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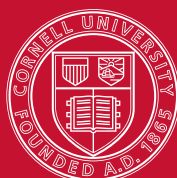


Cornell Hospitality Report

Unlocking the Secrets of Customers' Choices

by Rohit Verma, Ph.D.

Vol. 7, No 2, January 2007



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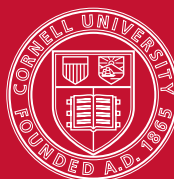
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Cornell University
School of Hotel Administration

Unlocking the Secrets of Customers' Choices

By Rohit Verma, Ph.D.

EXECUTIVE SUMMARY

Analysis based on two field studies demonstrates the benefits of customer choice modeling (CCM) for the purpose of designing and evaluating product and service bundles for food-service and lodging businesses. Just as important, CCM allows managers to determine how customers react to those features. CCM depicts a dynamic comparison of various service attributes, and it shows managers how different market segments react to a particular bundle of services. Given that information, managers can fine tune their operation, if needed. Moreover, if the analysis shows that a particular market segment prizes a specific product or service attribute, the business can feature that attribute in advertising targeted at that segment. A spreadsheet template is available in conjunction with this report that will allow readers to manipulate CCM data so that they can see how the comparison operates.

ABOUT THE AUTHOR

Rohit Verma, Ph.D., is an associate professor of service operations management at the Cornell University School of Hotel Administration. Prior to his current appointment, he was the George Eccles Professor of Management, David Eccles School of Business at the University of Utah. His research interests include product and service design, innovation and process improvement, supplier selection strategies, and interrelated issues of operations and marketing. He has published over 40 articles in such journals as *California Management Review*, *Cornell Hotel and Restaurant Administration Quarterly*, *Decision Sciences*, *Journal of Operations Management*, *Journal of Product Innovation Management*, *Journal of Service Research*, *MIT Sloan Management Review*, and *Production and Operations Management*. Summaries of three of his recent research articles appeared in various issues of *MIT Sloan Management Review's* Intelligence sections. His research projects have been sponsored by the United States Forest Service, Marketing Science Institute, Hospitality Sales & Marketing Association International, and corporations such as CSFB, First Chicago, NCR Knowledge Lab, General Growth Properties, Siemens, Mead Johnson, Kimberley Clarks, and Hammerson. He has received several teaching and research awards including the Skinner Award for Early Career Research Accomplishments from the Production and Operations



Management Society; Sprit of Inquiry Award (the highest honor for scholarly activities within DePaul University); Teaching Innovation Award (DePaul University); and Doctoral Student Teaching Award (University of Utah).

He serves as the associate editor of *Journal of Operations Management*, and *Decision Sciences*; senior editor of *Production and Operations Management*; and editorial board member of *Journal of Service Research* and *Cornell Hotel and Restaurant Administration Quarterly*. He also served as guest editor for four issues of *Journal of Operations Management* on topics related to effective management of service businesses.

He would like to thank his numerous colleagues and Ph.D. students for their collaboration in the research and consulting projects leading to the development and refinement of managerial applications presented in this report.

Unlocking the Secrets of Customers' Choices

By Rohit Verma, Ph.D.

Incorporating customers' preferences and choices into day-to-day managerial decisions is essential for hospitality businesses because their customers typically evaluate those operations on more than one criterion. For example, customers might choose fast-food establishments based on any combination of their type of food, cost, service quality, food quality, food variety, or speed of delivery. Similarly customers might choose a hotel based on its location, brand name, any of various amenities, price, loyalty program, or any of many other attributes.

Given resource constraints, most hospitality operators cannot excel in all aspects of service simultaneously (e.g., provide the highest quality, fastest delivery, and most variety at the lowest price). Therefore firms must make trade-offs on the basis of what they do best, what their competitors are offering, and what criteria they think matter most to their customers. With those points in mind, managers often struggle

to determine the "best" configuration of service offerings to appeal to their chosen target markets.

The hospitality industry has a long been interested in measuring and modeling consumers' judgments (or choices) of product-and-service or benefit bundles, typically using surveys with ratings or rankings. However, research shows that respondents are notorious for racing through such

surveys and using only a limited range of the scale points. Some respondents use just the top few boxes of a rating scale, some refuse to register a top score for any item, and still others conscientiously spread their ratings across the entire range. While standardization of ratings (forcing the mean rating for each respondent to zero and the standard deviation to unity) has often been suggested as an appropriate remedy. This transformation also doesn't help, however, if respondents use only a few scale points. Rankings are not always effective either. Though rankings would improve the situation of low discrimination across survey items, the problem with rankings is that respondents often find it difficult to rank more than about seven items. Another common approach is the "constant sum" or chip-allocation scale. To use a constant sum scale, respondents allocate a certain number of points or chips across an array of items. As with rankings, constant sums are difficult to complete for more than a small number of items.

During the last few years, research has explored the sophisticated toolbox available in customer choice modeling (CCM). CCM and similar methods allow the prediction of market performance of new or existing products, services, or experience offerings with remarkable precision. I have applied the choice modeling framework explained in this report in numerous studies for corporations, not-for-profit organizations, and government agencies to assess the potential market performance of new product-and-service offerings.¹

In this *CHR Report*, I illustrate the potential managerial applications of CCM for hospitality businesses with the aid of two examples derived from real-life situations. The first example is based on a research project conducted at the food court at Chicago's O'Hare international terminal. The second example is based on a hotel choice study which was sponsored by Hospitality Sales and Marketing As-

¹ Statistical and mathematical details of this approach are presented in, for example: L. Victorino, R. Verma, G. Plaschka, and C. Dev, "Service Innovation and Customer Choices in Hospitality Industry," *Managing Service Quality*, Vol 15, No 6 (2005); and R. Verma, J. Louviere, and P. Burke, "Using Market-Utility-Based Approach to Designing Government and Public Services: Case Illustration from United States Forest Service," *Journal of Operations Management*, Vol. 24, No. 4 (2006).

sociation International (HSMIAI). Based on these research projects I have constructed two examples that demonstrate how a hospitality operator can assess the desirability of and customers' willingness to pay for the firm's service offerings using a customer choice study. This report is accompanied by Microsoft Excel-based customer-choice analyzer (CCA) modules, which you can use to conduct various what-if type of analyses.

