A model of university choice: an exploratory approach

Raposo, Mário and Alves, Helena
University ob Beira Interior

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Mário Raposo mraposo@ubi.pt
Management and Economic Department
NECE – Research Unit
Universidade da Beira Interior – Covilhã
Portugal

and

Helena Alves halves@ubi.pt
Management and Economic Department
NECE – Research Unit
Universidade da Beira Interior – Covilhã
Portugal

Absctract:

In order to attract the best students, institutions of higher education need to understand how students select colleges and universities (Kotler and Fox, 1995). Understanding the choice process of a university is an instrument with high potential for developing universities marketing strategies (Plank and Chiagouris, 1997). Although many studies have tried to investigate which criteria students use to select a college or university, few have tried to analyse this trough a model that allows the interaction of all these criteria. This study presents a model of university choice, analysed through structural equations modelling using the Partial Least Squares approach.

Key words

Marketing, student recruitment and selection, high institution development, strategic planning

A MODEL OF UNIVERSITY CHOICE: AN EXPLORATORY APPROACH

INTRODUCTION

In the last two decades, the sector of Higher Education has suffered quite profound changes. This way, higher education faces more competitive market structures that threaten the survival of some of the existing institutions, for the latter are now forced to compete with scarce resources for a greater number of potential candidates, even more disputed by the several institutions.

In the future, it is expected that this scenario of competition will become even more intensified, in the sequence of the agreement foreseen in the Bologna Convention, for the harmonization of the academic degrees in the European Union. With the harmonization of the different academic degrees, the mobility and employability of students, professors, researchers and technicians will be greater, for which the less competitive universities may come to lose a good part of their students and their human capital. Given the present per capita and per knowledge areas financing system many universities may not survive.

Within this context, the identification of the institutional factors that a potential student may consider in choosing one university over another, are matters of importance to university administrators who are concerned with the long-term effectiveness of their institutions enrolment practices.

However understanding university choice process it's not easy. The choice process of a university is a great and complex decision for a student, not only in monetary terms, but also because it involves a long term decision which affects student life (Litten, 1980; Yost and Tucker, 1995). This choice can influence student's future career, his friendships, his future residence and his personal satisfaction (Kotler and Fox, 1995). Also Smith and Cavusgil (1984) reaffirm this statement, referring that this kind of shop is one, that in many cases, is unique in life and that involve many others costs besides monetary costs, for instance psychological costs and the lose of potential monetary rewards.

This study tries to investigate which factors most influence students' university choice process, by joining in one model factors that have been found as relevant in literature. This model has the advantage of taking simultaneously the influence of all factors, including their interaction.

The research is conducted in University of Beira Interior, one of the youngest Universities in Portugal, located in the Interior of the country and assumed as a project of a regional development, considering the need of attract young people and qualified human resources, to foster the social and economic development of the region.

LITERATURE REVIEW

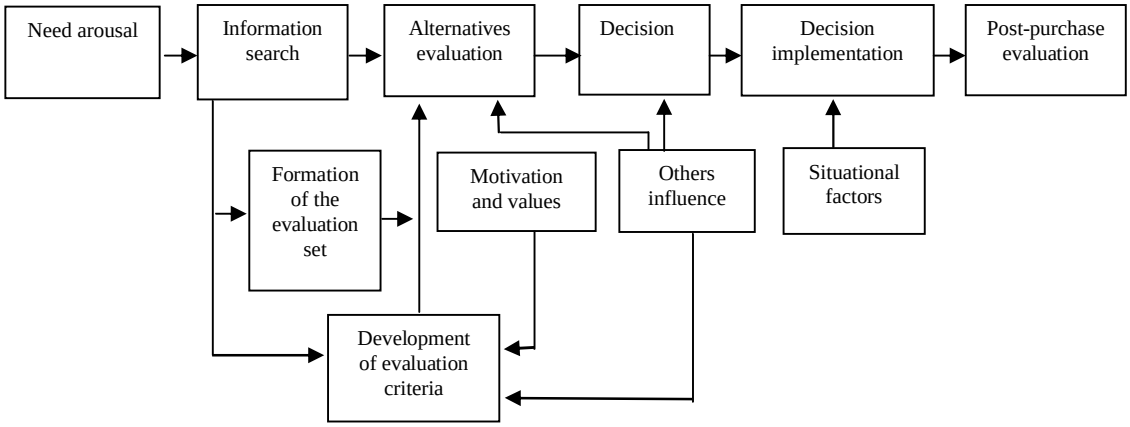
According to Hossler, Schmit and Vesper (1999) most of the studies that tried to understand the university choice process could be included in one of the following categories: economic models, status-attainment models and combined models. Economic models are based on the assumption that a student wants to maximize their utility and minimize their risks, i.e. they assume that college choice is a rational process and that students will always do what is best for them. Kotler and Fox´s (1995) model is one of this kind. According to them, status-attainment models are based on Social Theory, being focused on processes such as socialization, the role of the family, social networks and academic conditions. This kind of model rejects the assumption of students and families being rational deciders. Combined models try to capture the essence of both previous models. These kinds of models allow a considerable amount of analytical power, as they combine sociological aspects with a rational decision. An example of this type of model is the one of Hossler and Gallager (1987).

