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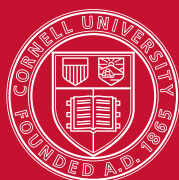


Cornell Hospitality Report

Segmenting Hotel Customers Based on the Technology Readiness Index

by Rohit Verma, Ph.D., Liana Victorino, Kate Karniouchina, and Julie Feickert

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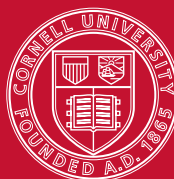
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EXECUTIVE SUMMARY

The extent to which hotel guests accept and use technology both during a hotel stay and on their own can be a useful means of segmenting guests. One excellent mechanism for establishing segments based on customers' inclination toward technology is the Technology Readiness Index (TRI), as shown by the study described here. A test of the TRI with 865 business and leisure hotel customers in the United States revealed an approximate normal distribution that ranged from people who seek to use technology at every turn to those who essentially want nothing to do with it. Furthermore, a comparison of the travel habits of the high and low technology-ready guests revealed numerous differences that should be of interest to the hotel companies. For example, guests with a high TRI score tended to travel more frequently on business and were willing to pay relatively high room rates. A greater percentage of male guests were in the high TRI group than were in the low TRI group. The study also found that the hotel guests with high TRI scores were relatively young, more highly educated, and more affluent than the sample as a whole. The technology-adept guests were more likely to patronize upscale hotels than were the other members of the sample. Thus, executives who wish to differentiate their hotels using technology should carefully consider the response to high-tech innovations that will come from their target guest segments.

ABOUT THE AUTHORS



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From self-service options in the lobby to internet options in guest rooms, technology's role in the hotel industry continues to grow. In making high-tech innovations, however, hotel operators must consider customers' level of comfort with and feelings toward technology, particularly in connection with a hotel stay. We have found that one useful way to view the relationship of hotel guests and technology is to segment guests according to their acceptance and use of technology. The logic here is that while some guests welcome additional technology in a hotel, others are nonplused or repelled by its use. In this report we describe an excellent tool that can distinguish customers according to this exact measure, that is, their technology readiness. The Technology Readiness Index (TRI), based on a questionnaire that was developed and subsequently abbreviated by Parasuraman and Colby, has been tested and validated in a number of industries.¹ This report demonstrates the effectiveness and usefulness of the TRI scale in differentiating hotel industry guests.

¹ A. Parasuraman and C.L. Colby, *Technology-Ready Marketing: How and Why Your Customers Adopt Technology* (New York: The Free Press, 2001).

The technology readiness index, as Parasuraman and Colby wrote, measures a person's "...propensity to embrace and use new technologies for accomplishing goals in home life and at work."² The TRI incorporates people's feelings of optimism, innovativeness, discomfort, and insecurity towards technology to determine a person's level of readiness toward the use of technology. Furthermore, the TRI can aid service firms because it enhances management's understanding of customers and can be used as a method for segmenting a service's clientele.³ The four components of the TRI are defined as follows.⁴

Optimism: A positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives.

Innovativeness: A tendency to be a technology pioneer and thought leader.

Discomfort: A perceived lack of control over technology and a feeling of being overwhelmed by it.

Insecurity: Distrust of technology and skepticism about its ability to work properly.

² *Ibid.*, p.18.

³ A. Parasuraman, "Technology Readiness Index (TRI): A Multiple-item Scale to Measure Readiness to Embrace New Technologies," *Journal of Service Research*, Vol. 2, No. 4 (2000), pp. 307-320; *Ibid.*; N. Tsikriktsis, "A Technology Readiness-Based Taxonomy of Customers: A Replication and Extension," *Journal of Service Research*, Vol. 7, No. 1 (2004), pp. 42-52; and B.R. van der Rhee, R. Verma, G.R. Plaschka, J.R. Kickul, "Technology Readiness, Learning Goals, and e-Learning: Searching for Synergy," *Decision Sciences Journal of Innovative Education*, Vol. 5, No. 1 (2007), pp. 127-149.