The Science of Customer Choice Modeling

Pioneered by Daniel McFadden (winner of the 2000 Nobel Prize in economics), the choice modeling framework focuses both on the economic reasons for individual choices and the ways researchers could measure and predict these choices. McFadden's work and a corresponding experimental approach development by Jordan Louviere and his colleagues have been used for such diverse applications as design and development of new products and services, transportation planning, evaluation of alternative pricing strategies, and financial services design.²

During the recent years, several applications of customer choice modeling have been published in *Cornell Hotel and Restaurant Administration Quarterly* (listed on the next page). These articles provide detailed guidelines for designing and conducting customer choice tests in hospitality industry and also describe several state-of-the-art methodological advances. For example, with coauthor Gerhard Plashka, I described how recent advances in information technology (e.g., broadband internet connections, digital imaging, and video technologies) along with greater computing speed allow researchers to develop realistic customer choice experiments specific to a particular decision scenario.³ Inno-

² J.J. Louviere, D. Hensher, and J. Swait, *Stated Choice Methods: Analysis and Application* (London: Cambridge University Press, 2000); R. Verma, Z. Iqbal, and G. Plaschka, "Understanding Customer Choices in e-Financial Services," *California Management Review*, Summer 2004; and 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.

³ Verma and Plaschka, *op.cit.*

*Choice modeling–related articles from
Cornell Hotel and Restaurant Administration
Quarterly*

“Basing Service Management on Customer Determinants: The Importance Of Hot Pizza,” by Rohit Verma and Gary M. Thompson, June 1996

—This article describes a simple application of customer choice modeling for pizza delivery industry. It describes how a simple choice modeling survey can be set up (including experimental design and analysis) and discusses managerial implications.

“Designing and Positioning Food Services for Multicultural Markets,” by Rohit Verma, Madeleine E. Pullman, and John C. Goodale, December 1999

—This article is based on a customer choice study conducted at the food court at Chicago’s O’Hare International Terminal (which forms the basis of this CHR Report). The study describes how choice modeling can be used to assess similarities and differences in customer preferences across multiple market segments.

“Understanding Customer Choices: A Key to Successful Management of Hospitality Services,” by Rohit Verma, Gerhard Plaschka, and Jordan J. Louviere, December 2002.

—This article discusses managerial applications of a customer choice modeling study, such as assessment of market share gains and losses, switching barriers, and brand equity, and provides directions for implementation.

“A Market-Utility Approach To Scheduling Employees,” by John C. Goodale, Rohit Verma, and Madeleine E. Pullman, February 2003

—Also based on Chicago O’Hare study, this article describes how customer choice modeling results can be used to effectively derive operational decisions such as labor scheduling.

“The Art and Science of Customer Choice Modeling: Reflections, Advances, and Managerial Implications,” by Rohit Verma and Gerhard Plaschka, October-December 2003

—This paper describes state-of-the-art advances in customer choice modeling such as implementation of multimedia web-based surveys and derivation of sophisticated statistical models.

vative optimization procedures such as chaos theory, neural networks, simulated annealing, genetic algorithms, and simulation modeling are being used in various applications to design services. Furthermore, by combining information collected from customer relationship management (CRM) systems with experimental choice studies, hospitality firms can fine tune their studies to assess preferences for each individual customer.⁴

A simple example of the usefulness of customer choice modeling approach is presented in an article I wrote with Gary Thompson in 1996.⁵ This paper shows how a choice modeling approach can be used to calculate market share for several pizza delivery companies located within the same market. Extending the discussion further, an article I wrote with Madeleine Pullman and John Goodale demonstrated how customer choice modeling can be used to assess the similarities and differences in fast-food preferences for multiple market segments.⁶ In a follow-up paper we showed how the decision-support models developed from customer choice modeling studies can be used to effectively derive labor requirements and schedules.⁷ Finally, with Jordan Louviere and Gerhard Plaschka I illustrated many different managerial applications of a customer choice modeling, including assessment of market share gains and losses, switching barriers, and brand equity.

The Art of Customer Choice Modeling

The choice-modeling approach requires that a representative sample of customers make choices in simulated situations derived from realistic variations of actual service offerings.

⁴ For example, see: G. Loveman, “Diamonds in the Datamine,” *Harvard Business Review*, May 2003.

⁵ R. Verma and G.M. Thompson, “Basing Service Management on Customer Determinants: The Importance of Hot Pizza,” *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 37, No. 3 (June 1996), pp. 18-23.

⁶ R. Verma, M.E. Pullman, and John Goodale, “Designing and Positioning Food Services for Multicultural Markets,” *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, No. 6 (December 1999), pp. 76-87.

⁷ *Ibid.*

Identifying the drivers for customers' choices involves first a qualitative assessment, and then experiments in the form of multimedia-surveys, followed by analysis of purchase drivers.

For example, say that we want to predict business travelers' market preferences for upscale hotels. This problem will require us to identify the drivers of customer choices for upscale hotels (e.g., brand name, location, amenities, loyalty program); construct realistic hotel choice "experiments" with potential customers; and then estimate statistical models that suggest which hotel attributes attract business travelers. The process typically comprises three steps.⁸

Qualitative assessment. First, using qualitative market assessment, customer interviews, case studies, industry data, focus groups, and other information sources, one compiles a list of drivers that are believed to influence customers' buying decisions. For example, the relevant drivers for a food-service operator at an airport terminal might be type of food, variety, waiting time, brand name, and price. For an upscale hotel operator the relevant drivers might be brand name, personalization and customization options, amenities, and office facilities.