Hossler and Gallagher's (1987) three – phase model includes: Predisposition, Search and Choice. The predisposition phase is an initial phase where students decide whether or not they will continue their education in higher education. The search phase is that phase where students gather information about

higher education institutions. The third phase is the one in which students decide which institution they will apply to.

In turn, Kotler and Fox's (1995) model is a wider one that shows the steps completed by students when they choose a higher institution to apply to (Figure 1).

Figure 1 – Steps completed in a complex decision



Source: Kotler and Fox

This study is based on the literature of combined models and is focused on the choice step thus being the most specific one analysed.

The Choice Step

Several studies tried to investigate which factors influence students in their decision of which university or college to attend. These studies can be viewed according to the stimulus-response model of consumer behaviour, where students are faced with external stimulus such as the institutionally controlled marketing vehicles, institutional attributes and non controlled factors, like parents and friends´ personal influence.

Some of these factors are listed in table 1, according different authors. As can be seen in table 1, the diversity of factors influencing student choice is great. Some are related to influence of others, some are related to personal and individual factors, and some others are related with institutions characteristics and students perceptions about value and costs.

Table 1 – Factors that influence the choice process of a college or university

Murphy (1981)	• Influence of brothers and friends • Academic reputation and costs
Webb (1993)	• Academic reputation • Accreditations • Proximity • Costs • Potential marketability of the degree
Chapman (1993)	• Quality of faculty • Quality of degrees • Overall academic reputation
Coccari and Javalgi (1995)	• Quality of faculty • Degree programs • Cost • Variety of offerings • Classroom instruction
Kallio (1995)	• Residency • Academic environment • Reputation and institution quality • Course diversity • Size of the institution • Financial aid
Lin (1997)	• Quality of education • International • Facilities and costs • Student life
Donnellan (2002)	• Personal contacts • Influence of parents • Location • Social life • Availability of a variety of degrees
Soutar and Turner (2002)	• Course suitability • Academic reputation • Job prospects • Teaching quality
Shanka, Quintal and Taylor (2005)	• Proximity to home • Quality/variety of education • Cost of living/tuition • Friends study • Family recommendation • Safety
Holdswoth and Nind (2005)	• Quality and flexibility of the degree/course combinations • Availability of accommodation • Whether or not employers are likely to recruit from that university • Costs • Spatial proximity to home

METHODOLOGY

The data was collected through a survey, from a sample of 1024 first year full-time students, who started their studies in University, immediately after their pre-university secondary education exam, in the school year 2006/2007.

The survey was developed having in mind the objective of the research. Therefore it contains questions about students' background, such as gender, age, origin region, course options and an open question about their idea of the University of Beira Interior. The survey contains several Likert type rating scales, with intervals from 1 (totally disagree) to 7 (totally agree).

In the whole questionnaire multiple item scales were used, as they allow one to reduce the standard error and the size of the required sample (Ryan, Buzas and Ramaswamy, 1995), as well as measuring constructs with greater validity (Hayes, 1998; Anderson and Fornell, 2000a). The rating scales used in this study intend to determine: the factors that had influenced the decision of students to enter this University, their opinion about the environment and the importance of the factors that promote the University and its courses. Table 2 shows the questions used to measure factors that may influence student's university choice.

After gathering the questionnaires it became necessary to analyse and interpret the data. What is treated here is the analysis of a model trough which a group of latent constructs is related. This way the analysis of data was realised through structural equations modelling, using the Partial Least Squares[1] (Chin 1998) approach through the statistical software VisualPLS 1.04. Figure 1 show the model used.

