

Applications of Multivariate Analysis in International Tourism Research: The Marketing Strategy Perspective of NTOs

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Abstract. International tourism has increased exponentially since 1950. With this growth the industry has become significantly more competitive, and the marketing role of National Tourism Organizations (NTOs) has taken on added significance. Correspondingly, research related to the marketing aspects of international tourism has increased. With this in mind, this paper provides a brief look at the growth of international tourism and the marketing role of the NTOs. It identifies and describes multivariate techniques most relevant to marketing research related to the key components of the marketing strategy of NTOs. In closing, the paper identifies areas for future research related to the scope of this paper.

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1. Introduction

Tourism is a multifaceted field and tourism research focuses on a variety of areas. Smith (1989) classifies tourism research into the following categories: (1) tourism as a human experience, (2) tourism as a social behavior, (3) tourism as a geographic phenomenon, (4) tourism as an economic resource, (5) tourism as an industry, and (6) tourism as a business. In this paper tourism is dealt with as a competitive business in which marketing plays a significant role. The importance of effective and efficient marketing strategies predicated on sound marketing research should only increase as international tourism continues to grow and gets more competitive. There has already been a marked increase in tourism related marketing research. Not only has the quantity of this research increased in recent years, but the depth, richness, and sophistication of this research has also improved. For example, a perusal of the literature and research indicates an increase in the application of multivariate statistical analysis and techniques to a variety of

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tourism related marketing issues, such as demand forecasting, market segmentation, positioning, product bundling, and consumer behavior. With intensifying competition for the international tourist's money, the marketing strategies of National Tourism Organizations (NTOs) is taking on added significance. With all of this in mind, this paper focuses on:

1. identifying and describing the key components of marketing strategy that must be addressed by NTOs, and
2. identifying and describing the multivariate statistical techniques most relevant to research that relates to enhancing the marketing strategies of NTOs along with citing some of the recent related research.

2. A Look at International Tourism

Tourism is one of the largest industries in the world (World Tourism Organization [WTO], 1998) and it continues to grow. From 1950 through 1998 international tourist arrivals have increased 25 fold. The corresponding receipts from tourists have increased 211 fold. Employment in tourism worldwide has shown a corresponding increase. To lend perspective, Table 1 shows the arrivals, receipts, and the corresponding index numbers in terms of 10-year intervals starting from 1950. An examination of Table 1 suggests that in addition to the dramatic increase in international tourist arrivals, the per capita expenditures of these tourists have also increased. With rising income levels, more leisure time, increases in life expectancy, advances in technology, and the shrinking of travel time, international tourism is expected to continue to grow well into the new millennium. With this growth, competition in the industry is likely to intensify and the marketing strategies of tourist destinations become increasingly important.

Table 1: The Growth of International Tourism, 1950--1998

Year	Tourist arrivals from abroad (in thousands)	Index	Receipts from international tourists (US \$ million)	Index
1950	25,282	100.00	\$2,100	100.00
1960	69,32	274.19	6,867	327.00
1970	165,787	655.75	17,9	852.38
1980	285,997	1,131.23	105,32	5,015.24
1990	458,229	1,812.47	268,928	12,806.10
1998	625,236	2,473.05	444,741	21,178.14

Source: World Tourism Organization (WTO), 1999

Table 2 shows the world's top twenty tourism destinations for 1980 and 1997, together with rankings, the average annual growth rate, and worldwide market shares. It is interesting to note that the rankings of the top four tourist destinations, France, the U.S., Spain, and Italy were the same in 1980 and 1997. Similarly, Mexico and Hungary retained their 8th and 10th rankings, respectively. The rankings of the other fourteen countries did change. In particular, the rankings of Turkey and China improved dramatically. Turkey climbed from a ranking of 52 in 1980 to 19 in 1997; whereas China climbed from a ranking of 18 to 6 over this time period. These changes in rankings are a function of a variety of factors, such as changes in the political and economic environments along with changes in the tourism related strategies and marketing campaigns launched by these destinations. With reference to Turkey, it is interesting to note that while currently in the midst of the worst economic crisis in its recent history, tourism in Turkey is the only sector doing well. The number of foreign visitors in 2001 is 20 percent above that of the preceding year. Furthermore, it is anticipated that tourism will bring in \$10 billion in revenues in 2001 (New York Times, 2001).