Great care must be taken to ensure that all (or at least as many as possible) of the determinant drivers are identified and expressed in terms understood by customers. The key here is to choose the truly determinant drivers so that the survey list remains manageable. One should consider the following two questions when building a list of market choice drivers: (1) Is it necessary to include an exhaustive list of all salient product and service drivers?; and (2) How can product and service attributes be configured so that the critical choice drivers are identified while the choice experiment is at once realistic and small enough to be tractable?

Conduct choice experiments. Once the list of choice drivers is finalized, sophisticated experimental design techniques are used to develop a set of realistic versions of service offerings.⁹ Using combinations of various service at-

tributes, one conducts choice experiments that ask respondents to select one out of two or more services available to them in a series of choice sets. For example, a study that I conducted with Madeleine Pullman and John Goodale presented 16 choice sets to people waiting at O'Hare airport. The sets contained variations of four descriptions of food-service concepts.¹⁰ Within each set, the respondent was asked to choose one of the four presented food-service options or none of them. In another study, again with Gerhard Plaschka, we presented respondents with descriptions of two hotels (using multimedia clips from hyperlinked images and service descriptions). The customer could choose one of the two hypothetical hotels, or choose neither one.

Analyze purchase drivers. In the final phase, econometric models based on responses from a representative sample of customers (or potential future customers) are used to identify key patterns in the survey responses, providing relative weighting for each market driver and for interactions among drivers. Managers can then select the optimal combination of operations and market drivers that will improve sales and customer satisfaction. Rather than describe statistical details behind the estimated choice models, in this report I offer two examples that illustrate the usefulness of the customer choice modeling approach.

Illustration #1: Food Service Choice Analysis

Returning to the study conducted at O'Hare, say that we are interested in assessing the preferences of food-service options for passengers at a major international airport.¹¹ For the purpose of this example, we can assume that there are four types of restaurant operating at the airport—a burger shop, a pizza place, a hot-dog shop, and a deli. Passengers traveling through this airport can be predominantly classified in three distinct segments: English speakers, Spanish

⁸ For example, see: R. Verma, G. Plaschka, and J.J. Louviere, "Understanding Customer Choices: A Key to Successful Management of Hospitality Services," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 43, No. 6 (December 2002), pp. 15-24.

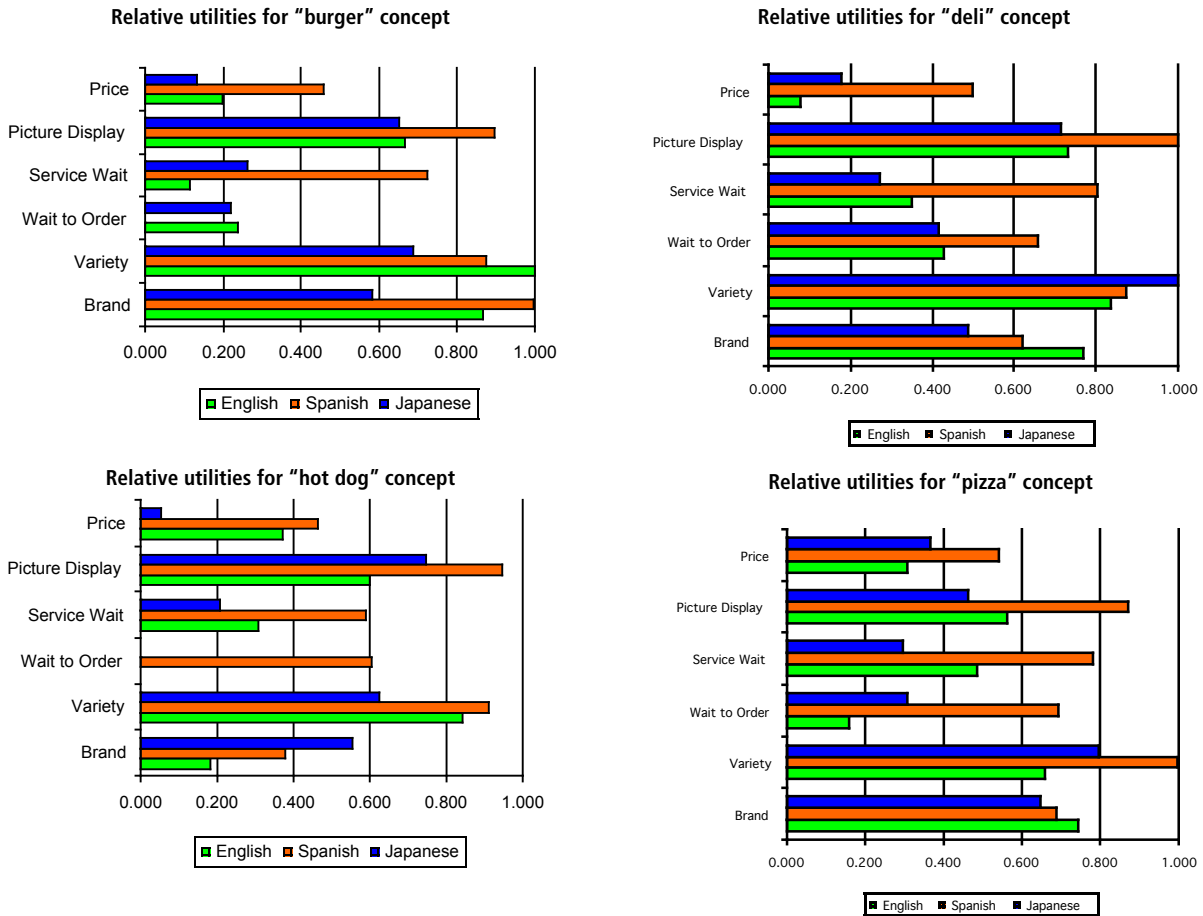
⁹ For additional details about choice experiment design options, see: Verma and Thompson, *op.cit.*; and *Ibid.*

¹⁰ R. Verma, M.E. Pullman, and J.C. Goodale, "Designing and Positioning Food Services for Multicultural Markets," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 40, No. 6 (December 1999), pp. 76-87.

