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STATISTICAL INFERENCES IN MARKET RESEARCH FOR SUSTAINABLE DEVELOPMENT IN CONFERENCE TOURISM

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ABSTRACT

The action and the interventions that are based on the research, especially in our days, very often create permanent and viable results, in the environment, in the local society and in the economy. In our proposal the constant question, is the investigation of other forms of tourism, after the decrease of the traditional tourism product. Specifically, for concrete geographic units and regions of our country that face problems of isolation or even those that not have easy access (e.g. islander or mountainous tourist regions), serial or declining demographic base, unfavourable socio-economic structure and low or not developmental records try to attract alternate forms of tourism, e.g. Conference tourism.

Keywords: tourism, market research, development, analysis, conference.

INTRODUCTION

The fact that tourism research activities are directly linked to the tourist customers' environment and the information supplier environment causes external influences and constraints on the internal research processes. Products and processes of the customers are under constraints like costs, quality. These constraints have a direct influence on tourism research processes:

- The results of the tourism research processes are dedicated to improve products and processes of the customers and thus need to respect the customers' constraints.
- The tourism research customer constraints become the tourism research constraints.

These constraints on research processes affect the information flow between the different systems and the marketing of tourism: the control of information flow in tourism research processes under constraints gets a crucial factor. However one may perceive that there is a balance between the goods offered by different forms of tourism, namely mass and sustainable tourism. It has been stated for example in [6] that mass tourism and sustainable tourism are two "opposites" and thus it is important for a tourist framework to decide what the desired form of tourism is. This greatly affects, of course, tourism marketing.

TOURIST MARKETING

One of the targets in tourism marketing is the ability to forecast the potential destinations [5] and trends. Terms as cooperation and collaboration become a priority in marketing, as a common goal is set for all financial and tourist policy agents to improve and enhance the economic capacity of there area [7]. In order to do so it is vital to identify and solve tourism marketing relevant problems. Tourism marketing relevant problems can concern (some examples coming from interviews with tourism researchers and research managers):

- Recognition and analysis of competitive tourist product. Selection of the organisation process of a congress, with the use of congress organisms.
- Financing of special advertising programmes and promotion of congress tourism. It considers tourism planning in terms of " fit " with other policies and functions, approaches to policy / plan making and the initiatives and physical developments that have occurred [1].
- Promoting the image of a city on an extensive basis, so as to establish it as a tourist destination [2, 9].
- Guiding the tourism impacts optimisation and maximisation of benefits for the region [3].
- Extending and verifying the potentiality of alternative means of communication and advertising as Internet, virtual communities, virtual presentations, etc. [4].
- Validating forecoming trends through analysis of socioeconomic factors in countries most visitors come from [5].

These problems need to be addressed in order to improve the efficiency of research processes of the "Applied Research at market services" lab and to counter the existing constraints.

STRATEGIC TOURIST MARKETING

Moreover, some strategic marketing issues can be addressed to:

a) Systematic avoidance of the tourist regions' creation.
b) Improvement of existing regions, due to the formation of general and special infrastructure. Generally, the tourist growth should be harmonised with natural, social and cultural environment. Incensement of the vigilance and sensitization, for the avoidance of interventions that overload the environment.
c) Promotion of the environmental exploitation of biotopes, national parks, mountainous areas, spaces of green, etc.
d) Creation of needed works, for the improvement of infrastructure and reconstruction. Intensive the efforts

for the improvement of the relation among the quality and the price of sale of the congress product, at least for the basic services that are offered by our country. This fact will be enhanced with the upgrade of human potential and the modernisation of programs in the Tourist Faculties and the professional further training.

e) Make an effort for the renewal of the tourist product through the congress tourism attraction of a new clientele, the time enlargement and the reduction of seasonal tourism in our country.
f) Achievement of reduction of seasonable tourism. This will be enhanced by the new infrastructures of higher specifications, the additional specialised reconstruction, the modernisation of units, the creation of congress centres and the remaining installations of alternative forms of tourism. For this reason the state is focused in qualitative objectives and is likely the number of foreigners for a considerable increasing, in profit of the daily exchange expense of each tourist.
g) Maintenance of National Cultural Heritage and need for further upgrade and exploitation. Distribution and promotion of Greek congress tourism abroad.
h) Create cultural institutions that clarify not only the cultural identity of Greece in general, but also each geographic unit separately.
i) Upgrade the offered services and improve the degree of satisfaction from the participating European customer.