Table 2 – Variables used to measure constructs

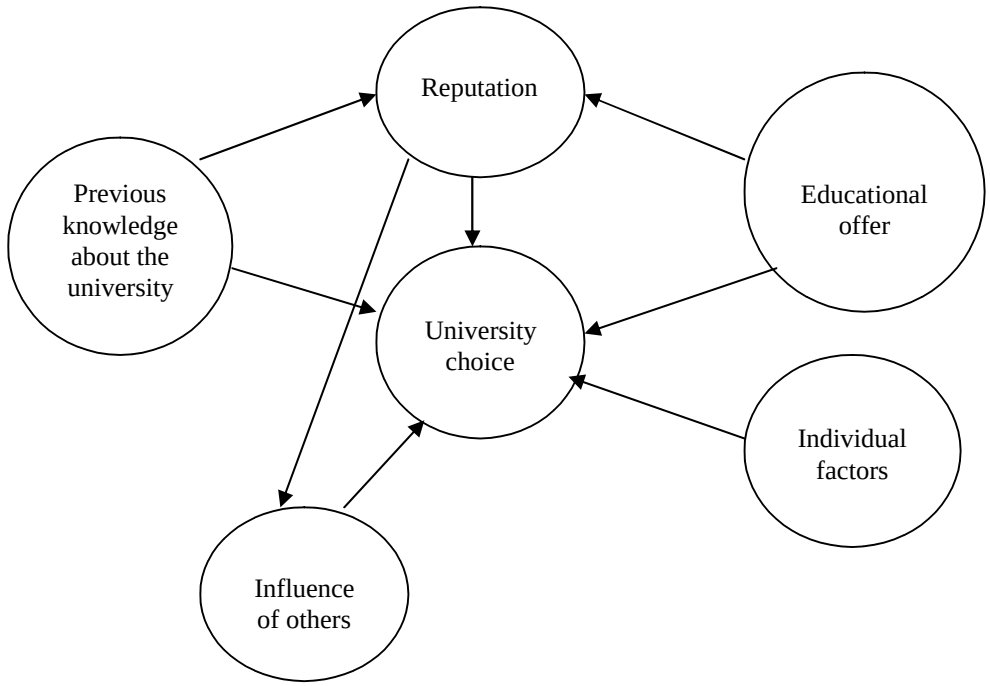
Institution Overall Reputation (Reput)
Reput 1 – Modernity of facilities and equipments
Reput 2 – Quality of education
Reput 3 – University reputation
Reput 4 – Teachers reputation
Reput 5 – Level of university promotion
Reput 6 – Existence of social life in the university
Reput 7 – Existence of sports and leisure activities
Educational offer (Offer)
Offer 1- Diversity of courses
Offer 2- Existence of actualised courses
Offer 3- Courses with good Professional perspectives
Offer 4- Courses with reputation in the market
Offer 5- Existence of help in search of the first Job
Offer 6- Amount of Job proposal to students
Previous knowledge about the institution (PrvKnow)
Prvknow1 – Already knows the institution
Prvknow2 –Already seen university promotion

1 PLS do not imply assumptions about the type of scales used neither data needs to follow a normal distribution and is suitable for exploratory analysis.

Table 3 – Variables used to measure constructs

Individual Factors (Individ)
Indiv 1- Probability of entry
Indiv 2 – Geographic location
Indiv 3 – costs of studying here
Indiv 4 – Near family
Indiv 5 – Friends and relatives studying here
Influence of others (Others)
Others 1 – Parents' recommendation
Others 2 – Secondary school teachers' recommendation
Others 3 - Friends' recommendation
University choice (choice)

Figure 1 – Model of choice



RESULTS

A model calculated using PLS should be analysed and interpreted in two stages (Anderson and Gerbing (1988): the analysis of the measuring model and the analysis of the structural model. The first stage seeks to check if the theoretical concepts are correctly measured by the observable variables. Whilst, the second stage has as its objective to assess the weight and magnitude of relations between the different theoretical concepts (constructs).

Given that the model proposed only involves formative indicators, in other words, indicators that define the characteristics of constructs under analysis, the steps to be taken in the first stage involves the analysis of the weight value of each indicator (variable), the analysis of multicolinearity and the statistical significance of the weights of each indicator.

Table 4, shows the weight of each variable in the formation of the construct. As can be seen in the above-mentioned table, the variables which most contributed to the formation of the construct reputation, were in order of importance, the variable Reput5 – The level of divulgation of the university, Reput7 – Existence of Leisure and Sport activities, Reput3 – The University's Reputation and Reput1 – Modernity of equipment and premises.

In turn, those variables which most contributed to the formation of the construct offer, were in order of importance, the variable Offer4 – Reputable courses in the job market, the variable Offer1 – Diversity of courses and the variable Offer5 – Assistance in finding one's 1st job

In relation to the construct "Individual factors", it can be seen Table 4 that those variables which most contributed to the formation of this construct were the variable Indiv4 – With the greatest weight being due to having family in the area and the variables Individ2 – for its geographical location and Individ3 – as it is more economical to study here, having the same importance.

With respect to the construct "Prior knowledge", both variables, PrvKnow1 – due to already knowing the institution and PrvKnow2 – due to seeing publicity/pamphlets about the university, are important to the formation of this construct.

Lastly, the construct "influence of others", seems to be more influenced, by order of importance from the variables Others2 – the recommendation of secondary school teachers and Others1 – the recommendation of parents.