Table 2: Ranking of the World's Top Tourism Destinations

Rank				World Market Share	
1980	1997	Country	Average annual growth rate (%) 1980/1992	1980	1997
1	1	France	4.81	10.52	10.95
2	2	U. S.	4.53	7.87	7.82
3	3	Spain	3.97	7.83	7.11
4	4	Italy	2.59	7.72	5.58
7	5	U. K.	4.33	4.34	4.18
18	6	China	11.93	1.22	3.89
13	7	Poland	7.55	1.98	3.20
8	8	Mexico	2.88	4.18	3.17
6	9	Canada	1.75	4.50	2.83
10	10	Hungary	3.63	3.29	2.82
*	11	Czech Republic	-	-	2.76
5	12	Austria	1.08	4.85	2.73
9	13	Germany	2.10	3.89	2.59
*	14	Russian Federation	-	-	2.51
11	15	Switzerland	1.05	3.10	1.74
28	16	China, Hong Kong	11.06	0.61	1.70
21	17	Portugal	8.04	0.95	1.67
16	18	Greece	4.46	1.68	1.65
52	19	Turkey	14.38	0.32	1.48
27	20	Thailand			

* = Data not available

Source: World Tourism Organization (WTO), 1998

3. Marketing Strategy and NTOs

Marketing strategy consists of the following interrelated tasks: (1) setting marketing goals, (2) segmenting the market and selecting one or more target markets, (3) positioning the product/service, and (4) developing the appropriate marketing mix (Harrell & Frazier, 1999, Perreault & McCarthy,

1999:53). Prior to addressing these tasks, a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis should be completed.

In the context of tourism, the marketing goals of a NTO may relate to achieving a revenue goal, attracting a certain number and type of tourists to a destination, obtaining a certain market share, achieving a seasonal spread of tourists, etc. After determining the marketing goals, appropriate segments of the tourism market must be identified and targeted. The segment(s) to be targeted influence the positioning strategy selected. Finally, the marketing mix, consisting of the appropriate product, price, promotion, and distribution, must be developed.

NTOs are organizations entrusted with the responsibility for tourism matters at the national level. In carrying out this responsibility they play a complementary role to the marketing efforts of individual agencies and organizations involved in providing tourism products and services for a given destination. The typical NTO plays the role of a promoter and a facilitator in the marketing of a destination. While NTOs are responsible for the overall marketing of a country or a region of a country as tourist destinations, in practice the traditional marketing role of NTOs is much narrower. For example, most NTOs are not involved in the creation of specific tourism products, in the pricing and delivery of these products, or in the quality of the products and services provided. The tasks of NTOs (Batchelor, 1999; Middleton, 1994:228-243) are to:

- ? research the relevant current and emerging markets and develop market intelligence,
- ? forecast demand,
- ? identify markets and segments having the best potential,
- ? establish promotional priorities,
- ? project the appropriate destination image to the targeted markets,
- ? provide destination information to interested parties,
- ? provide advise on product development and improvement to a variety of tourism organizations,
- ? create cooperative marketing campaigns in collaboration with other tourism organizations, and
- ? monitor tourist/visitor satisfaction.