METHODOLOGY AND ALGEBRAIC FORM

Discriminant function analysis, a.k.a. discriminant analysis or DA, is used to classify cases into the values of a categorical dependent, usually a dichotomy. If discriminant function analysis is effective for a set of data, the classification table of correct and incorrect estimates will yield a high percentage of correction. Discriminant function analysis is found in SPSS under Analyze Classify Discriminant. One gets DA or MDA from this same menu selection, depending on whether the specified grouping variable has two or more categories.

Multiple discriminant analysis (MDA) is an extension of discriminant analysis and a cousin of multiple analysis of variance (MANOVA), sharing many of the same assumptions and tests. MDA is used to classify a categorical dependent which has more than two categories, using as predictors a number of interval or dummy independent variables. MDA is sometimes also called discriminant factor analysis or canonical discriminant analysis.

There are several purposes for DA and/or MDA:

- To classify cases into groups using a discriminant prediction equation.
- To test theory by observing whether cases are classified as predicted. To investigate differences between or among groups.
- To determine the most parsimonious way to distinguish among groups.
- To determine the percent of variance in the dependent variable explained by the independents.
- To determine the percent of variance in the dependent variable explained by the independents over and above the variance accounted for by control variables, using sequential discriminant analysis.
- To assess the relative importance of the independent variables in classifying the dependent variable.
- To discard variables which are little related to group distinctions?
- To infer the meaning of MDA dimensions which distinguish groups based on discriminant loadings. Discriminant analysis has two steps:

a) AN F test (Wilks' lambda) is used to test if the discriminant model as a whole is significant; and
b) If the F test shows significance, then the individual independent variables are assessed to see which differ significantly in mean by group and these are used to classify the dependent variable.

Discriminant analysis shares all the usual assumptions of correlation, requiring linear and homoscedastic relationships, and untruncated interval or near interval data. Like multiple regression, it also assumes proper model specification (inclusion of all important independents and exclusion of extraneous variables). DA also assumes the dependent variable is a true dichotomy since data which are forced into dichotomous coding are truncated, attenuating correlation.

The mathematical objective of discriminant analysis is to weight and linearly combine the discriminating variables in some fashion so that the groups are forced to be as statistically distinct as possible.

The functions are formed in such a way as to maximize the separation of the groups.

Fundamental equations for DA

First, create cross-products matrices for between-group differences and withingroups differences, SStotal = SSbg + SSwg. The determinants are calculated for these matrices and used to calculate a test statistic – either Wilks' Lambda or Pillai's Trace.

Wilks' Lambda follows the equation,

$$\Lambda = \left| \frac{S_{wg}}{S_{bg} + S_{wg}} \right|$$

Next an F ratio is calculated as:

$$F_{approximate}(df_1, df_2) = \left(\frac{1-y}{y}\right)\left(\frac{df_2}{df_1}\right)$$

For cases where n is equal in all groups:

$$y = \Lambda^{1/s} \quad p = \#\text{ of predictor variables}$$

$$s = \sqrt{\frac{p^2(df_{effect})^2 - 4}{p^2 + (df_{effect})^2 - 5}}$$

dferror = number of groups times (n-1): k(n-1)

$$df_1 = p(df_{effect})$$

$$df_2 = s\left[(df_{error}) - \frac{p - df_{effect} + 1}{2}\right] - \left[\frac{p(df_{effect}) - 2}{2}\right]$$

dfeffect = number of groups minus one (k-1)

For unequal n between groups, this is modified only by changing the df_{error} to equal the number of data points in all groups minus the number of groups (N – k). If the experimental F exceeds a critical F, then the experimental groups can be distinguished based on the predictor variables. The number of discriminant functions used in the analysis is equal to the number of predictor variables or the degrees of freedom, whichever is smaller.

