of the analysis suggest that, although it's important to keep in mind that the statistical validity is limited due to the small sample size, both CoBP and VBP strategies have an impact on IP. However, the results also indicate VBP strategies have a greater positive effect which was in line with what was predicted in H1 and H2. It is important to keep in mind that the results of the regression analysis highlighted the fact that both CoBP and VBP are not significant predictors of innovation performance. Therefore, the statistical generalizability of the results is limited to the sample.

On the other hand, considering the relationship between IP and cost-based pricing strategies, the findings in this case were unexpected. This is because the reasoning behind the hypothesis stated that companies adopting CBP strategies would have a lower openness to external sources, thus, decreasing the range of technological opportunities which could potentially hinder their innovation performance. However, the results indicate that, in the case of small enterprises, relying pricing decisions solely on internal aspects (i.e. cost, profit margin objectives) of the business may have a positive impact on innovation performance. Whereas, considering medium enterprises the findings differ significantly, as a matter of fact the results suggest the for medium firms a higher degree of adoption of Cost-based pricing strategies will results in a lower innovation performance. These results can be explained by the fact that small firms, given their very limited resources, have major difficulties in protecting their intellectual properties, as a consequence, they tend to maintain a lower openness to external sources in order to obtain a higher level of protection (Vahter et al. 2013). Therefore, it can be argued that adopting cost-based pricing strategies may increase the protection of intellectual properties given the lower openness. Consequently, this could lead to an increased innovation performance. On other hand, medium firms have greater resources to protect their intellectual properties. Thus, one could argue that in this case the benefits of openness to external sources outweigh the drawbacks. Therefore, adopting CBP in medium firms, that leads to a lower openness, may result in a lower innovation performance in as suggested by the results.

Furthermore, it is interesting to point out the fact that age, unexpectedly, has an effect on the relationship between the degree of adoption of VBP and innovation performance. As a matter of fact, the results suggest that old companies (older than 16 years) adopting VBP may result in having a higher innovation performance compared to newer companies. This could be explained by the fact that it is more likely for medium companies to have an already established brand in the market. Additionally, one could argue that introducing an innovation with an already established brand can have an important impact on its performance. As it is fundamental for business to combine innovations to commercially successful product launches in order to fully realize its benefits (Crass, 2014). At the same time, for established companies it is critical the perform effective pricing decisions in order to avoid the destruction of value. Therefore, one could argue that older companies may result in having a greater ability to harvest the benefits of VBP.

Moreover, the findings indicate that for small companies, adopting competitor-based pricing strategies would have positive impact on their innovation performance. On the other hand, for medium companies, who are already well established within the market, adopting CoBP would have a negative impact on the firm's innovation performance. These results could be explained by the difference in the objectives of small and medium enterprises. As a matter of fact, it can be argued that small firms who recently entered the market do not have enough know-how to enable them to make effective pricing decisions themselves and most likely have as goal to gain market share and brand recognition. Therefore, it would wise for small companies to base their prices on the more experienced competitors in the industry. On the other hand, medium companies would have the objective to continuously innovate in order to stay competitive in the market to avoid the threat of new entrants. Therefore, adopting CoBP strategies that could result in financially consuming price war. As a consequence, given that lowering prices requires substantial investments from the company one could argue that that they will inevitably find themselves with limited resources to invest in R&D, thus, most likely hindering their innovation performance. Therefore, it would be wise for medium companies to adopt value-based pricing strategies in order to avoid the destruction of value related to a price war.

6.3 Contributions to theory

The theoretical contributions of this study are several. Firstly, considering the lack of literature on the relationship between pricing strategies and innovation performance, one could argue that this paper has contributed to theory by laying the groundwork for future research to perform a more thorough study on the topic. Secondly, it contributes in reducing the research gap present when considering pricing practices (Only 2% of the marketing publications regard pricing) by exploring the possibility that these practices have an effect on the innovation performance. Additionally, the results of this study outline the need for a follow-up research in the future.

6.4 Contributions to practice

The contributions to practice of this paper are in the form of recommendations for practitioners. This is because the findings suggested that, in terms of innovation performance, there is an ideal pricing strategy for different types of companies. The ones studied in the paper were: Old, new, small and medium firms. As a result, table 1 ranks the pricing strategies from best to worst, in terms of the impact on innovation performance, in relation to the mentioned companies' characteristics.

 Table 1. Ideal pricing strategy in terms of the impact on innovation performance

Type of								
company	Recommendations							
Small	1)CBP	2)CoBP	3)VBP					
Medium	1)VBP	2)CBP	3)CoBP					
New	1)CBP	2)VBP	3)CoBP					
Old	1)VBP	2)CBP	3)CoBP					

6.5 Conclusion

In conclusion, although the statistical validity of paper is in question, one could argue that this study shed a light on the possible effect that pricing strategies may have on the innovation performance. This said, one could deduce on the basis of the findings, that value-based pricing strategies have positive impact on IP when implemented in firms that are already established in the market (Medium and old companies) and have the resources to realize its benefits. On the other hand, companies who have less brand recognition and are not well positioned within the market, will most likely benefit from the adoption of more traditional strategies such as cost- and competitor-based pricing. Conclusively, this preliminary research provides the scientific community with the groundwork for performing a thorough analysis of the impact of pricing strategies on the innovation performance of SMEs.

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9. APPENDIX

9.1 Scatter plot H1 VBP-IP





9.2 Scatter plot H1 with control variable size



9.3 H1 simple linear regression SPSS output

Model Summary ^D												
					Change Statistics							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin- Watson		
1	.312 ^a	.097	.015	.95487	.097	1.186	1	11	.299	2.275		
a. Predictors: (Constant), VBP												

b. Dependent Variable: IP

9.4 Scatter plot H2 without control variables

Coefficients ^a											
Unstandardized Coefficients				Standardized Coefficients	95.0% Confidence Interval for B				Collinearity Statistics		
Model		В	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	3.155	1.413		2.232	.047	.044	6.265			
	VBP	.345	.317	.312	1.089	.299	352	1.043	1.000	1.000	
a. C	a. Dependent Variable: IP										

9.5 Scatter plot H2 with control variable age







9.6 H2 simple linear regression output

Model Summary ^b											
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin- Watson	
1	.503 ^a	.253	.185	.86886	.253	3.718	1	11	.080	2.183	
a. Pre	a. Predictors: (Constant), CBP										
b. De	b. Dependent Variable: IP										

				Co	efficients	s ^a				
		Unstandardize	d Coefficients	Standardized 90.0% Confidence Intern Coefficients B			nce Interval for B	or Collinearity Statistics		
Model		В	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	2.614	1.091		2.396	.035	.655	4.574		
	CBP	.493	.256	.503	1.928	.080	.034	.953	1.000	1.000
a. D	ependent Va	riable: IP								



9.8 Scatter plot H3 with control variable age

9.9 H3 simple linear regression output

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin- Watson
1	.102 ^a	.010	080	.999801241	.010	.116	1	11	.740	1.895

a. Predictors: (Constant), COBP

b. Dependent Variable: IP

		Unstandardize	d Coefficients	Standardized Coefficients			90.0% Confide	nce Interval for 3	Collinearity Statistics		
Model		В	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF	
1	(Constant)	4.239	1.290		3.287	.007	1.923	6.555			
	COBP	.087	.255	.102	.340	.740	371	.544	1.000	1.000	

a. Dependent Variable: IP