⁴ Parasuraman, p. 311.

A person's TRI index is determined based on his or her responses to a series of carefully constructed questions which measure their optimism, innovativeness, discomfort, and insecurity towards the use of new technology. The complete scale for measuring a person's TRI index includes 36 questions; however, Parasuraman and Colby's abbreviated scale of ten questions also provides reliable results.⁵ It was suggested that "...models positing various antecedents (e.g., demographics, psychographics) and consequences (e.g., satisfaction with products or services, general life satisfaction) of overall technology readiness are worthy of investigation."⁶ Our report adopts this research direction by empirically assessing antecedents to technology readiness within a hospitality context.

The primary objective of this study is to investigate the association between individuals' technology readiness and their demographic and service use characteristics. In that context, we examine the application of the TRI measure as a way to improve customer segmentation in the hotel industry. An approach to market segmentation which incorporates a customer's TRI score will allow managers to make more informed judgments about instituting technology. Moreover, it will help in determining the most efficient way to go about introducing technology, including decisions about service design and promotional channels.

Research Method

Study Setting and Data Collection

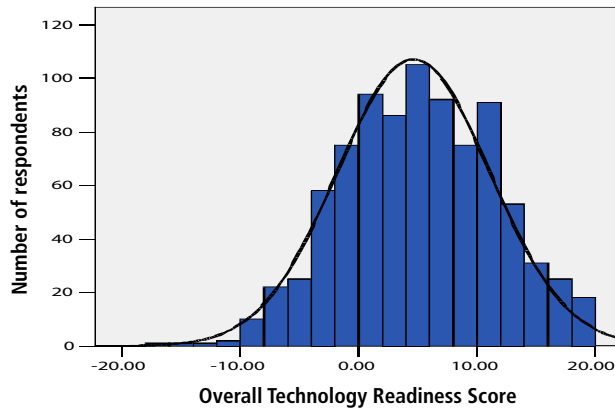
We seek to determine whether the technology readiness index can be used as a tool to identify distinct demographic and behavioral characteristics of customers in the hospitality

⁵ *Ibid.*; Parasuraman and Colby, *op.cit.*; and van der Rhee *et al.*, *op.cit.*

⁶ Parasuraman, p. 319.

EXHIBIT 1

Sample distribution



Note: Mean = 4.6312; Standard deviation = 6.44882; N = 865.

industry. Therefore, we examined the travel patterns of individuals who stayed in a hotel during the year prior to our study, considering such attributes as travel propensity and reason for travel. In brief, the research context for this study is the hotel industry in the United States and individuals who have experience within the last year of staying at hotels.

We engaged a reliable third-party vendor to provide a representative sample of United States residents who have recent hotel experience and who stay in economy, mid-range, or upscale hotels. This marketing research company gave us an electronic mailing list of 4,000 potential respondents—a balanced sample that reflected the nation's spread of demographic backgrounds. Via email, members of this sample were invited to participate in a web survey, with an incentive of the opportunity to win one of ten gift certificates for \$100 by participating in the study. Of the 2,500 who agreed to participate, 40 percent were excluded because they had not stayed in a hotel in the past year. At the conclusion of the three-week data-collection period, a total of 930 respondents completed and returned the survey. We saw no evidence of response bias, but we refined the sample to 865 due to missing data in some responses.

Survey Design

The survey consisted of six sections. In the first section of the survey, respondents were asked questions about

their frequency of hotel stay. The second section involved questions regarding their most recent stay at a hotel. Third, individuals were asked questions relating to their anticipated next hotel stay—questions leading to a choice-analysis study that would determine preferences for different hotel service offerings. In the fourth section, respondents were given the abbreviated ten-item technology readiness scale questions to estimate the individual's TRI score. The fifth section included questions about safety and security issues, and the concluding section posed traditional demographic questions. To test the survey for both simplicity and ease of understanding, the survey was pre-tested with 25 random hotel customers. On average, the pre-tested individuals took approximately 20 minutes to complete the survey, and there were no signs of difficulty in understanding survey questions.

