TIME SERIES ANALYSIS OF TRAVEL TRENDS IN VERMONT

Varna M. Ramaswamy

Graduate Student, University of Vermont, School of Natural Resources, Aiken Center, Burlington, VT 05405

Walter F. Kuentzel

Assistant Professor, University of Vermont, School of Natural Resources, Aiken Center, Burlington, VT 05405

Vermont's travel and tourism industry is not keeping pace with the nation-wide growth in the travel industry. While travel indicators such as domestic travel expenditures, tourism generated employment, payroll and tax receipts have been steadily increasing across the United States, these indicators in Vermont peaked in 1978 and have declined ever since. The state tourism industry experts have attributed this downward trend to weather, the cyclic nature of the U.S. economy, Canadian exchange rate, increasing state tax burden, size of state travel and tourism budget, and overall tourism industry competition.

This longitudinal study of tourism in Vermont from 1974-1991, refuted popular beliefs about what causes changes in Vermont's travel industry. Personal income, disposable income, size of the state travel and tourism budget, the state's travel generated taxes, full-time employment status, and gasoline prices had little effect on Vermont travel trends. The results indicated that increased competition in the travel and tourism industry has influenced Vermont's market share loss. This finding suggested that Vermont's mature travel market may not be keeping pace with the increase in other tourism related businesses that are capturing an expanding tourism market. That part-time employment status in New England has a negative association with travel indicators in Vermont. Finally, travel expenditures in Vermont are positively associated with a higher Canadian exchange rate, suggesting that travel to Vermont benefits from an active U.S. Economy.

Vermont Tourism Trends

Vermont's travel and tourism industry is not keeping pace with the growth nation-wide of the tourism industry. While travel indicators such as domestic expenditures, tourism generated employment and payroll, and tourism generated tax receipts have been steadily increasing across the United States, these indicators in Vermont peaked in 1978, and have shown a downward trend over the last 15 years (Figure 1). Tourism industry leaders in Vermont are just beginning to recognize this downward trend attributing it to such causes as weather, economic recession, the growing cost of doing business, and the Canadian exchange rate. Typically, however, they only perceive this downward trend as a five year phenomenon that corresponds to the recession of the late 1980s. Consequently, the industry feels it is only temporary, and many people expect tourism will be Vermont's #1 industry by the year 2000. The 15-year duration of this downward trend, however, suggests there may be different forces at work in the state's tourism industry besides a momentary downturn in the U. S. economy. The purpose of this paper is to examine the effects of weather, U. S. economic indicators, state advertising budgets, state tax burden, and competition on Vermont's travel and tourism indicators. The study uses time-series analysis to gauge whether the trends in Vermont are temporary or whether they have longer term implications.

This paper looks at the longitudinal effects of six types of measures that people have said affect Vermont's tourism indicators: weather, national economic indicators, the Canadian exchange rate, size of the state's advertising budget, the state's travel related tax burden, and industry competition. Each of these has been the subject of public discussion in Vermont's tourism industry. First, Vermont's tourism industry relies heavily on the skiing, which dominates tourism to Vermont for up to half the year. A 1993 survey (Kuentzel 1993) of winter visitors to Vermont showed that 81% of the sample's visitors to the state went skiing while they were here. Similarly, Bill Stenger of Jay Peak stated that when winter tourism declines, tourism to Vermont during the rest of the year is negatively affected "because so many tourism facilities in the state are driven by winter tourism" (Pyne 1993). So, when Vermont has a year with little snow, it should have a significant affect on tourism activity in the state. Second, the tourism industry in Vermont often attributes downturns in tourism related business to economic downturns. Leisure is often thought of as a luxury that is the first item of discretionary income cut back in times of economic uncertainty. Economic recessions create employment uncertainty and diminishing buying power, which directly affect travel spending. Third, closely related to economic conditions is the Canadian exchange rate. Vermont benefits from roughly 300 million dollars per year (about 20% of total expenditures) spent in the state by Canadians (Zentz 1994). Therefore, when the price of the dollar is high, Canadians are less likely to spend their money in the state. Fourth, the recession of the last several years stands out as the "down-sizing" recession. This event not only put small businesses in jeopardy, but forced significant down-sizing by large corporations, educational institutions, and government agencies. Vermont's Department of Travel and Tourism was level funded throughout the recession. Subsequently, there is a push to increase the department's budget to offset some of the crisis that the industry now is beginning to perceive. Past research, however, (Hunt 1990) shows that the size of state travel budgets have little effect on travel indicators, and conversely, the lack of state promotion dollars should have no direct effect on declining market share. Fifth, legislators and travel industry people often point to a rising tax burden as a condition that discourages growth in the states tourism industry. An increase in the rooms and meals tax or the gas tax can give the impression that Vermont is no longer a travel bargain. Consequently, many people in the industry are concerned that increased state taxes may turn potential visitors away from the state. Finally, increased competition may be taking away former visitors to the state. More ski slopes with newer equipment, more tourism marketing organizations, and a greater variety of destinations may be cutting into what was once a stable and reliable tourism market for Vermont. Thus, this paper will test the effects of each of these variables on tourism expenditures, tourism generated employment and payroll, and tourism generated tax receipts in Vermont from 1974 to 1991.