Figure 1: An Overview of Marketing Strategy and NTOs

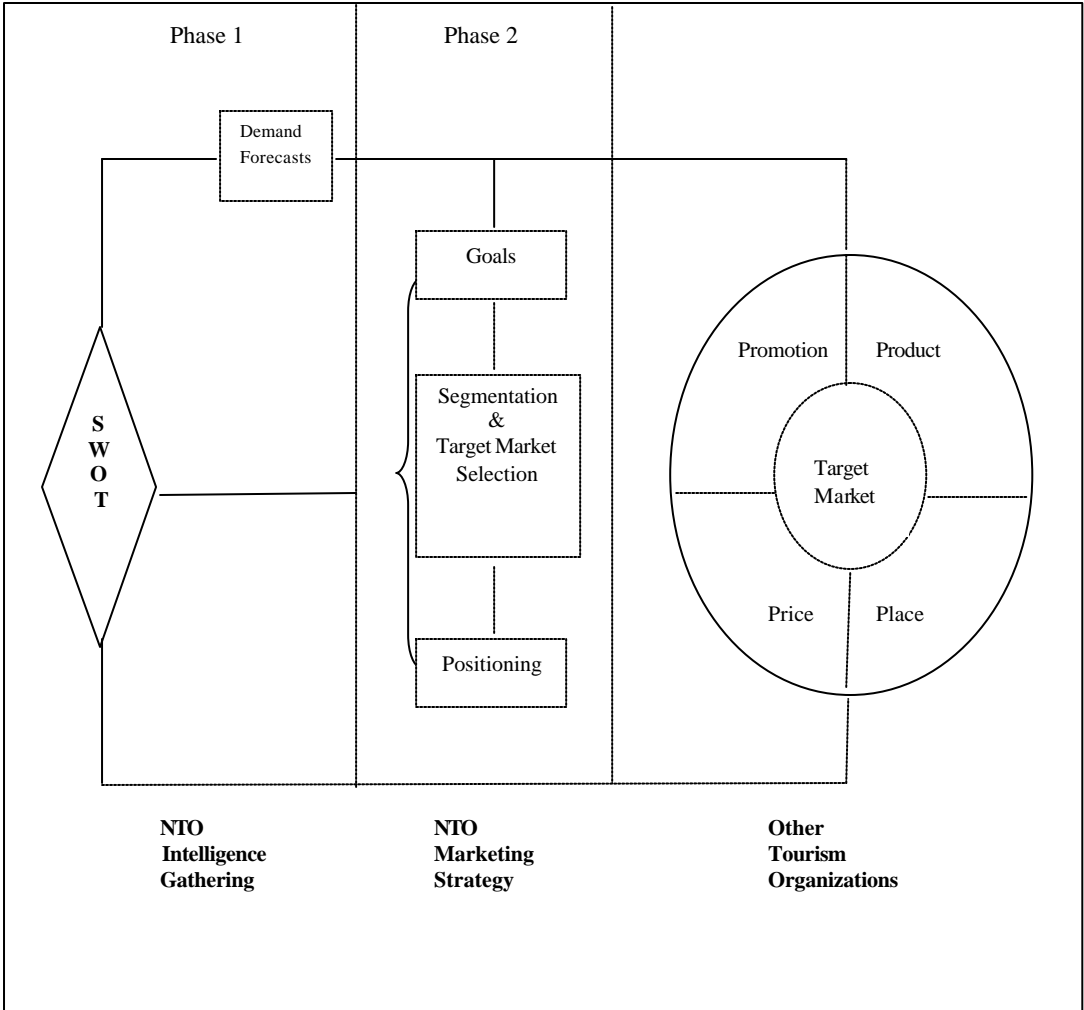


Figure 1 provides an overview of the marketing strategy planning process, along with the role of NTOs in this process. The first phase consists of a SWOT analysis and a demand forecast completed by the NTO. This may include an evaluation of sustainable sources of competitive advantage, the awareness and perceptions of the destination in the tourism market, an assessment of tourist satisfaction, an assessment of environmental changes and competitive threats, as well as new marketing opportunities. A NTO should not only focus on the strengths and weaknesses of its own country but

should also monitor the strengths and weaknesses of its major competitors. For example, it is possible that the NTO's country has improved as a tourist destination, yet tourist patronage may decline because competing destinations have improved their destinations, service quality, etc. to an even greater extent. A part of the strengths and weaknesses assessment should relate to an evaluation of tourist satisfaction. Customer or tourist satisfaction is central to the marketing concept and should feed into the strategic and operational planning of the NTO and other participating tourism organizations. As depicted in Figure 1, in addition to a SWOT analysis, a demand forecast is also made by the NTO in phase 1. This forecast may be in terms of revenues, number of tourists, or both. It should be noted that with over 175 NTOs of various sizes and organizational structures, not all would have similar marketing responsibilities and perform similar marketing roles consistent with those depicted in Figure 1.

The second phase shown in Figure 1 addresses the goals of the NTO, market segmentation, target market selection, and the appropriate positioning strategy. Goals may be stated in terms of the desired number of tourists, revenues to be generated, average duration of stay, redistribution of tourism demand to accommodate over and under capacity seasons, etc. The section that follows focuses on the multivariate statistical techniques that are particularly relevant to demand forecasting, market segmentation and target market selection, and positioning research.

4. Multivariate Analysis and Tourism Marketing Strategy

There is widespread agreement that multivariate analysis will dominate data analysis in the future (Hair et al., 1998, p. 4). Multivariate analysis techniques can be classified into two major categories. These are dependency techniques and interdependency techniques. The former consist of techniques in which a variable or a set of variables is identified as the dependent variable that is being predicted or explained by other variables, identified as the independent variables. Multiple regression is an example of a dependency multivariate technique. In contrast, in the case of interdependency techniques there is no single variable or set of variables identified as being independent or dependent. Interdependency techniques involve the simultaneous analysis of all the variables in the set. Cluster analysis is one example of an interdependent technique. Both, dependency and interdependency multivariate techniques can be further classified based

on the number of dependent variables and whether these variables are metric or non-metric.

One of the objectives of this paper is to identify and briefly discuss the most relevant multivariate analysis techniques for research helpful to addressing the key marketing strategy planning tasks of NTOs. Figure 2 indicates these techniques and the key components of a NTO's marketing strategy. The latter are: (1) forecasting demand, (2) segmentation and target market selection, and (3) positioning. Each of these is addressed in next three sections.

Forecasting Demand

Accurate forecasts of tourism demand are essential for the development of effective marketing plans and strategy. In this regard, Wander and Erden (Hawkins et al., 1980) note that the availability of accurate estimates of tourism demand has important economic consequences for various organizations (including NTOs) involved with tourism planning and the provision of tourism products and infrastructure. Given the perishable nature of the tourism product, the need for accurate demand forecasts is even greater. A variety of forecasting models can and have been used for forecasting international tourism demand. These encompass trend extrapolation, multiple regression, simulation, structural equation, and qualitative models.

