

AN APPLICATION OF IMPORTANCE-PERFORMANCE ANALYSIS TO RECREATIONAL STORM CHASING

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Abstract.—Since the release of the movie “Twister” in 1996, storm chasing has become an increasingly popular form of recreation. Storm chasing tour agencies have emerged to provide technical assistance and guidance to individuals wishing to participate in this activity. However, little is known about the participants’ perceptions of their storm chasing tours. Therefore, an Importance-Performance Analysis (IPA) was conducted to examine recreational storm chasers’ perceptions of 22 tour operational attributes. Results can be used by recreational storm chasing tour agencies to improve their service and to address participants’ needs for increased enjoyment and satisfaction. Future research is recommended to analyze results based on individual tour agencies as well as storm chasers’ demographic profiles.

1.0 INTRODUCTION

By definition, risk recreation activities (e.g., skydiving, mountaineering) include a certain level of danger for participants. Storm chasing is a relatively new form of risk recreation (Cantillon and Bristow 2001). Since the release of the movie “Twister” in 1996, storm chasing has become an increasingly popular

recreational activity for many individuals (Bristow and Cantillon 2000, Cantillon and Bristow 2001). Indeed, there was an explosion of storm chasing articles, books, television features, and even home video footage starting in 1996 (Robertson 1999). In 2007, the Discovery Channel launched the television documentary series “Storm Chasers”.

As storm chasing increased in popularity, some people began to participate in this activity without the proper equipment or knowledge. Storm chasing tour agencies emerged to provide technical assistance and guidance to individuals wishing to participate in this activity (Cantillon and Bristow 2001). These tour agencies provide transportation, storm chasing equipment, safety training, education, as well as meteorologists and experienced storm chasers as tour guides. However, due to the relatively recent emergence of recreational storm chasing, few studies have examined this activity. Further, the limited amount of previous research on recreational storm chasing (i.e., Bristow and Cantillon 2000, Cantillon and Bristow 2001) focuses just on the tour agencies (e.g., length of tour, tour packages), rather than participants’ perceptions of this activity. Thus, examining tour participants is critical in order to better understand recreational storm chasing.

One method for evaluating customer satisfaction and service quality in tourism and outdoor recreation is the Importance-Performance Analysis (IPA) (Deng 2007, Oh 2001). Developed by Martilla and James (1977) to assist with comparing performance and satisfaction for management decisions, IPA examines two facets of expectations in parallel: the importance and performance of particular attributes (Hollenhorst et al. 1992). Because of its simplicity and understandability, IPA has become increasingly popular among researchers (Oh 2001). It has frequently been administered as an evaluation tool for

market research, including various outdoor recreation and tourism studies (e.g., Deng 2007, Hollenhorst et al. 1992, Sanders et al. 2001, Scott 1993, Wade and Eagles 2003). Therefore, an IPA was conducted to examine recreational storm chasers' perceptions of the operational attributes of their tours.

2.0 METHODS

Subjects in this study were participants of organized recreational storm chasing tours in the United States. Storm chasing tour agencies were asked to distribute questionnaires at the end of each tour during the 2009 peak storm-chasing season (April through August). To protect the privacy of respondents, participants were asked to return their completed questionnaires to the tour operators in sealed envelopes to be mailed. Five partnering tour operators distributed 115 questionnaires to tour participants; 50 valid questionnaires were returned for a 43.5 percent response rate (50/115).

The three-page, self-administered questionnaire gathered information on the importance and performance of tour operational attributes, as well as motivations, storm chasing experience, and socio-demographic characteristics. Twenty-one items from the Recreation Experience Preference scales (Driver 1983) were selected, representing six motivational dimensions: *Enjoying Nature*, *Learning*, *Stimulation*, *Similar People*, *Taking Risks*, and *Achievement*. Respondents rated the importance of each item on a five-point Likert Scale ranging from 1 = "very unimportant" to 5 = "very important". The perceived importance and performance of tour operational attributes were examined with 22 items representing four business components: *Tour Operator*, *Tour Package*, *Logistics*, and *Education and Information*. Recreational storm chasers were asked to rate the importance of each attribute as well as the performance of their tour operator on five-point scales ranging from 1 (very unimportant/very unsatisfied) to 5 (very important/very satisfied).