Time-series Analysis in Tourism Research

Time-series analysis is a fairly new area of expertise in tourism research. Earlier trend analyses simply plotted measures and drew conclusions based on the visual and central tendency evidence. As the field of travel and tourism matured, the types of analyses have changed from use of basic descriptive statistics to increasingly complex multivariate quantitative analyses. Analyses of tourism trends are conducted for many reasons: for the researcher it may be out of curiosity, or the desire to forecast changes in the future; for businesses, states, and countries, it assists them in staying competitive in the travel and tourism market: and for practitioners it "provides useful guidance to those who plan for, provide, approve and fund..." tourism experiences (McClellan and Siehl 1989). The importance of generating accurate forecasts is particularly relevant for tourism. Archer (1987) points out that, "In the tourism industry, in common with other service sectors, the need to forecast accurately is especially acute because of the perishable nature of the product."

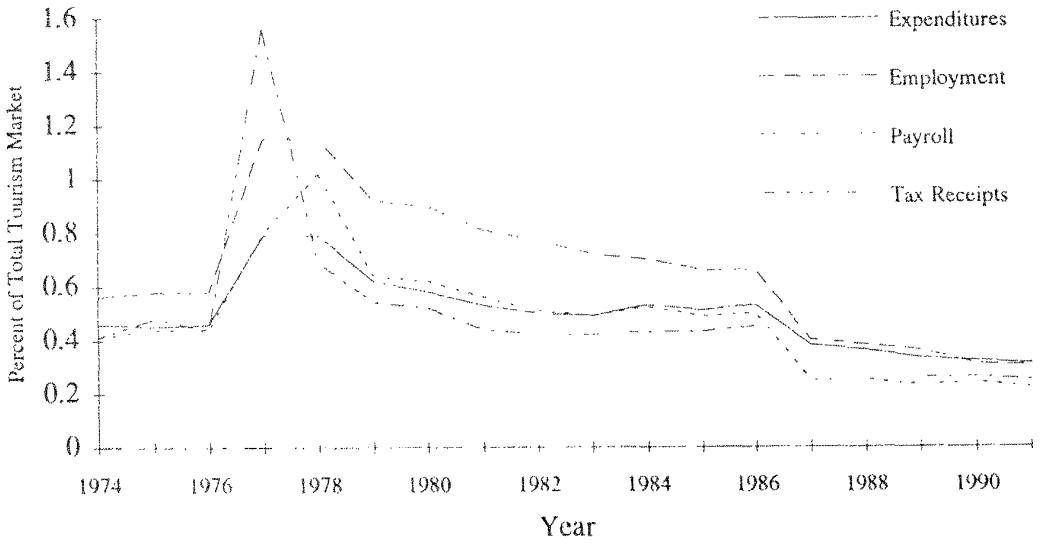

Figure 1. Vermont's tourism industry market share.

Two types of time-series quantitative analysis can be found in the literature -- regression models (Steinnes 1988, Johnson and Suits 1983) and forecast models (Sheldon 1993, Witt and Witt 1991). A forecasting model is typically a univariate analysis that uses the underlying pattern in the variable over time to model and extrapolate future trends. Regression analysis attempts to provide a causal explanation by using information on variables believed to influence the dependent variable. Hunt (1990) stresses the need for multivariate modeling of longitudinal tourism data. While it is easy to draw causal links between a single independent variable and the dependent variable, the researcher must be aware of the presence of other exogenous variables such as the overall economic conditions, weather, and competition, to name a few, that affect the nature of the impact of travel on the state.