Measures

The TRI segments in our study were selected by assessing Parasuraman and Colby's past work, as well as examining our own resulting data. Parasuraman and Colby categorized the following five groups according to the level of their technology readiness: explorers, pioneers, laggards, paranoids, and skeptics. They proposed that a score of -10 or lower indicated a person highly resistant to technology; the cutoff for somewhat technology resistant was -6; the cutoff for average technology readiness was 1; the cutoff for somewhat technology ready was 6; and any score higher than 6 was considered highly technology ready (see the appendix on page 12 for the survey questions). When we examined our own TRI data, we found a bell-shaped distribution, as shown in Exhibit 1. Following the approach of Parasuraman and Colby (but condensing their categories), we defined respondents to have low technology readiness if they received a TRI score of 1 or lower, somewhat technology-ready if their score was between 2 and 7, and highly technology-ready if their score was over 7. These cutoffs partitioned the respondent group into thirds.

Results

A snapshot of the overall demographic characteristics of our sample is shown in Exhibit 2. Overall, we see that we have a sample which is representative across demographic characteristics of age, gender, education, and income.

As well as examining the respondents' demographic background we also studied their traveling characteristics, as shown in Exhibit 3. The majority of the respondents had been on one to three trips in the twelve months prior to the survey. In addition, a large percentage of the respondents had traveled in the prior six months. Furthermore, approximately 75 percent of the respondents were traveling for leisure on their most recent trip.

EXHIBIT 2

Respondents' demographics

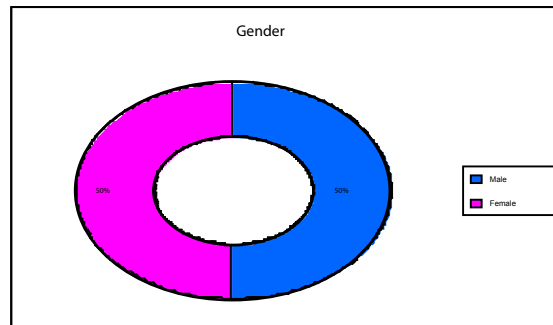
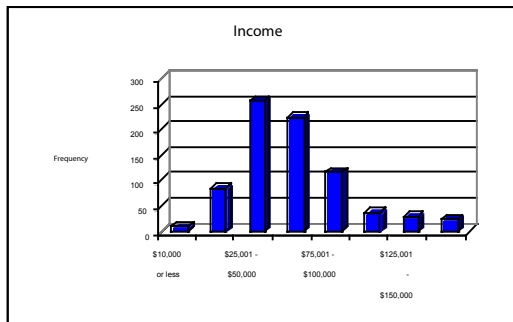
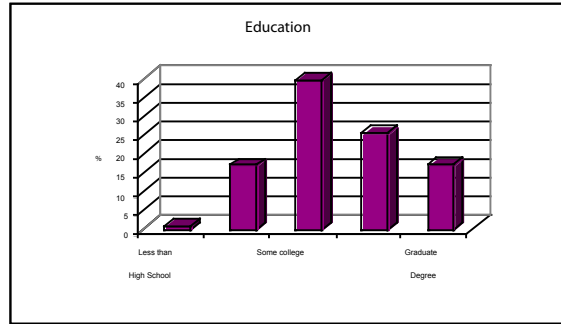
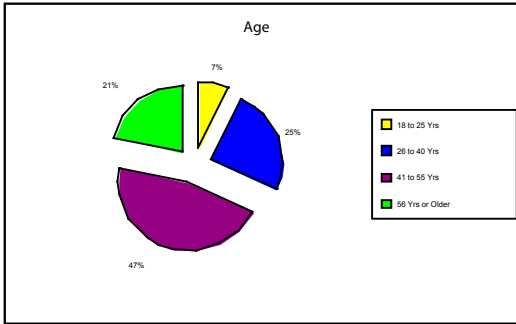