Among the forecasting models using multivariate techniques, multiple regression analysis is the most used and relevant technique for forecasting international tourism demand. Although multiple regression models and approaches may assume different forms (i.e. Logit, Probit models) and different approaches (i.e. Confirmatory or Sequential), the basic multiple regression model is represented as:

$$Y = b_0 + b_1X_1 + b_2X_2 \dots b_nX_n + e$$

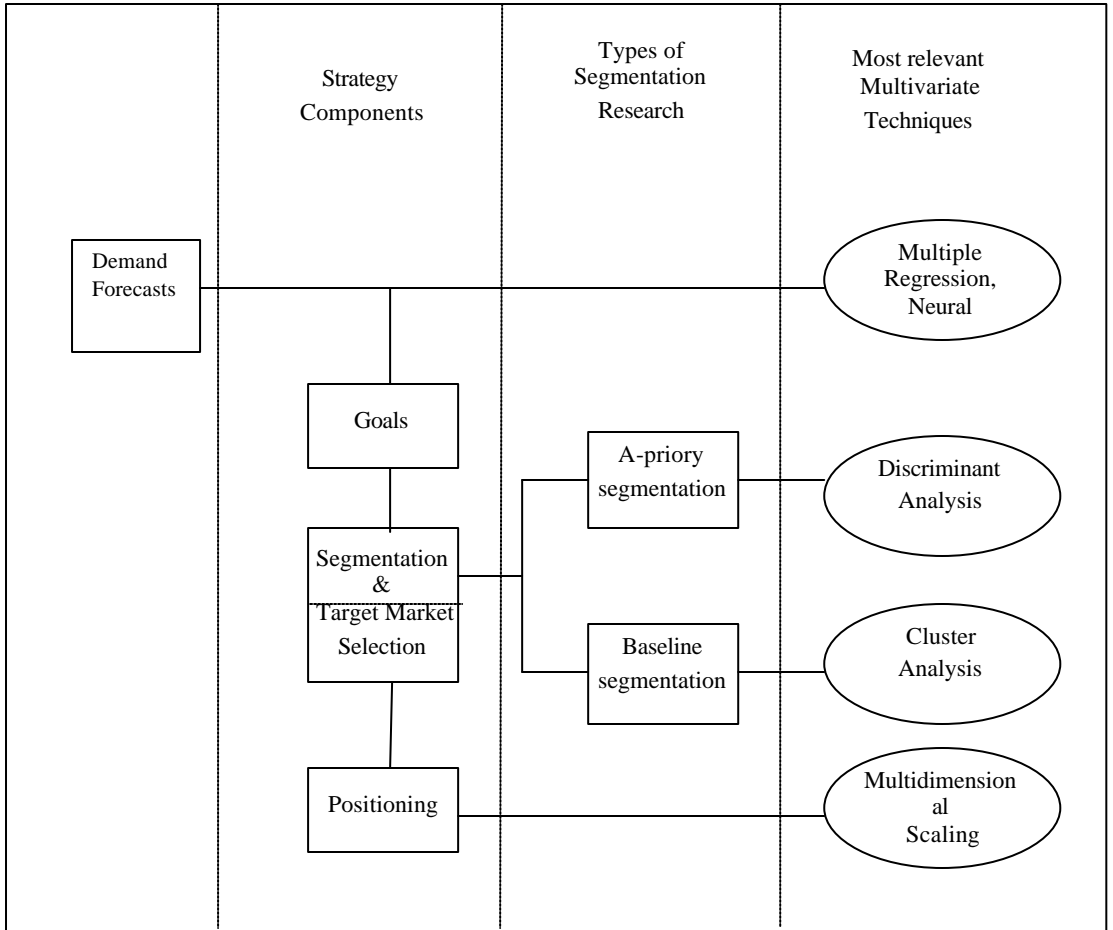
Where:

b_0 = intercept

$b_1X_1 \dots b_nX_n$ = linear effect of various independent variables

e = error term

Figure 2 :NTO Marketing Strategy Components and Multivariate Analysis



In a paper reviewing forecasting techniques for international tourism demand, Witt and Witt (1995) provide a nice perspective on the various techniques used for forecasting international tourism demand, including a comparison of the accuracy of the techniques. With reference to multiple regression, they note the need for improved model specification while recognizing that the more recent models have improved in this respect. For

example, in addition to including traditional independent variables, such as income, population, cost of travel, exchange rates, etc., the more recent models incorporate variables such as the prices of substitutable vacation destinations, trend variables, marketing expenditure, as well as qualitative variable effects expressed as dummy variables, such as travel restrictions, currency restrictions, political factors, etc. The consensus of opinion with regard to multiple regression models used for international tourism demand forecasting suggest the following:

- ? typically these models do better when forecasting over time horizons of two or more years,
- ? auto regressive models consistently perform better over the two-year time horizon than any other method for established tourist destinations and generators,
- ? in terms of accuracy as measured by MAPE (Mean Absolute Percentage Error), multiple regression models fail to outperform simple extrapolative models in the context of one-year forecasts,
- ? despite the limitations of multiple regression models in terms of forecasting accuracy, they serve a valuable purpose in explaining and understanding the relationships among the variables affecting international tourism demand, and
- ? the choice of the "best" forecasting method or regression model must be related to the specific forecasting situation at hand.