¹¹ A similar "real" example is presented in: *Ibid.*

EXHIBIT 1

Relative utilities of food service attributes for burger, pizza, hot-dog, and deli restaurants



speakers, and Japanese speakers. After the conclusion of a series of customer interviews and focus groups for each language group, we identified the following drivers for food-service choices: price, brand name, variety, waiting time to order, waiting time to get food after ordering, and picture display of popular menu items. Next, let's assume that we designed and conducted a choice study in which English-, Spanish-, and Japanese-speaking customers were asked to choose one food-service option from a series of alternatives presented to them. After collecting data from a large number of respondents, we developed the statistical models presented in the graphs in Exhibit 1.

The horizontal axis on each plot in Exhibit 1 shows the standardized relative utility (or weight) for various drivers of food-service choice for each of the four alternatives (i.e., burger, deli, hot dog, and pizza) for the three market

segments of interest (i.e., English-, Spanish-, and Japanese-speaking customers). The longer the length of the bar in the graph, the more important that particular driver is for a particular food concept from the customer's point of view. For example, we notice that within the burger concept, brand name is most important for Spanish-speaking customers, while variety is most important for English-speaking customers. For Japanese-speaking customers, we don't see any one driver that is extremely important, but we notice that brand, variety, and picture display are almost equally important. Similarly, we notice that the importance of price is low for the English and Japanese segments, whereas the Spanish segment assigned much higher weight to price. In the same way, we can derive a number of managerially useful conclusions by comparing the relative utilities of the plots shown in Exhibit 1.

EXHIBIT 2

Propensity to select a food-service concept, by market segment

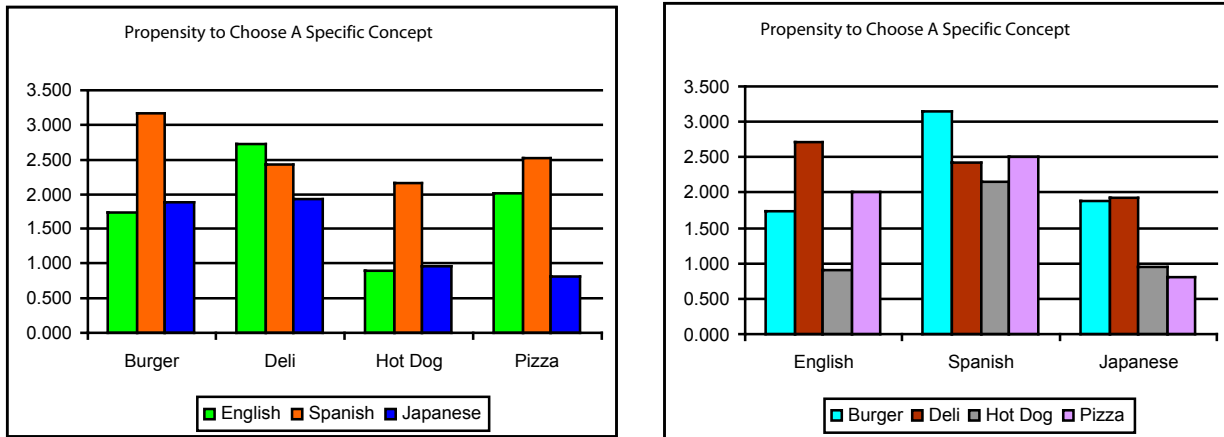


Exhibit 2 shows the plots of intercepts in the estimated customer-choice models. The intercepts in choice models represent the relative propensity for a member of a particular market segment to choose one or another service concept, assuming everything else is equal. From Exhibit 2 we notice that English-speaking customers are most likely to choose the deli, Spanish-speaking customers are most likely to prefer the burger concept, and Japanese-speaking customers are inclined to choose either the burger or deli concept.

While relative-utilities charts based on customer-choice studies (such as those found in Exhibits 1 and 2) can provide valuable managerial insights, they are static. A stronger approach is to compare concepts using a dynamic managerial decision-support tool, such as a customer choice analyzer (CCA), which can assist in conducting a variety of what-if analyses. A CCA includes modules for calculating desirability for various service alternatives and customer willingness to pay.