EXHIBIT 3

Respondents' travel preferences

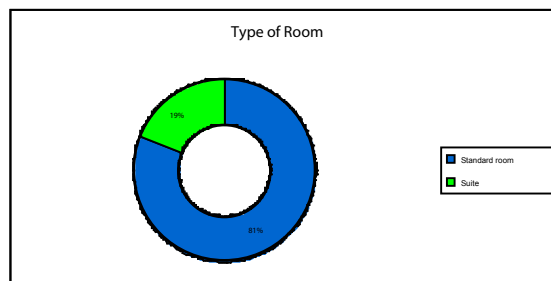
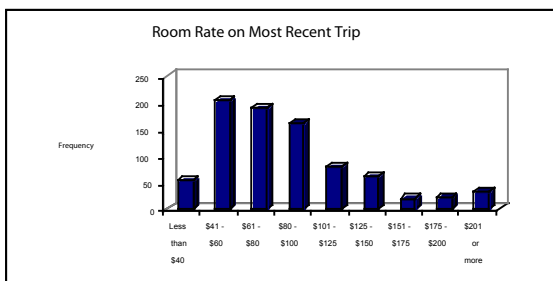
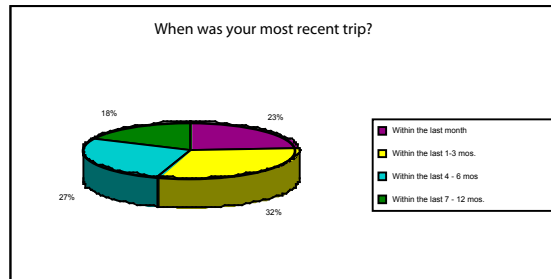
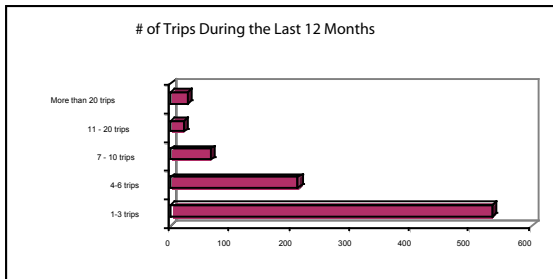


EXHIBIT 4

Respondents' demographics by technology preferences

		Technology Readiness		
		Low	Moderate	High
Gender	Male	46.5%	44.9%	59.4%
	Female	53.5%	55.1%	40.6%
		Low	Moderate	High
Education	Less than High School	1.7 %	1.1 %	0.0 %
	High School Diploma	24.0 %	16.7 %	10.2%
	Some College	41.3 %	40.2 %	37.5%
	Undergraduate College Degree	19.8 %	27.0 %	29.0%
	Graduate Degree	13.2 %	14.9 %	23.2%
		Low	Moderate	High
Income	\$10,000 or less	2.0 %	1.2 %	0.4 %
	\$10,001 to \$25,000	13.0 %	13.0 %	7.7 %
	\$25,001 to \$50,000	43.9 %	26.8 %	28.1%
	\$50,001 to \$75,000	21.7 %	33.1 %	31.4%
	\$75,001 to \$100,000	12.3 %	19.3%	13.1%
	\$100,001 or more	7.1 %	7.5 %	19.3%
		Low	Moderate	High
Age	18 to 25 Yrs	4.5 %	7.1 %	9.3 %
	26 to 40 Yrs	16.0 %	29.4 %	29.6%
	41 to 55 Yrs	50.3 %	44.3 %	45.0%
	56 Yrs or Older	29.2 %	19.1 %	16.2%

EXHIBIT 5

Demographic variables showing significant technology-readiness differences

Demographic Variable	Pearson Chi-Square	df	p-value
Gender	14.64	2	0.001
Education	36.58	8	0.000
Income	58.47	14	0.000
Age	32.58	6	0.000

Comparing Segment Demographics

Exhibit 4 shows the TRI groups according to their demographic variables. While the descriptive data illustrate the apparent differences among the TRI groups, we are also interested in testing the variations in demographic variables among the groups, according to their technology readiness.