More recently, Artificial Neural Networks (ANN) have been used in tourism demand studies (Muzaffer & Sherif, 1999; Pattie & Snyder, 1996). The findings of these studies are encouraging. Muzaffer and Sherif compared ANN versus multiple regression for predicting Canadian tourism expenditures in the U. S. Their analysis indicated that the ANN model performed as well as the multiple regression model in terms of the R-square and F values. Pattie and Snyder examined traditional time-series forecasting techniques with a neural network model for forecasting tourist behavior. They concluded that the ANN model was an effective alternative to the traditional time-series models in forecasting tourist behavior. Given the very limited number of research studies on the use of ANN for forecasting international tourism demand, it is still too early to evaluate its potential and accuracy. The interested reader can find good expositions and discussions of Artificial Neural Networks and its applications in books by Bigus (1996), Fausett (1994), and Smith (1993).

Market Segmentation and Target Marketing

Because of the diversity in the tourism market, tourist destinations should NOT target ALL tourists. At times NTOs may view a country or a group of countries as a single segment consisting of all tourists or potential tourists living in that country. This approach assumes that all tourists *within* that country are homogeneous. Furthermore, it ignores the possibility of the existence of homogeneous groups of tourists *across* countries. NTOs should preferably identify and target tourists with similar needs, wants, and profiles across a number of countries. The benefits of targeting well-defined segments of tourists rather than ALL tourists are: (1) the identification of opportunities for the development of new tourism products that better fit the needs and wants of specific tourist segments, (2) the design of more effective marketing programs to reach and satisfy the defined tourist segments, and (3) an improvement in the strategic allocation of marketing resources to the most attractive opportunities in the tourism market. In effect, market segmentation and target marketing are crucial to achieving cost effective marketing. For a detailed exposition of market segmentation, the interested reader would be well served by the work of Myers (1996)

Segmenting a market expedites finding the appropriate segment to target. The formula, Segmenting, Targeting, and Positioning (STP) is oftentimes seen as the essence of strategic marketing (Kotler, 1997). Multivariate analysis can assist in the task of segmenting, identifying, characterizing, and targeting the appropriate market segments. Two types of segmentation procedures using multivariate statistical techniques that are of particular significance are:

1. a-priori segmentation using Discriminant analysis, and
2. Baseline or Post Hoc segmentation using Cluster analysis.

A-Priori Segmentation and Discriminant Analysis: a-priori segmentation is a procedure in which the researcher selects the basis for defining the segment at the outset (a-priori). Thus, in the context of tourism, to start with, tourists would be classified into two or more groups on the basis of a known characteristic of relevancy. For example, tourists could be assigned to groups on the basis of length of their stay (e.g. those who stayed one week or less versus those who stayed more than one week). They could also be assigned on the basis their country of origin (e.g. German versus American

or British tourists) or on the basis of the type of tour package used, etc. The choice of classificatory descriptor used should be made on the basis of the relevancy of the descriptor to the marketing issue prompting the segmentation study. For example, an issue might be founding out whether the tourism related attributes of American versus German tourists visiting Turkey differed. Initially, one should have a representative sample of German and American tourists. Then, data would need to be collected from these German and American tourists on a number of variables having marketing relevancy such as the length of stay, accommodation preferences, the money spent, the benefits sought, use of travel agencies or tour operators, attitudes, age, occupation, etc. After this data are collected, Discriminant analysis can be used to identify the independent variables that discriminate best between the two groups of tourists. In addition, the technique derives the weights (relative importance) of the discriminating variables. Similarly, if tourists visiting Turkey could be classified a-priori on the basis of the benefits sought (e.g. tourists visiting Turkey for its history and culture versus those visiting Turkey for its coastal beaches and weather), the independent variables discriminating between these two groups could be determined together with their weights. This would be accomplished by surveying both sets of tourists on a variety of independent variables. The survey questionnaire should incorporate the measurement of independent variables that have marketing relevancy.

Discriminant analysis is a multivariate statistical technique that can be used to identify independent variables that can predict the group membership (the categorical dependent variable) of a subject. At the same time, it serves the objective of determining on what basis or characteristics the groups differ. In the context of tourism, Discriminant analysis can be used to predict the classification of a tourist to one of two or more groups on the basis of a set of independent variables. When two classification groups are involved, the technique is referred to as “a two-group Discriminant analysis”. When three or more classification groups are involved, the technique is referred to as “Multiple Discriminant Analysis”. In essence, Discriminant analysis involves deriving the linear combination of a set of independent variables that will discriminate best between two or more a-priori defined groups. This discrimination is obtained by setting the weights for each of the selected independent variables to maximize the between-group variance relative to the within-group variance. The linear combination of the independent variables that will discriminate best between the a-priori defined groups takes the following form:

$$Z_{jk} = a + W_1 X_{1k} + W_2 X_{2k} + \dots + W_i X_{ik}$$

Where: Z_{jk} = discriminant Z score of discriminant function j for tourist k

a = intercept

W_i = discriminant weight for independent variable i

X_{ik} = independent variable i for subject (tourist) k

When there are more than two membership groups in the dependent variable, Multiple Discriminant analysis will calculate more than one discriminant function. For a detailed description of discriminant analysis, including the assumptions, the limitations, and the testing of prediction accuracy, the reader may refer to a number of books (Hair et al., 1998; Sharma, 1996) on multivariate data analysis. An example of the use of Discriminant analysis in tourism segmentation studies is the research of Bonn, Furr, and Susskind (1999) where they profiled pleasure travelers on the basis of Internet use. A less frequently used alternative to discriminant analysis in a-priori segmentation is logistic regression or logit analysis (Chen, 2000:272).