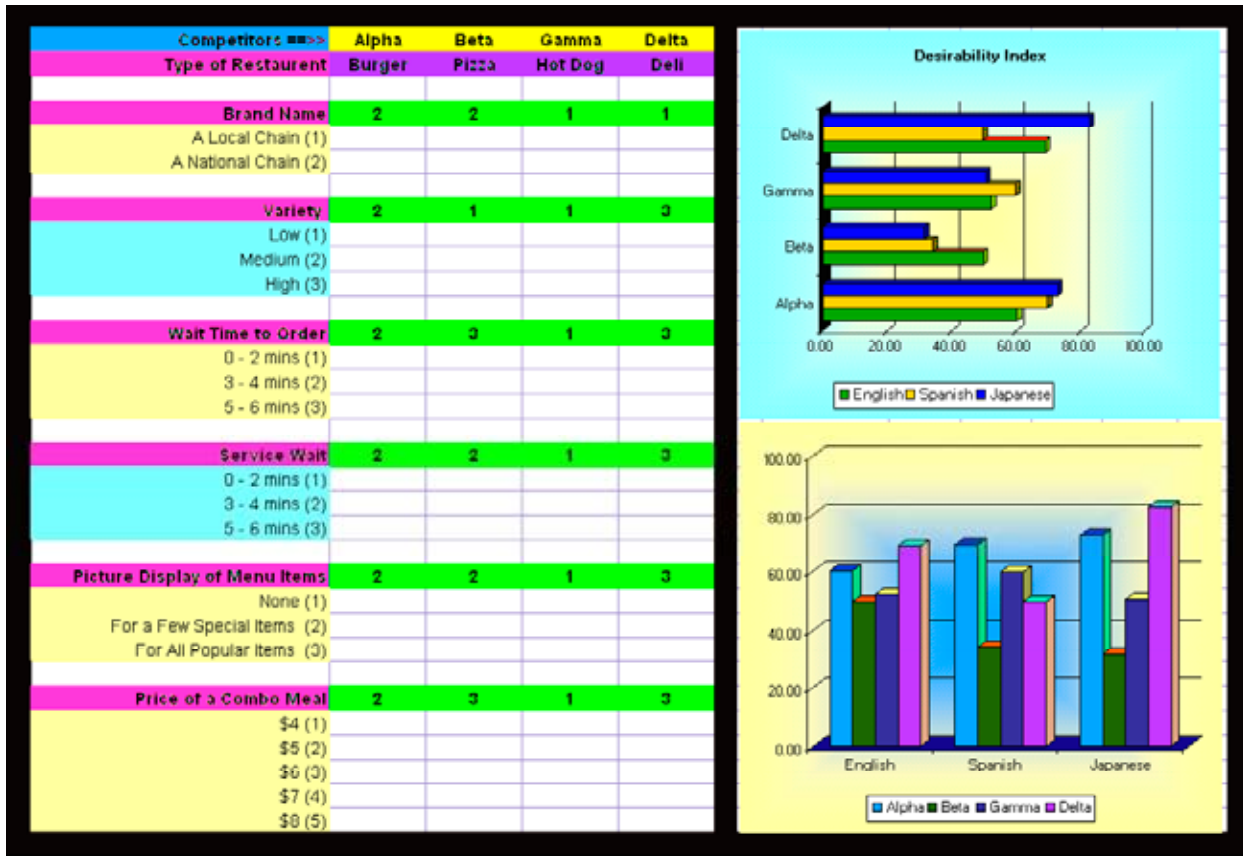
Desirability can be presented in the format of a relative index between zero and 100, in which zero represents the least desirable service of all possible combinations and 100 represents the most desirable service combination. Exhibit 3 (overleaf) shows the desirability index for the food-service simulation. The simulation is configured for four competitors, which I dubbed Alpha (burgers), Beta (pizza), Gamma (hot dogs), and Delta (the deli). The levels for each choice

driver (namely, brand, variety, wait time to order, service wait, picture display, and price) for each competitor are listed in the green cell. For example, Alpha is a national chain, offers medium variety, both its average wait time to order and its average service wait are 3 to 4 minutes, it has picture displays for a few selected menu items, and the price for a combo meal is \$5.00. The charts on the right side of the screen show desirability of each of the four competitors for the three market segments. The chart shows us the findings from above. The current formulation of Alpha burgers and Delta deli are most desired by Japanese-speaking customers; Beta pizza is most desired by English-speaking customers; and Gamma hot dogs is most desired by Spanish-speaking customers. The lower chart shows the same information by market segment rather than by concept. Here we can see that English-speaking customers most desire Delta and least desire Beta; Spanish-speaking customers most desire Alpha and least desire Beta; and Japanese speaking customers most desire Delta and least desire Beta. Thus, we can see that the service constellation provided by Beta appears to be least attractive whereas Delta and Alpha seem to be tied for most attractive.

As mentioned earlier, information collected from a customer choice modeling study can also be used to assess willingness to pay. Information about relative utilities (Exhibit 1), propensity to choose (Exhibit 2), and desirability (Exhibit

EXHIBIT 3

Desirability index simulation for food-service example



3) can be reconfigured to determine how much a customer might be willing to pay for a specific service combination. Exhibit 4 shows the three market segments’ willingness-to-pay simulation for the food-service example. For the sake of clarity and comparison, we’ve kept the service combinations in Exhibit 4 exactly same as those in Exhibit 3. For example, we can see that willingness to pay for the burger concept is highest among the Japanese-speaking customers (\$6.86), followed by Spanish-speaking customers (\$6.75) and then English-speaking customers (\$6.44).