To test the association of the variables of interest among the three categories of respondents (i.e., high-, moderate-, and low-technology readiness), we used a chi-square analysis. Chi-square analysis examines the association between two variables by assuming a null hypothesis that the variables of interest have no association with any technology-readiness category. In other words, chi-square analysis assumes that the ratio of the variables of interest should be the same for each of the technology-ready groups. The expected ratio is

compared to the observed results to determine whether there is an association between the categorical variables that allows us to reject the null hypothesis. If we receive a *p*-value of less than .05, then we are able to say that there is an association between a person's particular demographic and technology-use characteristics and his or her particular technology-readiness segment.

After conducting the chi-square analysis, we see that in fact there is a significant relationship between the demographic variables of interest and the definitions of particular technology-readiness segments, as shown in Exhibit 5. In conclusion, we find statistical support that there is an association between a person's demographic characteristics and that person's TRI level. If we look to Exhibit 6 we see the travel statistics for each technology-readiness group. A comparison of the travel habits of the guests with high

EXHIBIT 6

Travel proclivities by technology-readiness group

		Technology Readiness		
		Low	Moderate	High
Number of Trips				
	1 - 3 trips	69.23 %	67.02 %	50.51 %
	4 - 6 trips	22.03 %	21.28 %	30.38 %
	7 - 10 trips	4.90 %	6.74 %	10.92 %
	More than 10 trips	3.85 %	4.96 %	8.19 %
Most Recent Trip				
	within the last month	19.38 %	20.49 %	30.38 %
	within the last 1 to 3 months	31.49 %	32.16 %	30.03 %
	within the last 4 to 6 months	27.68 %	29.33 %	25.26 %
	within the last 7 to 12 months	21.45 %	18.02 %	14.33 %
Weekend or Weekday Trip				
	Weekend	64.01 %	68.90 %	61.77 %
	Weekday	35.99 %	31.10 %	38.23 %
Business or Leisure on your last trip?				
	Business	18.69 %	27.56 %	30.72 %
	Leisure	81.31 %	72.44 %	69.28 %

EXHIBIT 7

Chi-square test of travel-frequency differences

During the last 12 months...	Pearson Chi-Square	df	p-value
Number of Trips	34.203	8	0.000
When was your Most Recent Trip?	14.303	6	0.026
When will be your next visit?	26.519	10	0.003
Weekend or Weekday	3.345	2	0.188
Business or Leisure	11.833	2	0.003

EXHIBIT 8

Chi-square test of hotel stay frequency differences

During the last 12 months...	Pearson Chi-Square	df	p-value
Number of Upscale Hotel Stays	25.104	8	0.001
Number of Mid-Range Hotel Stays	13.68	8	0.091
Number of Economy Hotel Stays	7.25	8	0.510
Room Rate	24.833	16	0.073
Type of Room	3.91	2	0.142

technology readiness and those with low technology readiness reveals differences that should be of interest to hotel companies. For example, customers with high technology readiness (i.e., guests with a high TRI score) are relatively younger, more highly educated, and more affluent. The percentage of male guests in high-TRI group is greater than it is in the low-TRI group. Additionally, the technology-adept guests are more likely to patronize upscale hotels compared to the other members of the sample.

Comparing Characteristics of Technology Readiness Segments

Next, we look at the results of the TRI in regard to an individual's travel propensity and purpose. We intend to

show that the level of a person's technology readiness will help us discern that individual's travel characteristics, such as frequency of hotel stay and reason for travel. In summary, as illustrated in Exhibit 7, the most technology-ready individuals are also the most likely to be experienced business travelers.