An IPA matrix was constructed by combining the ratings of importance and satisfaction (as a

performance indicator) of 22 tour operational attributes on a two-dimensional grid. Following Martilla and James (1977), the x-axis reports the performance and the y-axis reports the importance mean on each item and factor. The overall means of both attributes were used to position the cross-hairs, a standard procedure for creating the four matrix quadrants: "*Keep up the good work*," "*Low priority*," "*Concentrate here*," and "*Possible overkill*" (Oh 2001). Finally, the importance and performance mean scores of each item and factor were plotted on the IPA matrix.

3.0 RESULTS AND DISCUSSION

3.1 Recreational Storm Chasing Behaviors

The majority of respondents were more than 35 years old (68.8 percent), male (62.0 percent), White (95.8 percent), or non-Hispanic (92.5 percent). Although respondents were middle aged, more than half were single without children (55.1 percent), suggesting that family obligations may limit participation in recreational storm chasing. At least 61.0 percent had an annual household income of \$50,000 or more, which was relatively high considering that the majority of respondents were single. More than half of the respondents were from North America (56.4 percent) followed by about a third from Europe (30.5 percent). Specifically, respondents were from the United States (43.4 percent), United Kingdom (15.2 percent), Canada (13.0 percent), Australia (10.9 percent), and the Netherlands (10.9 percent).

The two most common ways storm chasers learned about the tour operators were through an Internet search (63.3 percent) and from friends and relatives (22.4 percent). As many as 90 percent of the participants would take another tour with the same company, and even more (94.0 percent) would recommend their tour company to others. Therefore, satisfying and following up with present customers might be particularly important strategies for increasing the potential for word-of-mouth promotion. Advertising on specialized weather channels would be another choice since about a third (30.0 percent) of respondents were members of at least one type of weather-related organization and 24 percent subscribed

to at least one weather related magazine. When asked about their future involvement with recreational storm chasing, over two thirds (68.0 percent) said they were willing to spend more time and money on this activity in the future.

Recreational storm chasers were most motivated by *Enjoying Nature* ($M=4.37$; $\alpha=.844$), followed by *Learning* ($M=4.25$; $\alpha=.867$), *Stimulation* ($M=3.84$; $\alpha=.721$), socializing with *Similar People* ($M=3.83$; $\alpha=.734$), *Taking Risks* ($M=3.25$; $\alpha=.542$) and sense of *Achievement* ($M=2.77$; $\alpha=.813$). Previous studies in risk recreation have also found the motivations of enjoying nature and learning to be particularly important (Meyer et al. 2002, Weber 2001).

3.2 Perceived Importance and Performance of Tour Operational Attributes

Recreational storm chasers reported that they placed high importance on tour operational attributes. Most respondents agreed that “Experience of guide” ($M=4.88$), “Knowledge of guide” ($M=4.83$) and “Friendly attitude of guide/staff” ($M=4.71$) were the most important tour attributes (Table 1). Respondents ranked “Souvenir and memorabilia offerings” ($M=3.14$), “Provision of snacks and drinks” ($M=3.56$), and “Program activities during ‘non-action’ time” ($M=3.80$) as the least important attributes, although these were still somewhat important. Four factors were created from the 22 tour attribute items: *Tour Operator* ($M=4.64$; $\alpha=.929$), *Tour Package* ($M=4.34$; $\alpha=.729$), *Education and Information* ($M=4.28$; $\alpha=.803$), and *Logistics* ($M=3.94$; $\alpha=.792$).