Hunt (1990, p.11) also draws attention to one other limitation, i.e., lack of comparable longitudinal tourism data. At the state level, tourism has had support programs for the last 25 -50 years; however, compilation of comparable longitudinal tourism data has only been available since the 1970s with the inception of the U.S. Travel Data Center. The State of Vermont is just now realizing the importance of time-series analysis. The Vermont Department of Travel and Tourism has collected time-series data for many years. Its efforts, however, have been somewhat inconsistent. The consistent gathering of time-series indicators often falls by the wayside when tourism to the state is in a growth mode. Missing data points make an analysis difficult at best, and unreliable at worst. In any event, a formal time-series analysis of travel trends to Vermont has never been conducted.

Methods

Autoregression

This study uses a time-series regression analysis to investigate the trends in Vermont's tourism indicators between 1974 and 1991. The analysis seeks to determine the effects over time of weather, various economic measures, and market competition on domestic tourism expenditures in Vermont, tourism generated employment in Vermont, and tourism generated taxes gathered by Vermont's travel industry. Time-series data, however, presents a unique problem that ordinary least squares regression cannot handle. Time-series data characteristically has high levels of serial correlation. Serial correlation means that the best predictor of a value at time t is its measure at time $t-1$. A high value is usually not followed by a proportionately low value, but instead measures are highly correlated with their previous values. Stock prices are the classic example. The price of a share of AT & T stock does not close at $57 one day and $13 the next. Similarly most people's income tends not to fluctuate up and down drastically from year to year. This quality of serial correlation violates the assumptions of ordinary least squares regression. Autoregression is the statistical technique devised to handle the serial correlation problem that is inherent in time-series data (Ostrom 1978). Autoregression controls for the effects of autocorrelation in the regression equation and estimates effects of an independent variable on a dependent variable with the effects of serial correlation parceled out.

Sample Size

This analysis included 18 years of data on Vermont travel related indicators. The results of this analysis therefore must be interpreted with caution. The reason for caution is not statistical. Autoregression is able to calculate unbiased estimates with relatively small sample sizes such as this. Since longitudinal data on tourism is hard to come by, the data set represents the best available measures of tourism activity in Vermont. The reason for caution, however, is that small sample sizes may not represent actual trends. The travel and tourism industry in Vermont has been active for 175 years. Eighteen years of data may only reflect a momentary deviation in an otherwise clear trend. Consequently, 50 years or more of data would represent a more accurate picture of a time series. Nevertheless, the tourism literature states that the tourism industry has grown steadily in the U. S. since the end of World War II (c.f. Fridgen 1991). Therefore, a downturn in tourism activity in the 1980s to an established destination like Vermont raises questions that can be statistically tested within an 18 year time span.

Measurement

Dependent variables. This study used secondary data from a variety of sources. The dependent variables came from the U. S. Travel Data Center's series entitled *The Impact of Travel on State Economies*. The U. S. Travel Data Center's estimates of travel impacts uses what Flemming and Toepper (1990) call a aggregate model of economic impact. They use baseline indicators from a five year census of travel behaviors as constants in their model. They then input yearly secondary data on industry receipts and tax revenues and actual trip budgets from a yearly sample of travelers. Four variables from their series were included in the analysis: Vermont's domestic expenditures, travel generated employment (FTEs), travel generated payroll, and travel generated tax receipts.

Independent variables. The independent variables were taken from a variety of government sources. We used four measures of weather: annual snowfall (winter precipitation), annual rainfall (summer precipitation), average winter temperature, and average summer temperature (National Oceanic Atmospheric Administration). We averaged measures from Burlington (Champlain Valley), Mt. Mansfield (central mountains), and Bellows Falls (Southern Vermont) to create a statewide score for each weather variable. The study included three types of economic indicators. First were income statistics, including personal income, disposable income, and minimum wage (U.S. Department of Commerce 1989). Also included were labor statistics such as unemployment, full time employment, and part time employment (U.S. Department of Labor Statistics). We included overall measures of economic well being such as the consumer price index, inflation rate, and purchasing power of the dollar (U.S. Department of Commerce). Lastly, we included the average price of a gallon of gasoline. The study also used gathered data from different Vermont state agencies. The Vermont Department of Travel and Tourism supplied state tourism budgets along with the proportion of their budget that was devoted to advertising. The state tax department also supplied figures for the gasoline tax and the rooms and meals tax (Vermont Department of Taxes). Finally, the study used membership statistics from the National Tour Association that were itemized by the number of tour operators, the number of tour suppliers, and the number of tourism related marketing organizations (National Tour Operators 1993). In the analysis, current dollars were regressed with variables that were measured in current dollars; whereas any independent variable that was measured in either constant (1987) dollars or was not a dollar measurement was regressed with constant dollars.