Given the apparent differences in travel pattern variables among the TRI groups, we applied a chi-square analysis to determine whether there is statistical significance to these differences (see Exhibit 8). Notice that the travel-characteristic variables, such as number of trips, timing of the most recent trip, and the prospective next trip, are all significantly associated with an individual's technology readiness.

APPENDIX: THE ABBREVIATED TRI SCALE

The following 10 questions are used in a survey to measure TRI, the factor name is in parentheses after each question and was not shown to the respondents:

- Q1. I can usually figure out new hi-tech products and services without help from others. (Innovativeness 1)
- Q2. New technology is often too complicated to be useful. (Discomfort 1)
- Q3. I like the idea of doing business via computers because you are not limited to regular business hours. (Optimism 1)
- Q4. When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I'm being taken advantage of by someone who knows more than I do. (Discomfort 2)
- Q5. Technology gives people more control over their daily lives. (Optimism 2)
- Q6. I do not consider it safe giving out credit card information over a computer. (Insecurity 1)
- Q7. In general, I am among the first in my circle of friends to acquire new technology when it appears. (Innovativeness 2)
- Q8. I do not feel confident doing business with a place that can only be reached online. (Insecurity 2)
- Q9. Technology makes me more efficient in my occupation. (Optimism 3)
- Q10. If you provide information to a machine or over the internet, you can never be sure if it really gets to the right place. (Insecurity 3)

Each question was answered on a Likert-type scale of strongly disagree (1) to strongly agree (5) scale. The TRI is then calculated as follows: $(Q1 + Q3 + Q5 + Q7 + Q9) - (Q2 + Q4 + Q6 + Q8 + Q10)$.

Source: A. Parasuraman and C.L. Colby, *Technology-Ready Marketing: How and Why Your Customers Adopt Technology* (New York: The Free Press, 2001).

Comparing Perception of Quality by Technology Readiness Segment

After comparing the percentages of perceived-quality-related variables to the technology-readiness segments, we see that the most-technology-ready individuals are more likely to pay a higher room rate and to stay in a suite than other travelers are. Also, the most-technology-ready individuals are more likely to have stayed in an upscale hotel on their recent trip. We statistically tested this association and found support for the number of upscale hotel stays and a person's technology-readiness group. We found partial support (at the barely significant .10 level) for the number of mid-range hotel stays and room rate with technology-readiness segmentation. There was no statistical support for the number of economy hotel stays and the type of room selected. We do find (again) that the most technology-ready individuals are more likely to stay in upscale hotels and also pay a higher room rate. This assumes that the most technology-ready individuals are associating a higher room rate (price) with a higher perception of quality.

Discussion and Conclusions

Technology plays an essential role in hotel operations, has the potential for providing an increasingly customized service offering, and can improve a hotel's response to service

failures.⁷ However, the decisions regarding which technologies to implement and when to do it are not simple. Given the expense, careful consideration must be placed on the reaction of guests to technology changes.

By segmenting customers using the information that can be gathered from the TRI scale, we believe that a hotel operator can ensure the success of technological innovations. Managers who wish to differentiate their hotels on technological innovations need to know what innovations customers will perceive to be worth their paying a premium price. If one targets service strategy and offerings to be in line with the information gained from the enhanced customer segmentation offered by the TRI, then a manager should increase the likelihood of increasing occupancy and room rates with technology introductions.

As shown here, the abbreviated TRI scale has proven to be a reliable method for segmenting hotel customers and demonstrating the distinct differences of each technology-readiness group. For example, as we noted above, individuals who are considered to be the most technology ready are more likely to be male, educated, wealthy, young, and experienced travelers who are most likely traveling on

⁷ Parasuraman and Colby, *op.cit.*; and M. Bitner, S.W. Brown, and M.L. Meuter, "Technology Infusion in Service Encounters," *Academy of Marketing Science Journal*, Vol. 28, No. 1 (2000), pp. 138-149.

business and tend to pay a higher rate for their rooms than do guests in other segments. Additionally, knowing that the members of this segment are willing to pay a higher rate and are more technologically adept, marketing and service managers could better tailor their hotels' technology to its marketing mix.