Illustration #2: Hotel Choice Analysis

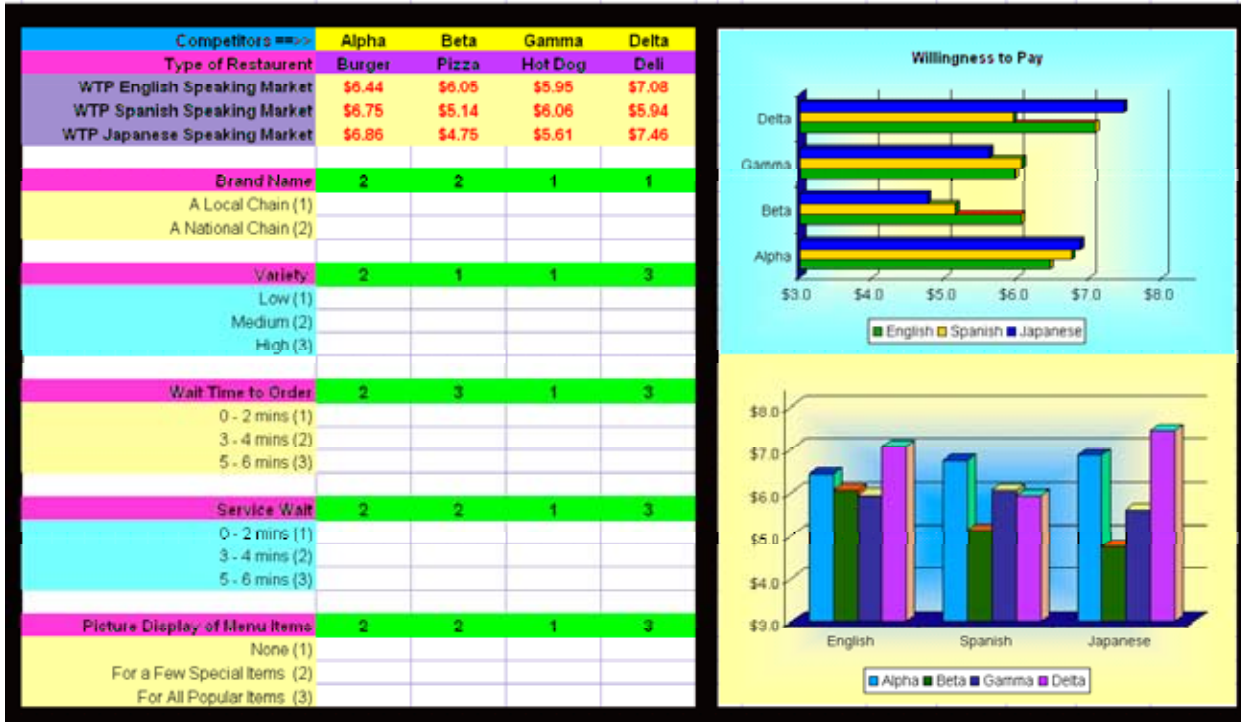
This example of how business and leisure travelers might choose a hotel is likewise based on an actual survey, where potential customers were presented with a variety of hotel options in a series of choice experiments.¹² Design of a hotel

¹² This example is based on a “real” study sponsored by HSMIAI. See: R. Verma, G. Plaschka, C. Dev, and A. Verma, “What Today’s Travelers What When They Select a Hotel,” *HSMIAI Marketing Review*, Fall 2002.

choice study is generally more complex than what we saw in the food-service example presented earlier, because certain characteristics are specific to each hotel concept. Room rates alone create considerable noise, due to hotels’ practice of manipulating rates according to revenue management strategies. In this illustration, we have bounded the room rates for the economy hotel at between \$40 and \$70; the midrange hotel at between \$90 and \$135; and the upscale hotel at between \$140 and \$200. In this way, room rates are “nested” within the hotel type.

Similar to the food-service example, after collecting data from a representative sample of business and leisure travelers, and estimation of customer choice models, we can plot the relative utilities for each driver included in the experiment. Even though the number of choice drivers included in this example is large, for the purposes of this illustration I have plotted relative utilities for just four selected variables (namely, loyalty program, business center, room rate for midrange hotel, and swimming pool), as shown in

Willingness to pay simulation for food-service example



Note: The Microsoft Excel files containing the desirability and willingness-to-pay simulation example presented in Exhibit 3 and Exhibit 4 are available for download from the CHR website (www.chr.cornell.edu). I invite you to conduct your own what-if type of analyses by changing the numbers in any of the green cells. As an exercise, identify the combinations for Alpha, Beta, Gamma, and Delta companies that give the highest desirability, the lowest desirability, the highest willingness to pay, and the lowest willingness to pay for each of the three markets.

Exhibit 5 (on the next page). In this case I've plotted relative utilities for each driver as line plots to show the attractiveness of each level of that driver. For example, we notice that compared to leisure travelers, business travelers assign higher weight to loyalty program options (in particular, earning 2 or 3 frequent flyer miles for each dollar spent). While leisure travelers are not influenced by the presence or absence of a business center, they are price sensitive, as indicated by the rapid drop in utilities for midrange hotels as prices increase as compared to those of business travelers.

Similar to the food-service example presented earlier, I developed a customer choice analyzer (CCA) simulation to assess desirability and customers' willingness to pay for hotel options. In this case, the simulator is designed for business and leisure travelers and for three relatively distinct hotel types (that is, economy, midrange, and upscale), yielding

six different choice models. Exhibit 6 (on a following page) shows a screenshot of the desirability simulation, and Exhibit 7 (also on a following page) shows a screenshot of the willingness-to-pay simulation. Again, the simulation user can change the value of any of the green cells to conduct various analyses.¹³