Table 4 – Factor weigths

Construct	Indicator	Weight
Reput	Reput1	0.766300
	Reput2	0.167700
	Reput3	-1.279400
	Reput4	-0.135200
	Reput5	2.195300
	Reput6	-0.619300
	Reput7	-1.291500
Offer	Offer1	-1.251100
	OffeR ²	0.230600
	Offer3	-0.231800
	Offer4	2.056600
	Offer5	-0.714500
	Offer6	-0.185500
Individ	Individ1	0.040400
	Individ2	-0.874500
	Individ3	-0.879400
	Individ4	2.111900
	Individ5	0.332000
Choice	Choice	2.013000
PrvKnow	PrvKnow1	2.036200
	PrvKnow2	-1.496700
Others	Others1	-1.282100
	Others2	2.245900
	Others3	-0.526000

To assess the multicolinearity, the value of tolerance was calculated and that of VIF (Variance Inflaction Factor), in accordance with that recommended by Hair et al. (1998). These values are represented in Table 5 e and indicate the correlation that exists between the various independent variables.

As can be seen in Table 5, as a whole all the variables present a value of tolerance distant from zero, revealing a reduced level of colinearity, as well as, a VIF value close to 1 and much lower to the maximum limit of 10, proposed by Hair et al. (1998).

Table 5 - Collinearity Statistics

Construct	Indicator	Collinearity Statistics	
		Tolerance	VIF
Reput	Reput1	,480	2,084
	Reput2	,361	2,772
	Reput3	,410	2,440
	Reput4	,418	2,390
	Reput5	,385	2,598
	Reput6	,529	1,889
	Reput7	,590	1,696
Offer	Offer1	,551	1,816
	OffeR ²	,416	2,403
	Offer3	,381	2,628
	Offer4	,410	2,439
	Offer5	,475	2,105
	Offer6	,470	2,130
Individ	Individ1	,768	1,302
	Individ2	,476	2,102
	Individ3	,515	1,941
	Individ4	,467	2,140
	Individ5	,611	1,636
PrvKnow	PrvKnow1	,556	1,800
	PrvKnow2	,641	1,561
Others	Others1	,474	2,111
	Others2	,531	1,885
	Others3	,625	1,600

Finally, to assess the measuring model, it is still necessary to evaluate the statistical significance of the model's weights. Thus, we turned to the calculation of weights through the utilization of the Jackknife technique, using 500 sub-samples of the original sample. The results are those presented in5.

As can be seen in practically all the indicators are statistically significant to a level of significance of 0.05, with exception to the indicators Reput1 – Modernity of equipment and premises and Offer1 – Diversity of courses. Despite these two indicators not being statistically significant their continuation in the model was opted for given the exploratory nature of this investigation.

Table 6, practically all the indicators are statistically significant to a level of significance of 0.05, with exception to the indicators Reput1 – Modernity of equipment and premises and Offer1 – Diversity of courses. Despite these two indicators not being statistically significant their continuation in the model was opted for given the exploratory nature of this investigation.

Table 6 - Measurement Model Weights thought JackKnife

Construct	Indicator	Entire Sample estimate	Jackknife estimate	Standard error (Adjusted)	T-Statistic (Adjusted)
Reput	Reput1	0.7663	16.1827	11.5637	1.3994
	Reput2	0.1677	9.4643	1.5302	6.1848*
	Reput3	-1.2794	-2581.2742	15.0639	-171.3545*
	Reput4	-0.1352	-278.6632	4.4109	-63.1766*
	Reput5	2.1953	7.9561	1.9545	4.0706*
	Reput6	-0.6193	-12.5113	2.7235	-4.5938*
	Reput7	-1.2915	-4.3750	0.8652	-5.0566*
Offer	Offer1	-1.2511	-1.1609	0.6200	-1.8724
	OffeR ²	0.2306	4.3044	1.4142	3.0438*
	Offer3	-0.2318	-6.7242	1.4835	-4.5326*
	Offer4	2.0566	3.9177	1.0277	3.8122*
	Offer5	-0.7145	-1465.9650	1.7384	-843.3050*
	Offer6	-0.1855	-384.2988	1.3291	-289.1375*
Individ	Individ1	0.0404	3.3411	1.1930	2.8006*
	Individ2	-0.8745	-1791.5913	1.8046	-992.7870*
	Individ3	-0.8794	-1801.0497	1.5834	-1137.4413*
	Individ4	2.1119	2.3263	1.0707	2.1727*
	Individ5	0.3320	1.7313	1.7540	0.9871
PrvKnow	PrvKnow1	2.0362	7.9119	1.0162	7.7860*
	PrvKnow2	-1.4967	-3068.0964	1.1901	-2577.9841*
Others	Others1	-1.2821	-2604.0974	13.2947	-195.8752*
	Others2	2.2459	22.3287	4.9009	4.5561*
	Others3	-0.5260	-10.4753	3.2412	-3.2319*