The discriminant function score for the i th function is:

D*i* = di1Z1+ di2Z2+...+ dipZp

Where z = the score on each predictor, and d_i= discriminant function coefficient. The discriminant function score for a case can be produced with raw scores and unstandardized discriminant function scores. The discriminant function coefficients are, by definition, chosen to maximize differences between groups. The mean over all the discriminant function coefficients is zero, with a SD equal to one.

The mean discriminant function coefficient can be calculated for each group-these group means are called Centroids, which are created in the reduced space created by the discriminant function reduced from the initial predictor variables. Differences in the location of these centroids show the dimensions along which the groups differ.

Once the discriminant functions are determined groups are differentiated, the utility of these functions can be examined via their ability to correctly classify each data point to their a priori groups. Classification functions are derived from the linear discriminant functions to achieve this purpose. Different classification functions are used and equations exist that are best suited for equal or unequal samples in each group.

For cases with an equal sample size for each group the classification function coefficient (C_j) is equal to the sum of:

Cj = cj0+ cj1x1+ cj2x2+...+ cjpxp

For the jth group, j = 1...k, x = raw scores of each predictor, c_{jo} = a constant. If W = within-group variance-covariance matrix, and M = column matrix of means for group j, then the constant c_{jo}= (-1/2)C_jM_j.

For unequal sample size in each group:

$$C_j = c_{jo} + \sum_{i=1}^{p} c_{ij}x_i + \ln\left(n_j/N\right)$$

nj = size in group j, N = total sample size.

Research identity

The frame of research: Type and method: Quantitative research. Tool: Questionnaires. Population of sample: 147. Region of sampling: Crete. Time of conduct of research: May- September 2007

The research study

A questionnaire research has been conducted and the Discriminant analysis procedure decided to be used in order to explore which variables among many are most useful, if one set of variables perform equally as another and which groups are most alike. The results from the analysis are given below:

Tests of equality of group means.

	Wilks' Lambda	F	df1	df2	Sig.
Do you think that we were flexible to unexpected program changes?	,915	6,202	3	200	,000
Have you been satisfied with our leisure time facilities?	,878	9,249	3	200	,000
Would you recommend one of the hotels that you've stayed for future conferences, etc.?	,890	8,245	3	200	,000
Would you choose one of the hotels that you've stayed for your vacations?	,936	4,587	3	200	,004

Wilk's Lambda provides information regarding differences among groups.
No significant differences are identified.

Classification function coefficients.

	Education			
	HND	University	Magesta	PhD
Do you think that we were flexible to unexpected program changes?	19,586	17,469	17,526	18,428
Have you been satisfied with our leisure time facilities?	4,106	2,168	1,803	1,146
Would you recommend one of the hotels that you've stayed for future conferences, etc.?	-8,200	-7,577	-8,332	-6,711
Would you choose one of the hotels that you've stayed for your vacations?	31,767	28,956	29,645	29,708
(Constant)	-29,799	-22,443	-21,990	-24,057

Fisher's linear discriminant functions

Each column contains estimates of the coefficients for a classification function for one group.

The estimate of the classification function for education = University is

17,469program-changes + 2,168leisure-facilities-7,577future-conferences + 28,956vacations-22,433

Thus, for each case for each group, the procedure multiplies each coefficient by the value of the corresponding variable, sums the products, and adds the constant to get a score.

Eigenvalues

		Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
Function	1	,171(a)	91,6	91,6	,382
	2	,008(a)	4,5	96,0	,091
	3	,007(a)	4,0	100,0	,086

First 3 canonical discriminant functions were used in the analysis. The first two canonical variables account for 96% of the total dispersion-most of the spread is attributable to the first canonical variable (91, 6%).