Results

The results generally did not confirm popular beliefs about the causes of Vermont travel activity (Table 1). One common belief in the state is that snowfall has a big impact on travel to Vermont. Though there was not a "big" affect, snowfall was found to be positively related to travel generated payroll. Table 1 shows that the lack of snowfall did not negatively affect Vermont's domestic tourism expenditures, employment or tax receipts. Neither did average winter temperature or the average summer temperature. Though a weak relationship was found between the amount of rainfall and tax receipts. While weather may have an impact on daily or weekly tourism indicators at specific sites, it does not have a big affect on the states overall tourism activity over the course of a year.

Table 1. Autoregression estimates (Betas) of economic, weather, and competition variables on Vermont's travel indicators.

	EXPEDITURES		EMPLOYMENT		PAYROLL		TAX RECEIPTS	
	Beta	SE Beta	Beta	SE Beta	Beta	SE Beta	Beta	SE Beta
WEATHER								
Snowfall	1.79	1.54	0.065	0.049	1.00*	0.461	0.578	0.338
Rainfall	6.38	7.05	0.157	0.228	2.34	2.380	-0.476**	2.540
Winter Temp.	-13.88	8.86	-0.408	0.285	-5.76*	2.930	-3.72	3.080
Summer Temp	-13.88	13.60	-0.545	0.420	-0.485	4.620	-4.23	4.720
ECONOMIC IND.								
NE Per Capita Inc.	0.026	0.019	-.00076	0.00074	0.003	0.004	0.0020	0.0017
NE Per Cap. Dis. Inc.	0.030	0.022	-.00090	0.00085	0.003	0.005	-0.0024	0.0021
Minimum Wage 356.420* 83.63	3.10	6.96	66.18*	27.870	20.95	14.93		
NE F.T. Emp.	0.180	0.316	0.006	0.011	-0.102	0.077	-0.084	0.047
NE P.T. Emp.	-1.410*	0.470	-0.066*	0.013	-0.487*	0.151	-0.236**	0.123
NE Unemp.	-0.536	0.589	-0.014	0.019	-0.147	0.195	0.0053	0.166
CPI	-3.59	3.78	-0.166	0.136	-1.56	0.991	-1.01*	0.489
Purchase Power $	-91.14	308.73	0.932	10.87	23.30	86.28	35.23	40.52
Inflation	25.71	21.28	0.953	0.720	5.37	7.38	2.36	5.52
Ave. Gas Price	221.01	286.44	-5.85	11.79	65.89	66.97	-60.64	56.23
CANADIAN EXCHANGE								
Rate	1976.42	338.71	43.33	29.75	389.68*	130.66	136.81**	74.37
STATE TAX BURDEN								
Room and Meals Tax	0.006	0.007	-0.00034	0.0024	0.00069	0.0017	0.00071	0.00069
Gas Tax	0.014	0.012	-0.00047	0.0045	0.0017	0.0031	0.0015	0.0013
STATE TRAVEL OFFICE								
Dept. Budget	0.080	0.139	-0.0053	0.0049	0.011	0.033	0.015	0.014
Advert. Budget	-0.110	0.315	-0.014	0.011	-0.026	0.086	0.037	0.046
COMPETITION								
Marketing Org.	-1.13*	0.25	-0.047*	0.005	-0.379*	0.084	-0.081*	0.036
Tour Operators	-1.60*	0.47	-0.069*	0.010	-0.566*	0.122	-0.107**	0.057
Tour Suppliers	-0.338*	0.124	-0.011*	0.002	-0.129*	0.033	-0.019	0.014