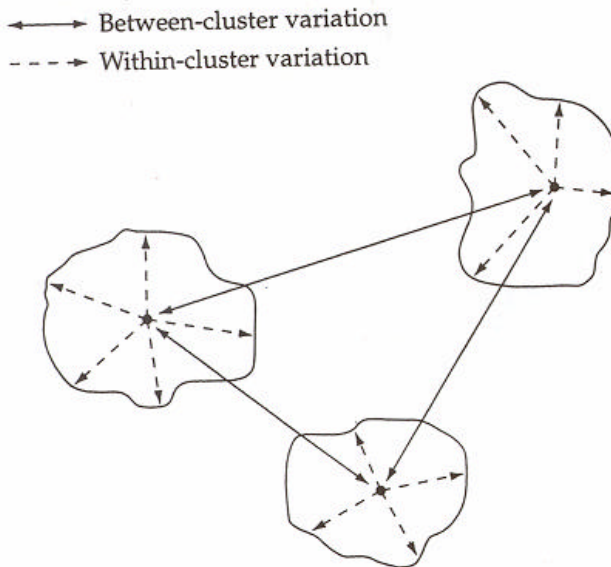
Baseline/Post Hoc Segmentation and Cluster Analysis: Unlike a-priori segmentation, in Baseline segmentation, tourists are classified into clusters on the basis of their similarities. Thus, tourists within a cluster are very similar to each other. However, when compared to tourists from other clusters they are different. Baseline segmentation involves analyzing a large cross sectional sample of tourists where data has been collected on a variety of variables, such as psychological, life style, demographic, and other variables of interest. The preferred mode of analyzing this large set of data is Cluster analysis. As distinct from a-priori segmentation, where the researcher knows and specifies the number and identity of the segments, in the baseline segmentation approach using Cluster analysis, the segments are produced analytically.

Cluster analysis consists of a group of multivariate techniques that classify subjects like consumers, tourists, or respondents into clusters, so that each subject is very similar to other subjects in that cluster with respect to selected criterion variables. The clusters formed exhibit high within cluster

homogeneity and high between cluster heterogeneity. Thus, when good classification is achieved, subjects within clusters will be close together when plotted geometrically, but different clusters will be far apart. In the context of segmenting tourism markets, Cluster analysis can be used to identify different clusters of tourists that exist within a larger group or market of tourists. As a result, Cluster analysis may be used to develop a taxonomy of different types of tourist segments and thereby gain a better understanding of the composition of the larger population of tourists. The within cluster similarity of the tourists is typically determined using an intersubject Euclidean distance measure as shown below.

Euclidean distance between two subjects measured on two variables X and Y is given by: the Square root of $(X_2 - X_1)^2 + (Y_2 - Y_1)^2$

Figure 3: Cluster Analysis: Illustrating Within & Between Cluster Variation



Adapted from Hair, et al. (1998)

Figure 3 illustrates a cluster diagram showing within and between cluster variation. The ratio of the between-cluster variation to the average within-cluster variation is quite similar to the F ratio in ANOVA. Given the possibility that there may be many variables that may be scaled differently in a segmentation study, the variables are generally standardized (i.e. converted to a Z score) by subtracting the mean and dividing by the standard deviation for each variable. There are other issues that relate to Cluster analysis, such as the choice of the clustering algorithm to be used, assessing the overall fit and number of clusters to be formed, etc. For a discussion of these and other issues, the interested reader is encouraged to refer to the books on multivariate statistical analysis referenced earlier and listed in the bibliography.

Examples of the use of Cluster analysis in travel market segmentation include the research of Mazanec (1984), who showed how to find market segments in travel markets using Cluster analysis; Keng and Li Cheng (1999), who used Cluster analysis in determining tourist role typologies in the context of vacationers in Singapore; and Arimond and Elfessi (2001), who indicated how Cluster analysis can be used for categorical data in tourism market segmentation research. Punj and D. Stewart (1983) provide a nice exposition of the use of Cluster analysis in marketing research.