Wilks' Lambda

		Wilks' Lambda	Chi-square	df	Sig.
Test of Function(s)	1 through 3	,840	34,582	12	,001
	2 through 3	,984	3,122	6	,793
	3	,993	1,472	2	,479

The test of functions labelled 1 through 3 and the observed significance level is less than 0,0005, so the hypothesis of equality is rejected. The tests labelled 2 through 3 and 3 are successive tests. Here, after removing the first canonical variable (function 1), Wilk's Lambda is 0,984 and the associated significance level is 0,793 indicating that the centroids of functions 2 and 3 do not differ significantly across the four groups. Thus, it is not worth keeping all three functions.

Canonical discriminant function coefficients.

	Function		
	1	2	3
Do you think that we were flexible to unexpected program changes?	1,572	-,044	2,749
Have you been satisfied with our leisure time facilities?	1,598	3,153	-2,648
Would you recommend one of the hotels that you've stayed for future conferences, etc.?	,028	-5,405	-,646
Would you choose one of the hotels that you've stayed for your vacations?	1,699	3,382	4,409
(Constant)	-5,350	-1,121	-3,695

Unstandardized coefficients

Therefore, we use the values of the function 1 to compute a canonical variable score:
1,572program_changes + 1,598leisure-facilities + 0,028future-conferences + 1,699vacations- 5,350.

Structure Matrix.

	Function		
	1	2	3
Have you been satisfied with our leisure time facilities?	,895(*)	,082	-,435
Would you recommend one of the hotels that you've stayed for future conferences, etc.?	,843(*)	-,458	-,109
Do you think that we were flexible to unexpected program changes?	,732(*)	-,301	,242
Would you choose one of the hotels that you've stayed for your vacations?	,624(*)	,226	,485

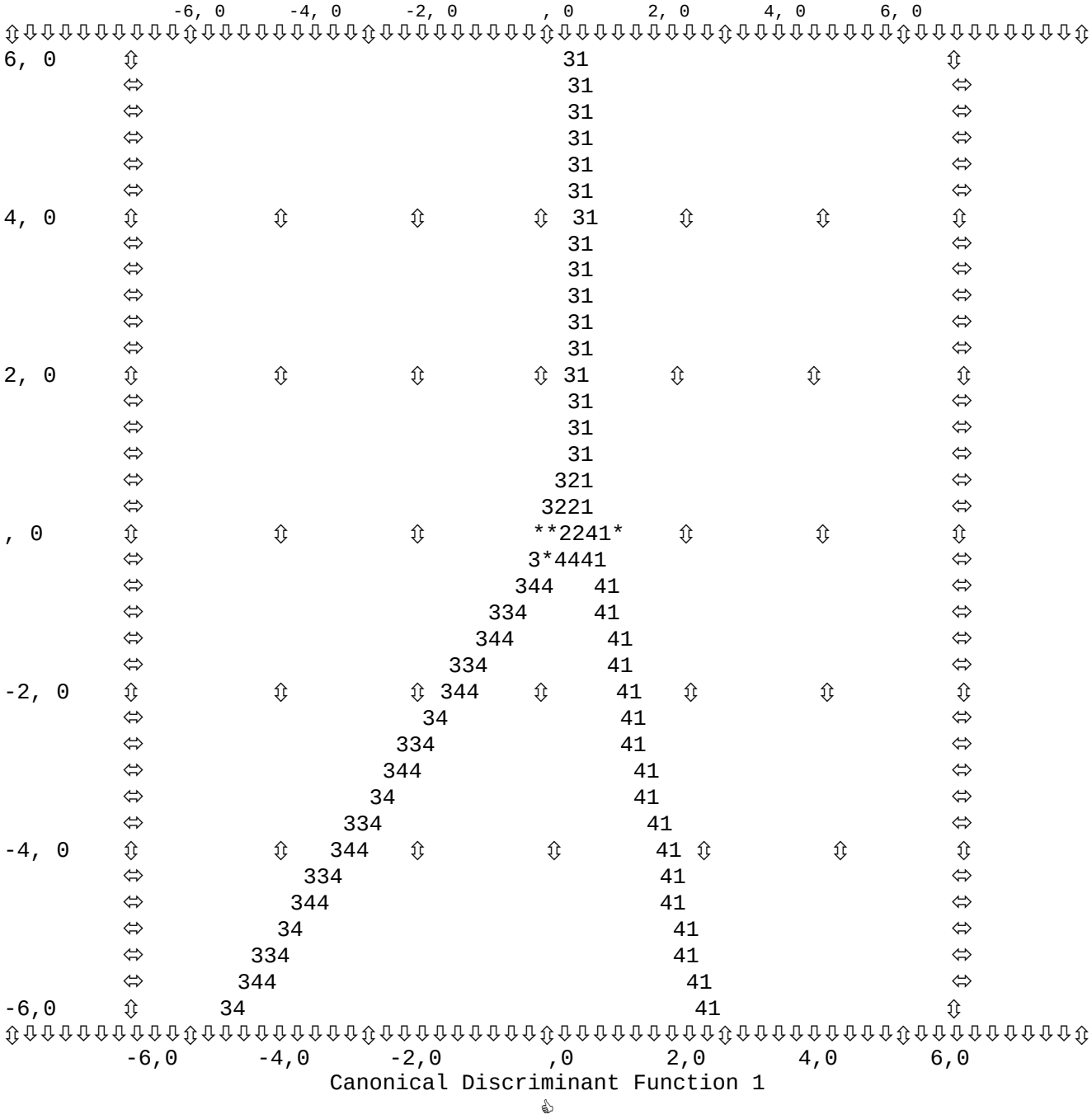
Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
Variables ordered by absolute size of correlation within function.