Table 1.—Importance and performance of tour operator attributes

Operational Attributes (n=50)	Importance ¹		Performance ²	
	M	SD	M	SD
Tour Operator ($\alpha=0.929$)	4.64	0.60	4.68	0.41
Experience of guides	4.88	0.60	4.82	0.39
Knowledge of guides	4.83	0.63	4.82	0.39
Friendly attitude of guide/staff	4.71	0.71	4.76	0.43
Driving skills of guides/staff	4.69	0.78	4.65	0.63
Responsiveness of tour operator	4.67	0.63	4.60	0.61
Ease to contact/reach the tour operator	4.40	0.87	4.65	0.60
Ease of booking/registration	4.29	0.84	4.52	0.74
Tour Package ($\alpha=0.729$)	4.34	0.60	4.36	0.59
Price of tour	4.47	0.71	4.04	0.90
Length of tour	4.40	0.82	4.76	0.43
Number of people per group	4.29	0.91	4.34	0.85
Tour design and itinerary	4.19	0.82	4.33	0.85
Education and Information ($\alpha=0.803$)	4.28	0.69	4.48	0.54
Learning during the trip	4.37	0.86	4.34	0.90
Safety instructions during the chase	4.37	0.86	4.64	0.53
Web site information	4.24	0.88	4.52	0.61
User friendly Web site	4.12	0.88	4.40	0.64
Logistics ($\alpha=0.792$)	3.94	0.63	4.25	0.59
Weather forecasting equipment	4.59	0.79	4.58	0.67
Vehicle comfort and reliability	4.51	0.82	4.48	0.71
Lodging and accommodations	4.13	0.73	4.30	0.84
Provision of meals	3.81	0.92	4.04	0.91
Activities during “non-action” time	3.80	1.08	4.26	0.94
Provision of snacks and drinks	3.56	0.97	4.02	0.84
Souvenir and memorabilia offerings	3.14	1.16	4.00	0.78

¹ Measured on a 5 point scale from (1) Very Unimportant to (5) Very Important.

² Measured on a 5 point scale from (1) Very Unsatisfied to (5) Very Satisfied.

Similar to the importance of tour operational attributes, recreational storm chasers reported high satisfaction with the performance of tour operators. Respondents were most satisfied with the following attributes: “Experience of guide” ($M=4.82$), “Knowledge of guide” ($M=4.82$) and “Friendly attitude of guide/staff” ($M=4.76$). Although still highly satisfied, respondents were least satisfied with the performance of “Souvenir and memorabilia offerings” ($M=4.00$), “Provision of snacks and drinks” ($M=4.02$), “Provision of meals” ($M=4.04$) and “Price of tour” ($M=4.04$). The 22 performance items were also examined by business component factors. Respondents were most satisfied with *Tour Operator* ($M=4.69$), followed by *Education and Information* ($M=4.48$), and *Tour Package* ($M=4.36$).