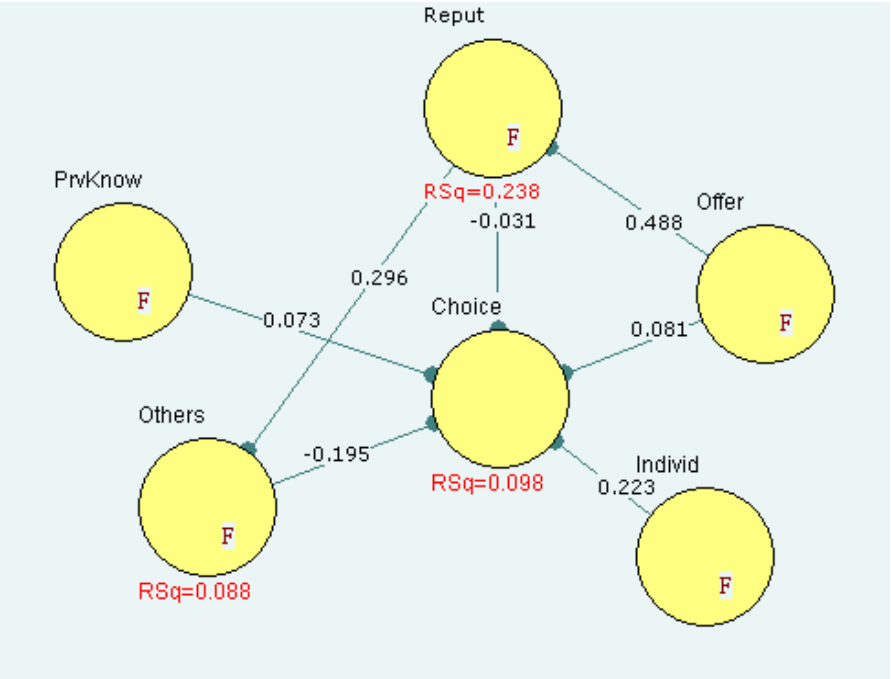
* Statisticaly significant for a level of 0.05

After analysing the measuring model, the analysis of the structural model was proceeded to, with the aim of assessing the robustness of relations between the model's various constructs. This analysis is done through the assessment of the model's explicative capacity and the statistic significance of the various structural coefficients.

In figure 2 one can see the R Squared (Rsq) associated to various dependent constructs ("Reputation", "Choice" and "Influence of others"). This value indicates the part of the variance of dependant constructs which are explained by the independent constructs. The closer R squared is to 1 the better will be the model represented.

As can be seen in figure 2, the highest R squared corresponds to the construct "Reputation", with "Final Choice" being quite reduced. The value of R Squared for the construct "Final Choice" shows that despite the measurement model presenting a quite satisfactory robustness, the structural model can only explain 10% of variance in the student's final choice.

Figure 2– Structural Model for university choice



The values from the model's structural coefficients can be seen in figure 2 and correspond to the value seen in the connections between the different constructs. According to Chin (1998), the relations between constructs that present structural coefficients superior to 0.2, can be considered robust. In accordance with this criterion only the coefficients of relations between "Formative Offer" and "Reputation" (0.488) and "Individual Factors" and "Final Choice" could be considered robust. However, this assessment of the weight of relations should take into account, not only the direct effect but also indirect, to which is presented in Table 7 the total effects of relations.

Table 7 – Direct, Indirect and total effects on students' choice

Construct	Effects		
	Direct	Indirect	Total
Reputation	-0.031	0.101	0.07
offer	0.081	0.0178	0.098
Individual factors	0.223	-	0.223
Influence of others	-0.195	-	-0.195
Previous knowlwdge	0.073	-	

As can be seen in Table 7, the greatest influence on the student's final choice in selecting the University of Beira Interior is from the construct "Individual Factors", which is in line with the results found from the investigations of, Quintal and Taylor (2005) and Holdswoth and Nind (2005). The construct "Influence of others" also has a big influence, but in a negative way, contrarily to the effect found, although in an isolated manner, in the investigations of Murphy (1981), Donnellan (2002) and Shanka, quintal and Taylor (2005).

The assessment of statistic significance of relations of the structural model is done using the Jackknife technique. The calculation values are presented in Table 8.

Table 8 - Structural Model--JackKnife

	Entire Sample estimate	Jackknife estimate	Standard error (Adjusted)	T-Statistic (Adjusted)
Reput->Choice	-0.0310	-66.3302	1.1448	-57.9418*
Offer->Reput	0.4880	16.2416	5.8200	2.7906*
Offer->Choice	0.0810	-2.4795	0.4891	-5.0695*
Individ->Choice	0.2230	1.4758	0.2348	6.2848*
Others->Choice	-0.1950	-3.1461	0.4828	-6.5158*
PrvKnow->Choice	0.0730	-3.3027	0.4881	-6.7658*
Reput->Others	0.2960	7.9006	1.3775	5.7354*

As can be seen in Table 8 all the structural coefficients appear as statistically significant to a level of significance of 0.05, despite relations between the constructs not being presented as robust, which may have some explanation in the fact of the model attempting to represent an equal choice process for all the students, with this being different for different student groups. However it's possible to assume that the choice process varies according to scientific area in which the student is in.