*/ p< .05
** / p<.10

Another common belief is that tourism activity is subject to the cyclic swings of the U. S. economy. The results from the autoregression offer mixed support for this assertion. Table 1 shows that trends in Vermont's tourism indicators were not related to changes in the U. S. inflation rate, or the purchasing power of the dollar. Similarly, travel tends in Vermont were not related to all labor or wage statistics. Changes in personal income, average income, and disposable income had no effect on changes in tourism indicators. Similarly, full-time employment status and the unemployment rate had no effect on tourism activity in Vermont. Finally changes in the price of oil did not affect travel to Vermont. Only two labor statistics, part-time employment and minimum wage, were found to significantly affect Vermont travel indicators. A rise in the minimum wage was associated with a rise in domestic tourism expenditures in Vermont. CPI had a negative effect on travel generated tax receipts. Part-time employment had negative effect on all dependent variables.

The effect of the Canadian exchange rate on Vermont's travel indicators offer some evidence that tourism is related to the health of the U. S. economy, although the results were counter-intuitive to common beliefs in Vermont. Given the importance of Canadian visitors to Vermont's travel industry, many have stated that travel indicators in Vermont should decrease as the Canadian exchange rate increases. The results (Table 1) show a significant effect in the opposite direction. Tourism activity in Vermont increased with the increase of the Canadian exchange rate. A higher exchange rate is an indicator of increased economic activity in the U. S. Therefore, increased economic activity in the U. S. appears to be associated with increased travel to Vermont.

The results also did not support the "state level" arguments about what affects travel and tourism activity to Vermont. Increases in the state tax burden on visitors had no effect on Vermont's travel indicators. An increase in the gasoline tax (9¢/gallon in 1974 to 15¢/gallon in 1991) and an increase in the rooms and meals tax (5% in 1974 to 8% in 1991) had no effect on yearly travel generated expenditures, tax receipts, or employment. Thus, tax increases do not appear to drive away potential visitors to the state. The results also supported Hunt's (1990) findings that the size of a state's tourism promotion budget does not have a significant impact on travel expenditures. The size of the Vermont Department of Travel and Tourism's budget, and the proportion of that budget devoted to advertising had no effect on tourism expenditures, tourism employment, or tourism tax receipts.

Finally, the results showed that an increase in competition in the tourism industry nation-wide has a strong significant effect on tourism indicators in Vermont. Table 1 shows that an the increase in destination marketing organizations (i.e., membership in the NTA) tour operators, and tour suppliers nationwide (attractions, motels, gift shops, restaurants, etc.) had a negative effect on travel generated expenditures, employment and payroll in Vermont.

Discussion

Contrary to the Vermont travel industry speculations, the effects of weather, national economic indicators, size of state advertising budget, and relative state tax burden do not have a marked affect on tourism activity in the state. On the other hand, competition, Canadian exchange rate, part-time employment and minimum wage significantly affected tourism activity in Vermont.

With the increasing competition in the overall tourism industry, it is important to realize the affect that it has on Vermont's tourism industry. First, the increase of marketing organizations in the nation, are often associated with state tourism initiatives. It is apparent that the main source of competition is coming from other states and destination marketing organizations (DMO), who are capturing larger portions of the market share pie and making it increasingly difficult for Vermont to maintain its tourism industry. Currently, states are increasingly active in marketing and promotion of tourism regionally, nationally and internationally. According to Hawes, Taylor, and Hampe (1991):

> *the successful states have infrastructure of a tourist industry, and a number of strategies at their command, and they can meet the tourism demand with necessary local resources such as motels, hotels, restaurants, transportation, or information. A state such as Nevada, for example, focused on a particular type of tourist activity (gambling) and developed the necessary goals, strategies, and tactics.* (p.15)

These states, as Hunt (1990) says are "aggressive or bullish" in nature, and between 1977 and 1986 were able to gain $8.8 billion in market share. This means that certain states are gaining larger slices of the tourism pie at the expense of other states. The state of Vermont who has thrived as a travel destination for 175 years, and is now faced with the dilemma of loss of market share and needs to become a "bullish" player in this ever increasingly complex and aggressive market.

Second, the increase in tourism is further highlighted by the increase in tour suppliers (accommodations, attractions, restaurants, entertainment complexes, gift shops, etc.) This increase in tourism suppliers suggests that the state's more mature tourism market may not be sharing in the growth of the overall U.S. tourism industry. Lastly, the negative association of the number of tour operators that are affecting generated employment, payroll, and tax receipts also seems to supports the current trend of loss of market share by the State of Vermont. These variables, though limited to membership in the National Tour Operators Association, mirror the steady increase in three sectors of the travel industry and assist in realizing the possible ramifications of diverse and competitive tourism market.