3.3 Importance-Performance Analysis

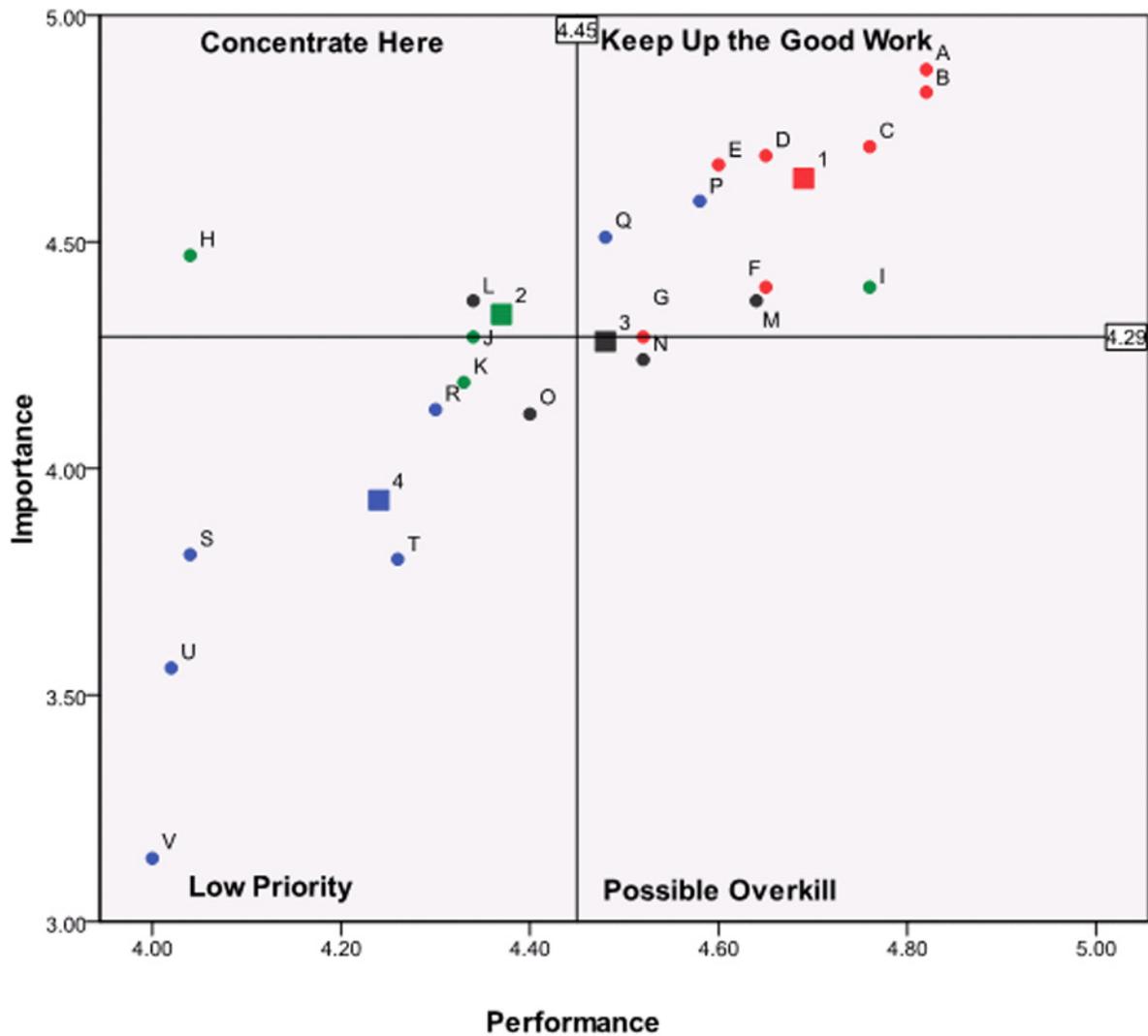
The four-quadrant Importance-Performance matrix was defined by the two axes based on the overall mean of importance (4.29) and performance (4.45) of the 22 operational tour attributes (Figure 1). Half (11) of the attributes were located in the “*Keep up the good work*” quadrant and seven of them appeared in the “*Low priority*” quadrant. Three attributes positioned in “*Concentrate here*” quadrant and only one attribute fell into the “*Possible overkill*” quadrant.

IPA results indicate that storm chasing tour agencies are doing well with the *Tour Operator* component and items, as respondents were very satisfied with the service offered by tour operators and considered these factors very important; thus these efforts should be sustained in the future. In particular, items in the “*Keep up the good work*” quadrant suggest that tour operators are doing well regarding customers’ ability to contact the operator and the process of registering for the tours. In addition, respondents regarded tour guides as experienced, knowledgeable, friendly, and having good driving skills. Respondents also considered logistic attributes such as “weather forecasting equipment” and “vehicle reliability” as highly important, and they were highly satisfied with these items on their tours.

Respondents were least concerned about *Logistics* compared to other factors; these attributes (e.g., provision of meals, snacks and drinks; activities during “non-action” time; and souvenir offerings) fell into the “*Low Priority*” quadrant, indicating that tour operators are doing fine given the relative importance of these attributes. Given that respondents were mostly motivated by enjoying nature and learning, they may not have been as concerned with some of the logistic attributes such as souvenirs, meals, and drinks in comparison to other tour attributes such as knowledge and experience of the guides.