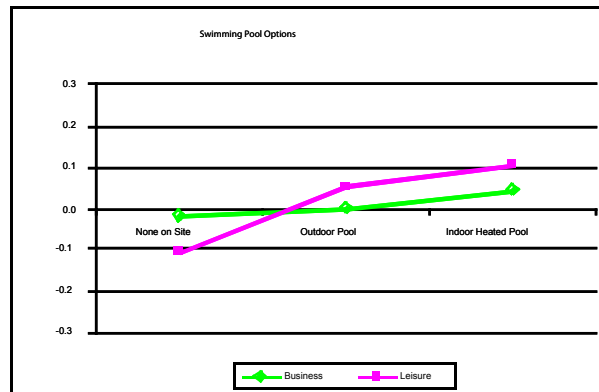
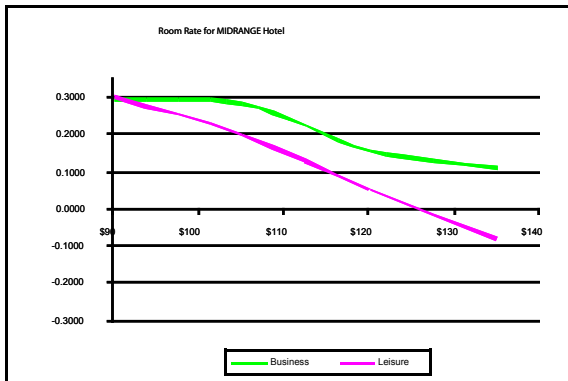
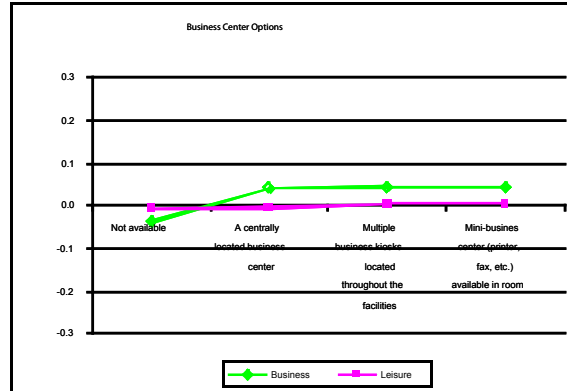
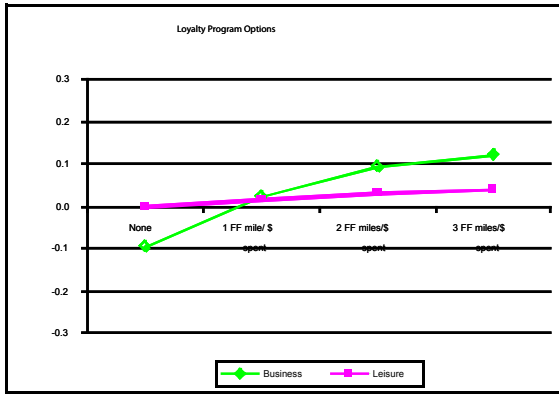
Managerial Implications

This report presents an effective approach for designing and configuring hospitality services based on customers' tastes and preferences. The customer choice analysis presented in this report can be used to identify relative weights ascribed by customers to different features of the service offerings.

¹³ This file is also available from the CHR website and we invite the readers to download and play with the program and conduct their own "what-ifs".

EXHIBIT 5

Relative utilities for selected hotel attributes for business and leisure customers



Then the estimated choice models can be analyzed on a spreadsheet to create an easy-to-use managerial decision support tool for assessing desirability and willingness to pay for different service offerings. Thus, by understanding consumer choices managers can effectively develop and position service offerings to better suit their customers' needs.

Identifying such preference differences across customer groups or for different product-and-service offerings can help a firm improve the effectiveness of its marketing campaign for each market segment cluster. By assessing the relative weights given different features by different customers, managers can identify desirable service features, and firms can further optimize product and service offerings. This analysis allows firms to focus on the critical choice drivers when developing new products and services or when

changing selected features of existing offerings. For example, if we know that the loyalty program is a big draw for business customers and swimming pools are important to leisure customers, we can emphasize one feature or the other depending on our customer mix.

While this report has focused primarily on assessment of desirability and willingness to pay, customer choice modeling can be used for other analyses. For example, mathematical models representing customer choice can be linked to operating decisions relating to budgeting, labor scheduling, and special-activities planning, and optimal service configurations can be identified for further improvement.¹⁴

¹⁴ John Goodale, R. Verma, and M.E. Pullman, "A Market-Utility Approach To Scheduling Employees," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 44, No. 1 (February 2003), pp. 61-69.