This competitiveness is also present at Vermont's northern border, where intuitively with the increase in the Canadian exchange rate should decrease the number of cross-border visits by Canadians. In this study, that was not the case. The Canadian exchange rate did not directly effect tourism activity in Vermont even though Canadians help makes up 20% of tourism expenditures (Zentz 1994). Counter-intuitive to what is expected, a positive association between the Canadian exchange rate and expenditures was found. This says that with an increase in the rate of exchange, Vermont travel indicators also increases. This association represents an increasing strength of the dollar, which is in turn associated with the increased economic activity in the U.S. and hence increased travel activity in the state.

Additionally, as there is an increase in part-time employment in New England, there will be a negative affect on all tourism indicators in Vermont. New England is main source of tourism for Vermont, and a larger part time workforce may mean slower growth in total and disposable income in the region. If this is the case, New England income statistics may begin to have a significant negative effect on Vermont's travel industry in the near future.

Minimum wage was one of the only significant economic variables, but we think this finding is suspect. This effect can be explained by the nature of the trend of minimum wage which remained the same for the last 11 years. The high association with travel expenditures was due to steady increase in both variables in the 1970s and may not indicate any long term relationship between them. In addition, this variable would be more valuable if the number of minimum wage tourism jobs in the state were readily known.

This study was able to specify forces that work in the Vermont tourism industry over the last 18 years in order to understand a 15-year downward trend of loss of market share. There is however a need to recognize several limitations in the method of analysis and types of data used. First, the method of time series analysis of only 18 years of data could be limiting due to the possibility that small sample sizes may not represent actual trends. The 175-year history of Vermont's tourism trade may be relatively smooth and in actuality the 18 years may only represent a small bump in that trend line.

Second, the U.S. Travel Data Center data used in this study were estimated with the Travel Economic Impact Model (TEIM). This model has several limitations. First, the impact estimates fail to include two classes of travel generated expenditures: goods purchased in anticipation of travel (sporting equipment, travel books, language tapes etc.) and major consumer durable goods bought related to outdoor recreation (bikes, OHVs, snowmobiles etc.). Second, expenditure data is only recorded in a state if a person actually spends the night there or the state is the point of origin or destination. Third, model also excludes day-trips and travel less than 100 miles away from home. Finally, the expenditure data is collected through household surveys that carry sampling and non-sampling errors making estimates in smaller states less reliable (U.S. Travel Data Center 1992). Though all of these factors contribute to the potential for substantial error in the Vermont estimates, the error terms were distributed randomly across the years. This makes time-series analysis a suitable method of analysis of this type of data.

Conclusion

This study has used autoregression to analyze the causal factors that have affected trends in Vermont's travel industry between 1974 and 1991. The results refuted popular beliefs about what causes changes in Vermont's tourism generated expenditures, employment, payroll and tax receipts. Snowfall, rainfall, temperature, the Canadian exchange rate, personal income, disposable income, the state's travel generated taxes, employment status, and gasoline prices had little effect on Vermont's travel trends. The results did indicate that increased competition in the travel and tourism industry has influenced Vermont's market share loss. The state may be suffering from increased competition from other aggressive state promotion offices and destination marketing organizations. The mature state tourism industry may also not be keeping pace with the increase of other tourism related businesses that are capturing an expanding tourism market. Subsequently, this mature industry will not be able to compete with the growing number destinations that ten years ago were not even on the map. For the tourism planner in New England, this may indicate a need to become a more "bullish" player in the global tourism market through more creative and structured planning. Finally, travel to Vermont appears to benefit from a vital economy where U. S. dollars are more scarce and invested in an active economy.

Future time-series research should focus on maintaining consistent and reliable longitudinal data. More time-series observations will produce more reliable autoregression results. Research should also look more closely at the impact of Canadian travel on Vermont's travel related economy. Finally, this analysis needs more, and better, measures of industry competition, in order to determine where the state's promotional, demographic, and infrastructural shortcomings, and to focus its competitive efforts in directions that will capture a share of a growing travel market in the U. S.

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