Positioning Strategy and MDS

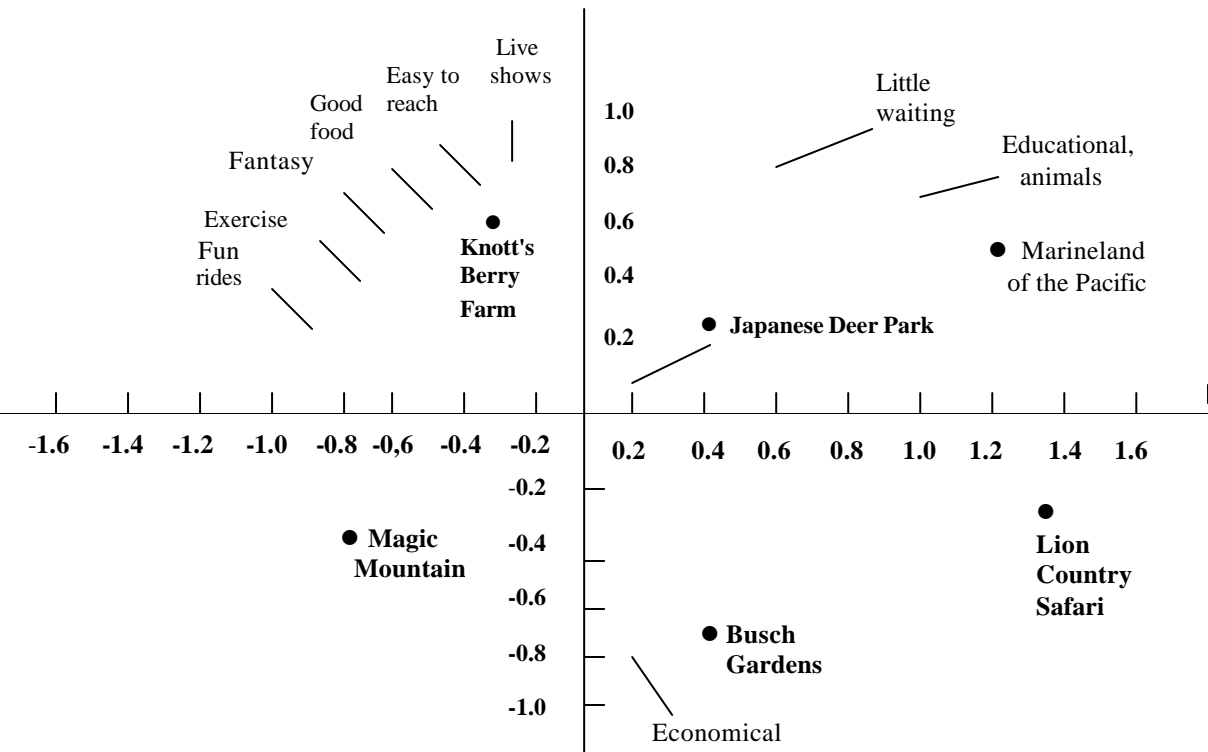
Positioning is the task of designing a company's offering and image so that they occupy a meaningful and distinct competitive position in the target customers' minds (Kotler, 1997, p. 295). Several marketing pundits view positioning as finding a niche in the minds of consumers and occupying it (Baker, 1992; Ries & Trout, 1981). In the context of NTOs, the positioning task is to create a distinctive image for a given destination in the minds of potential tourists that distinguishes the destination from competing destinations. This distinctive image is created largely via appropriate communication messages that target selected market segments. A successful positioning strategy should provide a sustainable competitive advantage to a destination. For example, a tourist destination like Turkey, with its rich cultural heritage, can position itself to appeal to tourists across several countries that are interested in history, culture, and historical architecture. Similarly, the country of Belize in Central America, with the rain forest in its backyard and the world's second largest live coral reef off its shores, may position itself to appeal to eco-tourists.

A tourist destination may be positioned on a number of different bases, such as positioning by benefit, price, quality, direct comparison, etc. When using positioning by benefit, although it is possible to use more than one benefit, caution must be exercised when doing so. Using more than one benefit to position a tourist destination can create disbelief and the absence of a clear image. Like brands, tourist destinations may have to be repositioned, too. An interesting example of repositioning is that of Club Med. Originally, Club Med consisted of numerous seaside village type resorts positioned to appeal to the single, city dweller who wanted to escape the pressures, stress, and routine of city life. The Club Med villages had none of the reminders of daily routine, such as telephones, newspapers, fax machines, etc. Dress was casual with plenty of sporting activities and entertainment. Club Med was positioned as the antidote to the stresses of urban living. In more recent years, Club Med has been repositioned to appeal to families, with amenities like telephones, TV, fax machines, and even computer facilities available at some of its resort villages. The decision about how to position or reposition a tourist destination should be made on the basis of market segmentation and targeting analysis in tandem with positioning analysis. The position selected should match the preferences of the targeted market segment and the positioning of competing tourist destinations.

Multidimensional Scaling (MDS), sometimes referred to as perceptual mapping, is a multivariate analytical procedure often times used by marketers for mapping the perceptions of consumers of a set of competing products or brands in terms of similarities and differences on a number of dimensions. These perceptual maps facilitate the identification of attributes that are the most relevant to consumer decision-making and choice. In addition, MDS allows the visualization of the strengths and weaknesses of competing products on these important attributes, the identification of positioning opportunities, and the tracking of consumer perceptions of these products over time as market dynamics change. Perceptual maps generated via MDS work best in tandem with market segmentation data in terms of developing the perceptual maps by market segment. Although MDS has been used quite extensively for the perceptual mapping of products such as automobiles (Churchill, 1998: 221), beers (Bagozzi, 1986: 245), and other products, its use in tourism research has been limited. Stumph (1976) applied MDS to theme park attractions such as Disneyland, Lion Country Safari, and Magic Mountain, etc. in Southern California. Figure 3 shows the perceptual map resulting from this study. The seven dots in this perceptual