Thus, the initial sample was divided into sub-samples in accordance with the students´ scientific area of study, calculating a new model for each one of these sub-samples, in so far as it is possible to allow different students perceptions in accordance with the scientific area. The models calculated for the sub-samples obtained are presented in figure 3, students of the arts; figure4 – students of human and social sciences; figure 5 – students of engineering; figure6 – students of exact sciences and figure7 – medical students.

Figure 3 – Structural Model for Arts students' choice

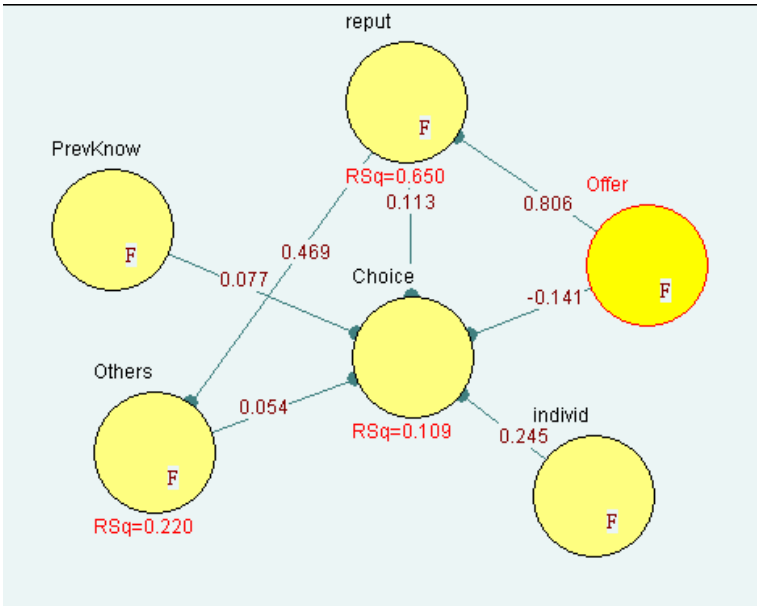


Figure 4 – Structural Model for Social and Economics students' choice

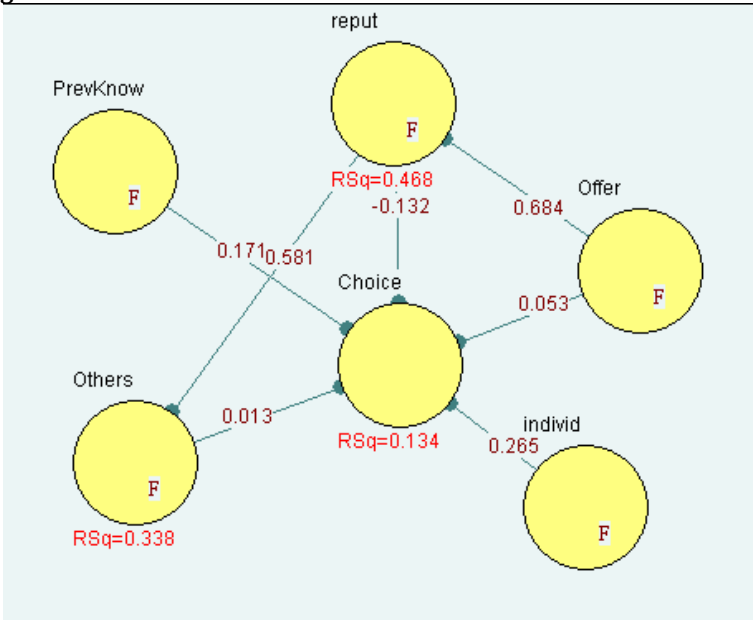


Figure 5 – Structural Model for Engineering students' choice

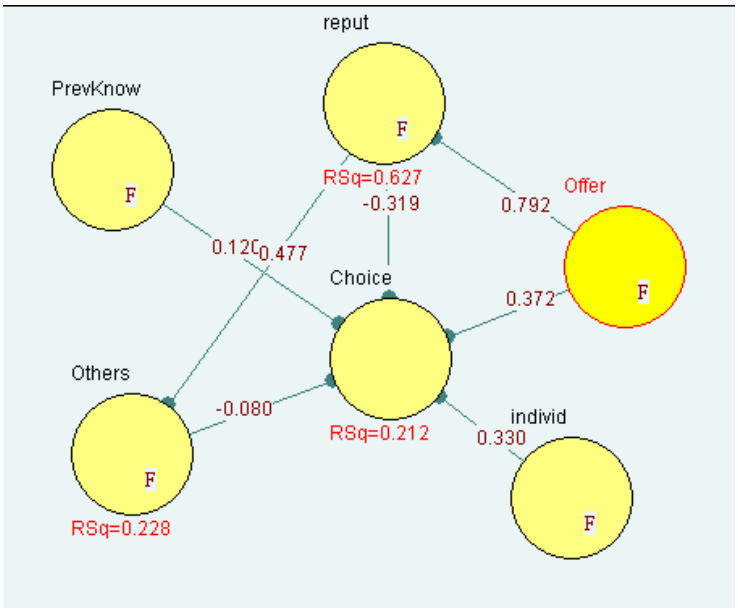


Figure 6 – Structural Model for Exacts students' choice

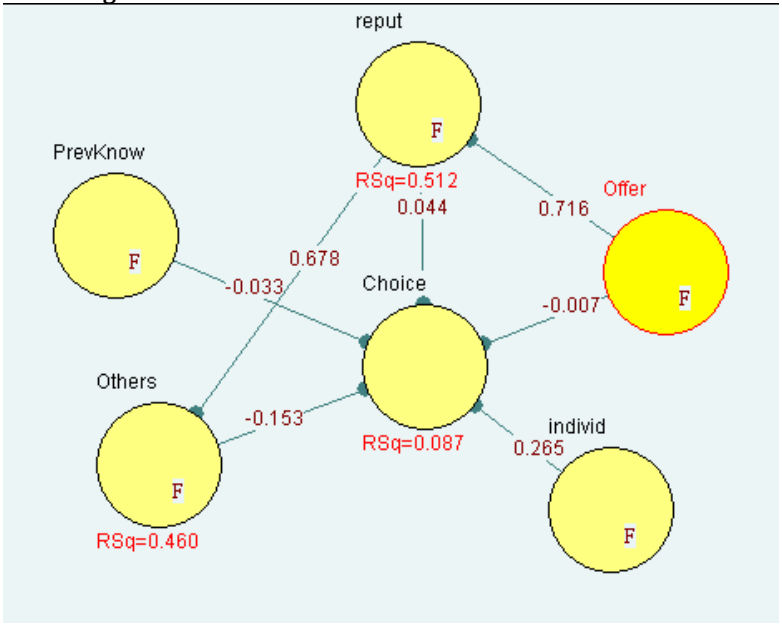
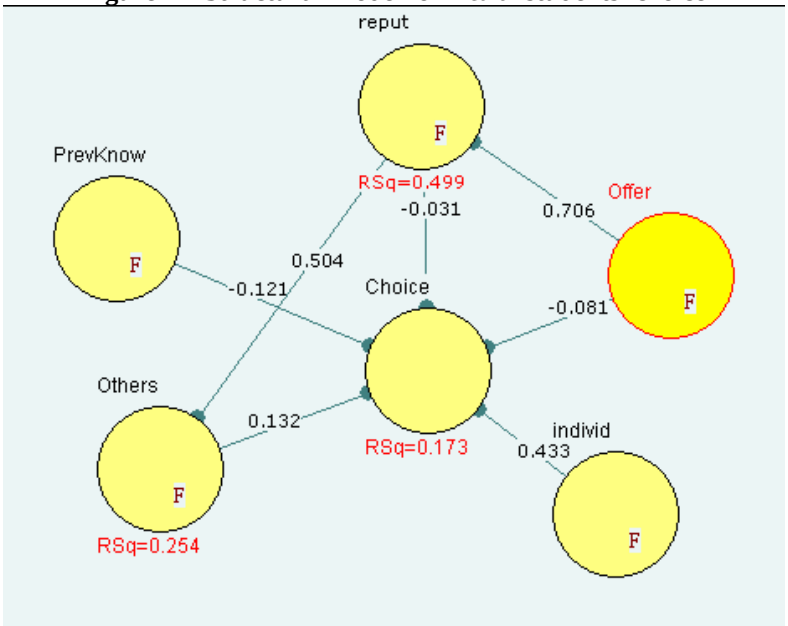


Figure 7 – Structural Model for Health students' choice



As can be seen from the analysis of the figures, the model's calculation presents different results, depending on the students´ area of study. In Table 9 the R squared of different calculated models can be seen, in other words, the explicative capacity of each one of the models. The model that presents the greatest explained variance is the student choice process model of students in Engineering Sciences, which explains 21% of variance of the construct "final choice". When analysing the choice process of students from Health Sciences, it was noticeable that the model loses explicatory power, explaining only 17% of variance of the construct "final choice". The model presents even less explicative capacity when tested on students belonging to the Arts, Human and Social Sciences and Exact Sciences.

Table 9 – R Squared for the several models estimated

Model	R^2
Global	0.098
Arts	0.109
Social and Economics Sciences	0.134
Engineering Sciences	0.212
Exacts Sciences	0.087
Health Sciences	0.173

The variability of the final decision process when choosing the University of Beira Interior, based on the area studied by the student, implies that the model cannot be generalized and from there its low explicative power. However, this does not stop it from presenting some important implications for the persons in charge of the University and for the different Faculties.