* Largest absolute correlation between each variable and any discriminant function

Here, leisure_facilities has the largest correlation with the canonical variable scores.

Territorial Map

(Assuming all functions but the first two is zero)
Canonical Discriminant Function 2



Symbols used in territorial map.

Symbol	Group	Label
1	2	HND
2	3	University
3	4	Magenta
4	5	PhD
*	Indicates a group centroid	

Numbered boundaries mark the regions into which each group is classified. For example, all points for education falling to the right of the 1's are classified into the first education, HND; those bordered by 2's, University, and so on.

Just exactly the coordinates (0,0), notice **2241*. The asterisks mark the means of the HND, University and PhD groups. They are very close together, as the earlier F values indicated.

CONCLUSIONS

For the evaluation of the priority, the degree and the place of growth of congress tourism, as well as for the application conditions in Crete and in the entire country, a lot of factors should still be investigated, as: the existence of comparative advantage as for the tourist competitiveness, the tourist and particularly congress demand (the potential clientele), the possibility of exploitation of existing hotel potential with increase of "fullness" and upgrade of level of expiring services, the possibility of the influence of model of congress tourism or generally the tourist picture of the country, the bluntness of seasonable tourism, the attraction of high level income of congresses, the need for new special infrastructure work and their cost, the possibility of rational growth of new regions/activities of congress tourism, the degree of feasibility of congress tourism, the conditions of application, as technical infrastructure, know-how, studies, legislation, the required interventions for the application in the infrastructure, in reconstruction, in the services, in the education, in the promotion, the possible regions of application, considering the land-planning or the tourist particularity, the expected tourist utility short-term, medium-term, long-term, decentralisation, decision-making, constant Economic Policy, motives, adaptation of Greek Legislation for a better congress competition, exploitation of human potential. Again the ability to forecast congress tourism destinations, enhances the ability to sustain tourism in an area, yet extensive econometric research should be applied in order to achieve a minimum level of prediction, in enhancing tourism. Thus, an organized policy is required on a specific-level approach, demanding constant update of targets and goals [8].

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