Although IPA indicated that *Education and Information* fell within the “*Possible overkill*” quadrant, suggesting that perhaps too much effort is placed in this area, this finding needs to be interpreted with caution. In particular, Web sites are important communication and marketing tools, particularly for niche markets with dispersed clientele such as recreational storm chasers. Indeed, most respondents reported that they learned of their tour operator through an Internet search. Therefore, it is not recommended that operators reduce their Web site information but instead continue to use this tool to reach and communicate with customers. In addition, even though learning during the trip also fell within the *Education and Information* component, it is important to recognize that this attribute was not considered to be overkill. Similar to other risk recreation activities (e.g., scuba divers; Meyer et al. 2002), learning was a highly important motivation for tour participants, and therefore should be a continued emphasis for tour operators.

The IPA analysis indicated that to improve satisfaction for recreational storm chasers, tour agencies could place more effort on their *Tour Packages*, which fell into the “*Concentrate here*” quadrant. In particular, respondents perceived price of tour, number of people per group, and learning during the tour as the attributes with lower satisfaction scores relative to high importance. Respondents’ were not as satisfied with learning during the trip relative to the importance



Legend

Operational Components

- 1: Operator (A, B, C, D, E, F, G)
- 2: Tour Package (H, I, J, K)
- 3: Education and information (L, M, N, O)
- 4: Logistics (P, Q, R, S, T, U, V)

Operational Items

- A: Experience of guides
- B: Knowledge of guides
- C: Friendly attitude of guide/staff
- D: Driving skills of guides/staff
- E: Responsiveness of tour operator
- F: Ease to contact/reach the tour operator
- G: Ease of booking/registration
- H: Price of tour

- I: Length of tour
- J: Number of people per group
- K: Tour design and itinerary
- L: Learning during the trip
- M: Safety instructions during the chase
- N: Web site information
- O: User friendly Web site
- P: Weather forecasting equipment
- Q: Vehicle comfort and reliability
- R: Lodging and accommodations
- S: Provision of meals
- T: Activities during "non-action" time
- U: Provision of snacks and drinks
- V: Souvenir and memorabilia offerings

Figure 1.—Importance performance analysis of tour operational attributes.

they placed on learning. Therefore, as discussed previously, reflecting the finding that learning was a high motivation for participation, educational opportunities on the tours should be a continued area of focus. Regarding the number of people per group, it is likely that individuals prefer smaller group sizes, yet some may also enjoy socializing with people with similar interests, as this was an important motivation for respondents. Therefore, additional research could help provide insight into the optimal group size.

Finally, because of the high cost of scientific equipment and experienced staff, it is not likely that tour operators can lower the price of the tours. Further, lowering prices may not be advisable, as respondents indicated their willingness to spend more money on the activity in the future, and storm-chasing tours are booked well in advance. However, as price was one of the lowest items on performance scores, yet perceived as highly important, one suggestion is to offer a discounted price for returning customers to help build loyalty and help improve tour price satisfaction. Another possibility could be to offer discounts to returning customers for new referrals. As customers were highly satisfied with the tour, and word-of-mouth was the second highest method of acquiring information about the tours, this may be a particularly effective way of reducing the price for returning customers while promoting more participation in the tours.

4.0 CONCLUSION

Given that respondents rated tour operational attributes highly in both importance and performance indicators, examining these scores alone does not provide much guidance in where to place future efforts. However, using IPA to contrast both the importance and performance of the tour operational attributes identifies both strengths and areas to focus on for improvement. Therefore, this study builds on previous literature demonstrating the utility of IPA in outdoor recreation applications (Hollenhorst et al. 1992, Sanders et al. 2001, Scott 1993, Wade and Eagles 2003). Given that responses to the importance and performance questions would likely vary across different tour

operators, future research could examine findings specific to each individual agency as the small sample size in the present study prevented this analysis. In addition, future research could also examine differences and influences of socio-demographic characteristics such as age, gender, or income on responses to the importance and performance of tour operational attributes.

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