EXHIBIT 6

Desirability index simulation for hotel choice example

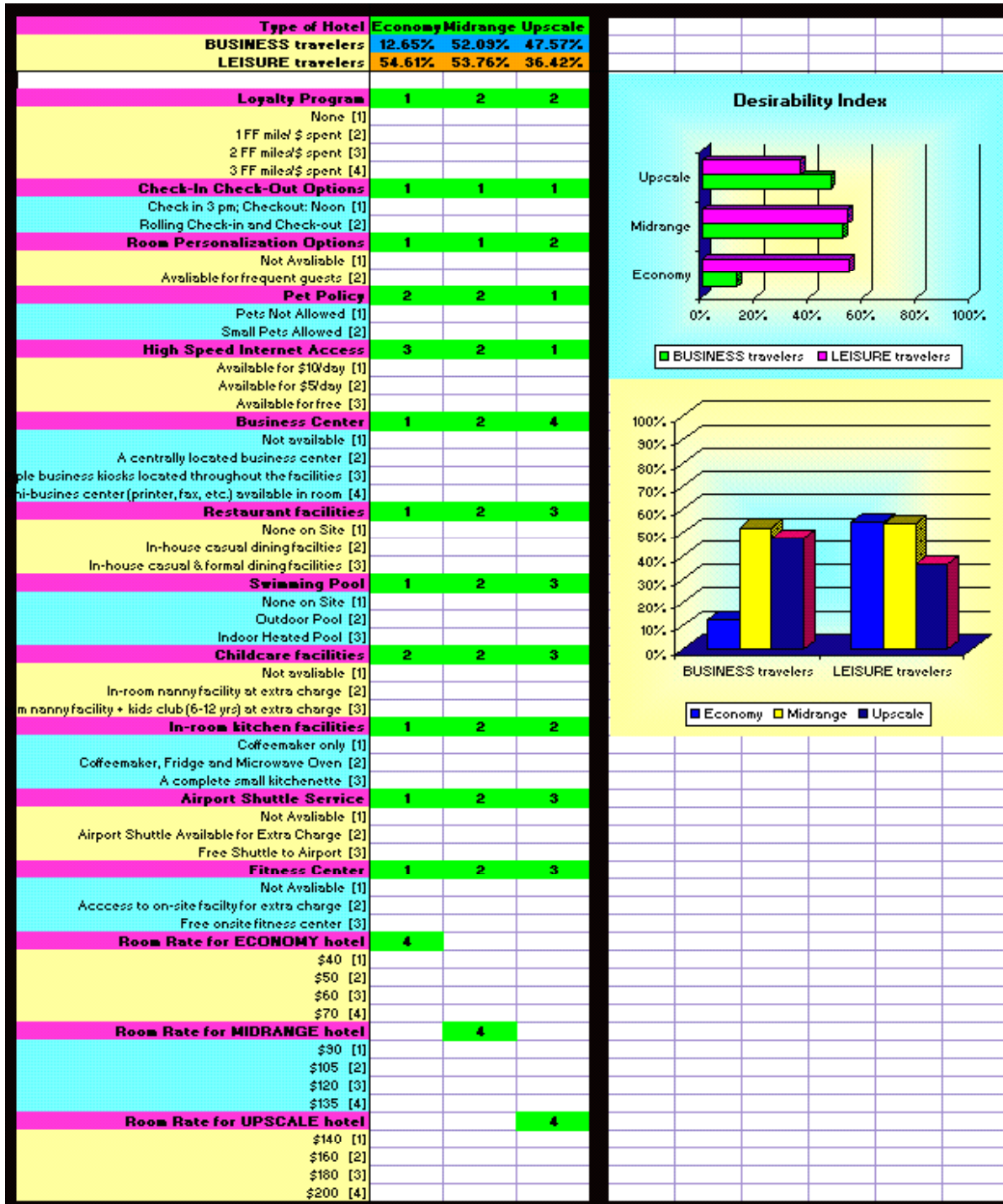
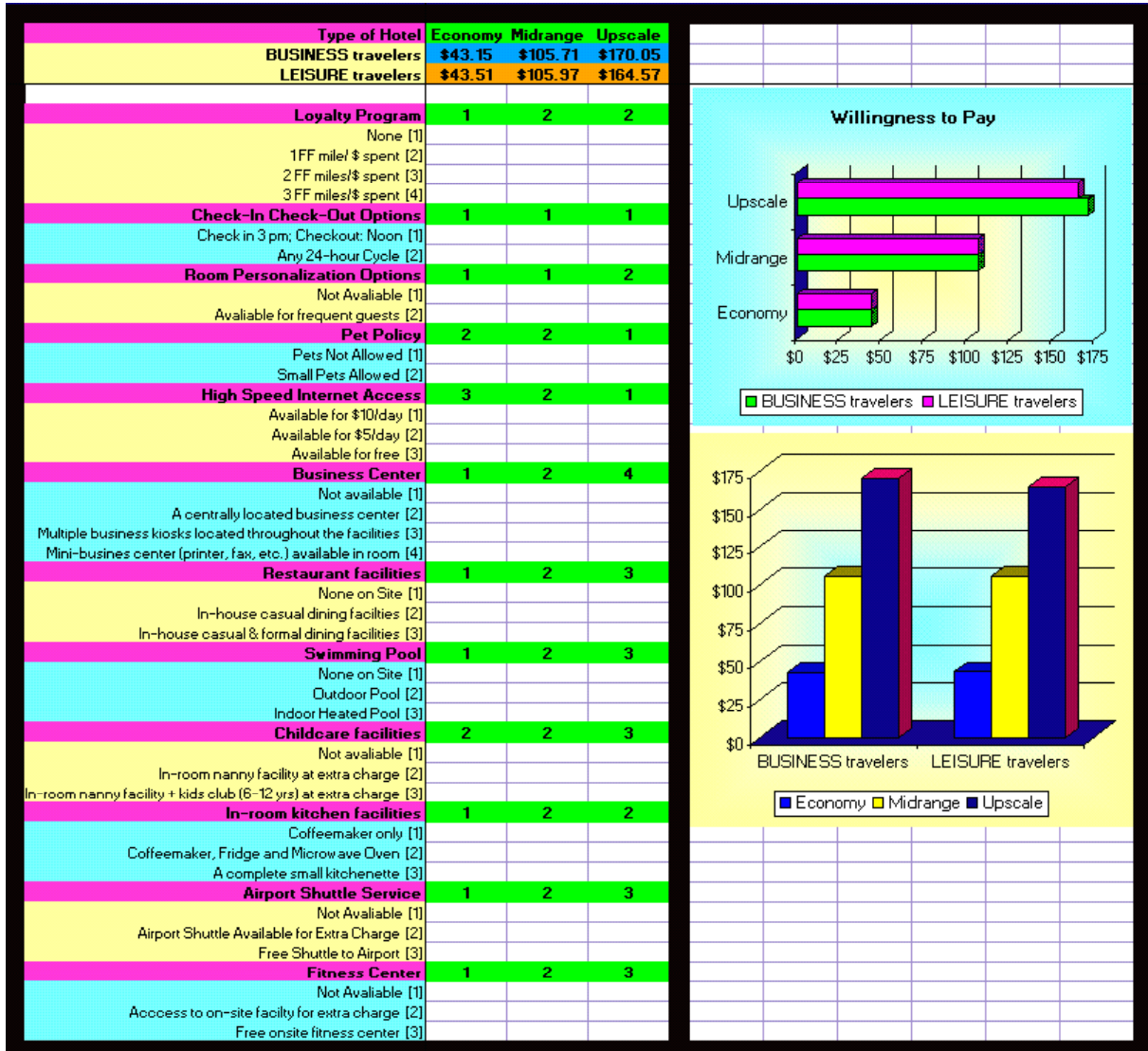


EXHIBIT 7

Willingness to pay simulation for hotel choice example



Two articles in *Cornell Hotel and Restaurant Administration Quarterly* describe various managerial applications of customer choice modeling, such as assessment of customer satisfaction, brand equity, switching inertia, identification

of order-winner, and qualifier features.¹⁵ Furthermore, top managers can assess market-share gains and losses and profitability prior to making any drastic operating changes. ■

¹⁵ Verma, Plaschka, and Louviere, *op.cit.*; and Verma and Plaschka, *op.cit.*

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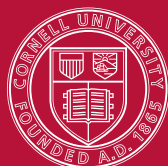
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