Tables 9, 10, 11, 12 and 13 present the direct, indirect and total effects of the model's different constructs when tested in different student groups, in accordance with their area of study.

Table 10 – Direct, Indirect and total effects on Arts students' choice

Construct	Effects		
	Direct	Indirect	Total

Reputation	0.113	0.523	0.636
offer	-0.141	0.919	0.778
Individual factors	0.245	-	0.245
Influence of others	0.054	-	0.054
Previous knowlwdge	0.077	-	0.077

Table 11 – Direct, Indirect and total effects on Social and Economics students' choice

Construct	Effects		
	Direct	Indirect	Total
Reputation	-0.132	0.594	0.462
offer	0.053	0.552	0.605
Individual factors	0.265	-	0.265
Influence of others	0.013	-	0.013
Previous knowlwdge	0.171	-	0.171

Table 12 – Direct, Indirect and total effects on Engineering students' choice

Construct	Effects		
	Direct	Indirect	Total
Reputation	-0.319	0.397	0.078
offer	0.372	0.473	0.845
Individual factors	0.330	-	0.330
Influence of others	-0.080	-	-0.080
Previous knowlwdge	0.120	-	0.120

Table 13 – Direct, Indirect and total effects on Exacts students' choice

Construct	Effects		
	Direct	Indirect	Total
Reputation	0.044	-0.186	-0.142
offer	-0.007	0.76	0.753
Individual factors	0.265	-	0.265
Influence of others	-0.153	-	-0.153
Previous knowlwdge	-0.033	-	-0.033

Table 14 – Direct, Indirect and total effects on Health students' choice

Construct	Effects		
	Direct	Indirect	Total
Reputation	-0.031	0.636	0.605
offer	-0.081	0.675	0.594
Individual factors	0.433	-	0.433
Influence of others	0.132	-	0.132
Previous knowlwdge	-0.121	-	-0.121

As can be seen in tables 9 and 10, for the students who opted for the Arts and Human and Social Sciences as areas of study, the constructs, "Reputation" and "Formative Offer", present the most explicative effects for the decision in choosing this University. The other constructs also present a total positive effect, though with little expression.

Table 13 refers to Medical students and shows that the most explicative variables result from the constructs Reputation, Formative Offer and Individual Factors. The construct Prior Knowledge presents a total negative effect. Given that it refers to a new Faculty (5 years old), the values obtained are surprisingly positive, which may be due to the innovative method adopted for the teaching of Medicine and which has had large repercussions on society.

Table 11 refers to the area of Engineering Sciences and table 12 to the area of Exact Sciences. The effects calculated of the constructs for these areas, are those which present the lowest values or even negative ones in explaining the choice of University. Probably, this is due to the fact that traditionally students of these areas present high rates of failures and the generalized belief of the difficulty involved in completing the courses in these areas.

CONCLUSIONS AND FUTURE RESEARCH

After having tested the proposed model of choice process, the results show that the model only explains 10% of data variance in what concerns the choice of university, showing that other factors should be used to explain the university choice process. All the proposed effects in the choice process are significant to a level of significance of 0.05 although they are not very strong. Personal factors show the greatest positive influence (0.223), whilst influence of others shows the greatest negative impact in the decision taken by the student. Educational offer has a strong influence in university reputation, since it explains 49% of variance in reputation.

Since the model explains such a low percentage of data variance, we tried to analyse the model for students of different scientific areas, namely students of Engineering, Exacts Sciences, Social and Economic Sciences, Health Sciences, and Arts. The model shows a different capacity of explanation according to the area of study, because the weights of the variables which form each construct differ considering the student's area of study.

The results are in accordance with previous studies (see table 1) showing that proximity to home, costs, parents and school teacher's recommendations are strong influences in the choice process of selecting a university.

This study is an exploratory one, but it shows that when we put all the interaction effects in one single model, some of the theoretical influences lose weight to individual and personal factors. This study also shows that universities' marketing strategies cannot be the same for all students. It's necessary for universities to use market segmentation strategies and apply them to their communication strategies.

In turn, for Medical students it is important when planning communications to promote individual factors, such as proximity to home, costs and staying near the family, but also to promote the university to teachers of secondary education and professional counsellors. It is also important to raise current student satisfaction in order to generate positive word of mouth.

For students of Social Sciences and Economics students, individual factors are the most important For these students it is also important to arrange visits to the campus, since this group shows that previous knowledge about the institution is important in their choice of university.

As a final remark we assume that this study helps universities to have a deeper knowledge about the student choice process, helping universities to improve their knowledge on how to deal with the influences that can form student expectations and also in recruitment development strategies.

In the future it will be important to test an enlarged model that include others kind of variables, namely, social variables and psychological variables, such as students background, personality, motivation and others.

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