map represent the seven theme parks. The more similar any two theme parks are in the minds of tourists the closer they are spatially on this map. For example, Disneyland and Magic Mountain are perceived as being quite similar, whereas Disneyland and Lion Country are perceived as very different. In addition, the map shows, with the arrows, nine ways of satisfying the tourists that the tourists wanted. Marineland is seen as having the shortest waiting time (it is farthest along the "little waiting" arrow). Bush Gardens is the most economical. This perceptual map can be utilized for identifying the different positioning strategies that are being used or that can be used by the various theme parks in the area. Similar analysis can be used to position other tourist destinations. Obviously, the want satisfying attributes will vary depending on the destinations being mapped.

Figure 4: Illustration of a Perceptual Map



Adapted from Stumpf (1976)

If one were, for example, interested in applying MDS for positioning Turkey as a tourist destination, this could be accomplished as follows. The set of competing tourist destinations would have to be identified. The ratings or rankings of a representative sample of tourists or potential tourists would have to be gathered in terms of the "similarities" of these competing destinations or the "preferences" of the surveyed tourists for these destinations. Typically, this information is collected using the "paired comparisons" procedure (Hair et al., 1998). If the total number of competing tourist destinations were 6, the number of pairs on which the similarities or preference data would have to be collected would be $15--(n [n-1] / 2)$. The obtained similarity or preference data is analyzed and mapped using one of several MDS programs. When preference data is collected, incorporating the mapping of the respondent's "ideal points" is desirable for the purpose of developing position strategy.

In perceptual mapping, as is the case with other multivariate techniques, there are many discretionary choices that must be made, such as: (1) the collection of similarity versus preference data, (2) the use of compositional (attribute-based) versus decompositional (attribute free) approaches, (3) the method of obtaining "ideal" point data when using preference data, (4) the number and choice of destinations (objects) to be included in the analysis, (5) determining the number of dimensions to be used in the spatial map configuration, (6) the choice between vector versus point representation in the perceptual map, (7) the choice between subjective versus objective procedures to identify the dimensions of the perceptual map, and (8) the decision about whether to use Correspondence analysis for dimensional reduction in perceptual mapping. A discussion of these issues is beyond the scope of this paper. However, the interested researcher can refer to a number of books on multivariate analysis, some of which are referenced in the bibliography section of this paper.

5. Concluding Comments

International tourist arrivals increased from approximately 25 million in 1950 to 625 million in 1998, an increase of 2,500 percent. A WTO survey of NTOs and leading experts in tourism envision the following (WTO, 1998a): (1) international tourism arrivals by 2020 to be 1.6 billion, with spending in excess of 2 trillion U.S. dollars, (2) the percent of the traveling population involved in international travel increasing from 3.5 percent in

1998 to 7 percent by 2020, (3), Europe continuing to be the largest international tourism region, although by 2020 its market share being significantly eroded, (4) by 2020 China being the largest receiver of international tourists, (5) among the various international tourism market segments, eco-tourism, cultural tourism, theme based tourism, adventure tourism, and the cruise market growing in importance, and (6) tourism as a sector growing at a faster rate than the global economy. These predictions by the WTO suggest that the international tourism market will continue to expand at a rapid rate and become increasingly competitive. In this environment, the use of effective and efficient marketing strategies by NTOs as well as other international tourism organizations will become increasingly important.

With the large number of NTOs involved in international tourism, and the significant differences in the size and operating budgets of these NTOs, the marketing roles and tasks performed by these organizations is likely to vary significantly. Thus some NTOs may indeed take on more than the marketing tasks identified in this paper, whereas others may be responsible for less. For example, the importance and the task of measuring, tracking, and analyzing customer satisfaction is well recognized in the marketing literature. Should this be the responsibility of NTOs? Our paper does not address this issue. This omission does not imply that tourist satisfaction, its measurement, etc. is not an important issue affecting tourist patronage. On the contrary, its significance merits attention that goes beyond the scope of this paper.

Although sound judgement and experience will continue to play a role in marketing decisions, marketing research and good data analysis will increasingly drive these decisions. Because of the nature of such research and the related data, multivariate analysis will continue to gain in use and applications. The multivariate techniques and the context of their use discussed in this paper do not include all the applicable multivariate techniques. Only the most widely used techniques for addressing the specific marketing strategy related research issues for NTOs were identified and discussed. However, the reader interested in learning more about the multivariate techniques discussed in this paper, as well as other multivariate techniques, can refer to a number of books on multivariate analysis in marketing research, such as Hair et al. (1998), Sharma (1996), and Malhotra (1996).

Future areas of research that relate to the theme of this paper, include: (1) a comprehensive review of the literature indicating the varied applications of multivariate analysis and techniques to international tourism research, (2) the measurement, tracking, and analysis of tourist satisfaction and its impact on tourist patronage and destination success, and (3) the roles, tasks, and organizational structures of NTOs. It is hoped that this paper will spur additional research and writing in these areas.

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