Anecdotal evidence supports the financial importance of attracting the most technology-ready segments. In year 2000, for instance, the executive vice president of sales for Marriott International estimated that internet users alone would provide around \$125 million of their business and, at the time, that number was expected to more than double by the next year.⁸ While the growth of internet-based business is no longer exponential, such growth demonstrates the powerful effect the expanding segment of technology users has had on the hotel industry. In addition, hotel managers have recognized that the appropriate use of technology results in the opportunity to obtain a higher market share.⁹ As Ed Watkins suggested, for example, "A new check-in system or an enhanced in-room entertainment offering or installation of high-speed internet access can produce the point of difference for a hotel or chain that creates long-term loyalty among guests."¹⁰ Therefore, certain technology-related additions to hospitality services have the potential to create loyalty and can ultimately provide support for a differentiation strategy.

We submit that using the TRI to segment guests addresses one of the top concerns among hotel managers, namely, the ability to understand their customers needs and wishes.¹¹ Specifically, one category of apprehension involves, "...thinking strategically about marketing and customer segments to obtain competitive advantage."¹² Hotel manag-

⁸ E. Watkins, "Building the Perfect Site," *Lodging Hospitality*, Vol. 56, No. 3 (2000), pp. 38-40.

⁹ E. Watkins, "It's Guest Services, Not Technology," *Lodging Hospitality*, Vol. 55, No. 9 (1999), p. 2.

¹⁰ *Ibid.*

¹¹ C. Enz, "What Keeps You up at Night?: Key Issues of Concern for Lodging Managers," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 42, No. 2 (April 2001), pp. 38-45; and R. Verma, "Unlocking the Secrets of Customer Choices," *Cornell Hospitality Report*, Vol. 7, No. 8 (2007).

¹² Enz, p. 40.

ers realize that it is of the utmost importance to understand their customer base, including who their customers are, what they want from a service, and what is the most optimal way to serve them.¹³

Managerial Implications

To summarize, this study illustrates the importance of considering a person's technology readiness as a means of customer segmentation. The valuable and distinct information that can be gained from this segmentation scheme will assist managers with making decisions regarding the technology they include as part of their hotel's service offering. Moreover, the information thus revealed suggests the best strategies for marketing such services. Perhaps the most valuable point to glean from this report is that it proposes another means of attracting the most valuable of hotel guests, namely, the most-technology-ready individuals, who are also the most frequent travelers and are most likely to accept, appreciate, and pay a premium for technology-added services.

Technological offerings have become inextricably bound with hotel operations, with such innovations as online hotel booking, self check-out, in-room internet access, and business centers. While many hotel guests might desire additional technological innovations, managers must still consider whether their hotel appeals to customers who have less interest in technology. Even as technology allows a hotel to operate with more efficiency, one of the critical disadvantages of using technology in services is the potential loss of human interaction and the possibility that customers will feel isolated.¹⁴ Moreover, some customers are simply not ready to use technology (or are not interested).¹⁵ When designing a service it is important to keep technology's role in mind and take advantage of the customer information that can be obtained from the TRI measurement. ■

¹³ *Ibid.*; R. Verma and G. Plaschka, "The Art and Science of Customer Choice Modeling: Reflections, Advances, and Managerial Implications," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 44, No. 5-6 (October-December 2003), pp. 156-165; and R. Verma, G. Plaschka, and J. Louviere, "Understanding Customer Choices: A Key to Successful Management of Hospitality Services," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 43, No. 6 (2002), pp. 15-24.

¹⁴ M. Bitner, "Service and Technology: Opportunities and Paradoxes," *Managing Service Quality*, Vol. 11, No. 6 (2001), pp. 375-379.

¹⁵ *Ibid.*

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