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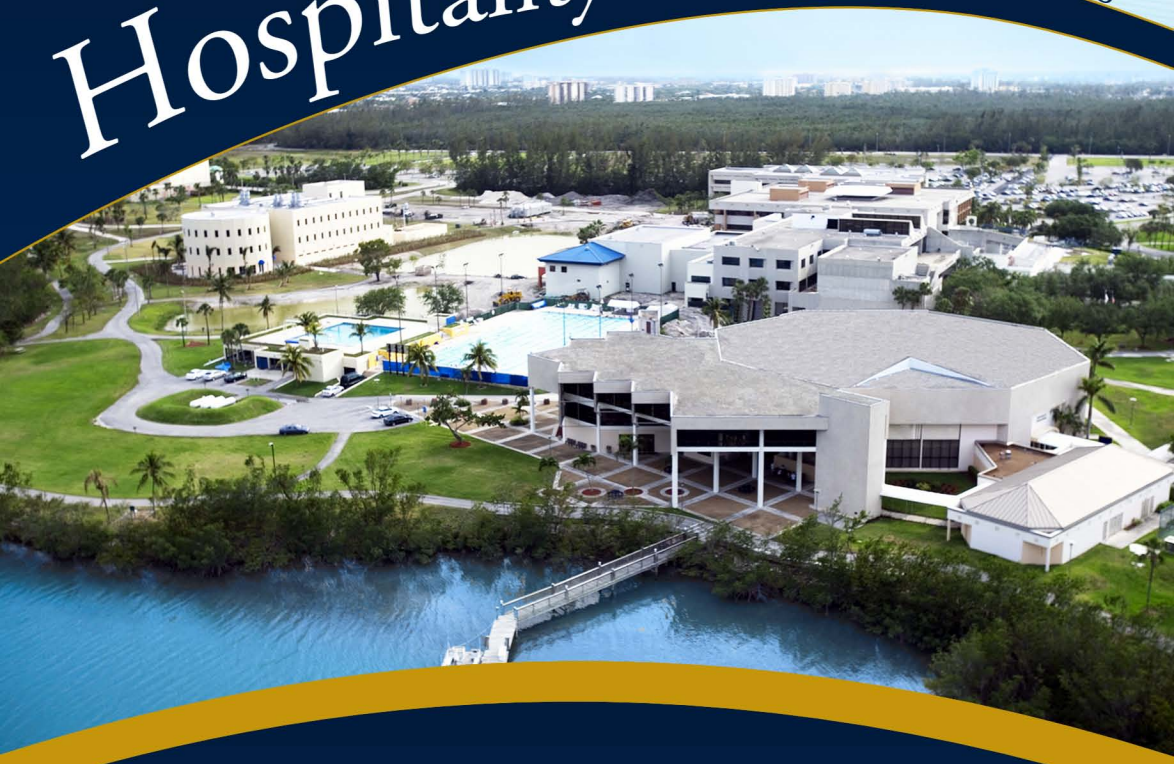

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Table of Contents

VOLUME 27 ■ NUMBER 1 ■ SPRING 2009

Florida International University Hospitality Review

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MESSAGE FROM THE DEAN

The newly designed look and feel of the Review promised with the appointment of Dr. Mary L. Tanke as Editor is in your hands. With this Spring, 2009 issue, we are now a "green" professional journal. This is an important landmark in our commitment to be an environmentally responsible organization. The Review is now recognized as Forest Stewardship Certified (FSC). The FSC certification insures that the printer, paper and print products used in the production of our journal complies with their standards. This certification requires the maintenance of a "chain of custody" accounting from the FSC certified forest to the printing company we use to produce the final product. "Going green" also means that the FIU Hospitality Review is available in electronic format. We now have all back issues of the journal in digital format and available for purchase. We are excited about the forward looking vision provided by Dr. Tanke for the FIU Hospitality Review. Dr. Tanke can be reached at Review@fiu.edu. We look forward to continuing to receive your manuscripts and comments.

Joseph J. West, Ph.D.
Dean and Professor

Exploratory Study of the Download Speed of Leading University Hospitality and Tourism Department Websites Worldwide

By Steven Chan, Rosanna Leung, Rob Law and Wen Shi

Increased broadband penetration (BP) rates around the world have encouraged web designers to include more web content and additional functions on their web sites, thereby enhancing the richness and playfulness of the information. However, it is often very difficult for web surfers who are still using narrowband connections to access such web sites. Many university web sites target international audiences; therefore their download performance should be considered, as it may directly influence the user experience. This exploratory study examined 331 university hospitality and tourism department web sites in 37 countries. The empirical results showed that entry web pages of universities in Asia, with a medium BP rate (mid-BP), have the slowest download speeds, and those in Australia and New Zealand perform the best. The adoption rate of the Cascade Style Sheet (CSS) in Asia is relatively lower than that of other regions.

INTRODUCTION

The Internet has become an essential part of people's daily lives. Web users generally expect rich content and great functionality from the Internet (Pons, 2006), but the richer the content, the longer the download time that is required. As the majority of web design companies around the world have installed broadband connections, web designers tend to concentrate on enriching web site content and often pay little attention to download speed. According to Web siteOptimization.com (2008), Monaco boasts the world's highest broadband penetration (BP) rate (40%); the average BP rate internationally is only 4.6% (Internet World Stats, 2008). This indicates that the majority of Internet users are unable to enjoy high-speed Internet access. Previous studies have found that web surfers will leave a site and search for alternatives if downloads take longer than expected (Ranganathan & Ganaphy, 2002; Rose, Lees, & Meuter, 2001) and may even abandon the use of a web site completely (Shneiderman, 1998). Therefore, a reduction in web page download time can keep most, if not all, web visitors, thus leading to greater web site service quality (King, 2003). Moreover, if a web page has no unnecessary content and a short download time, then visitors' satisfaction level may increase.

In the education context, students access various university web sites to locate information that will help them choose which university to attend. For overseas students, in particular, the first point of contact with a university is very likely to be through its web site. Students' impression

of this web site thus directly affects their feelings about the university, which, in turn, influence their university choice (Corry, Frick, & Hansen, 1997). This is in line with Yamamoto's (2006) findings that a web page has the greatest impact on university selection. If students are not satisfied with a university's web site performance, then their likelihood of selecting that university is lessened. Therefore, university web site designers must enhance web page performance by improving download time.

The literature contains a very limited number of studies that examine web page download time in general and university web page download time in particular. Most of the prior studies on web site response time focused on web site design and subjective web site performance evaluations. Weinberg (2000) indicated that the most important page within a web site is the home page, as it provides visitors with their first, and possibly only, impression of the site. To bridge the aforementioned research gap, the study reported herein focused on the download speed of the home pages of the world's leading university hospitality and tourism department web sites. Its findings will be of use to the users and owners of the selected web sites.

LITERATURE REVIEW

Web sites are consumers' key interface when they use the Internet, and web site performance directly influences web surfers' satisfaction. Researchers have presented various approaches to improving both web site usability and functionality (Au Yeung & Law, 2006; Law & Wong, 2003; Nielsen, 2000; Yeung & Lu, 2004). Palmer (2002) has pointed out that the speed with which web site content is accessed and displayed has a major impact on web site success. Many web designers add a lot of information to a single web page to enrich the content, but this leads to a longer download time (Nah, 2003), which may result in a lower degree of service satisfaction; impatient users may simply abandon the site (Hoxmeier & DiCeare, 2000; Galletta, Henry, McCoy, & Polak, 2004; Rose et al.).

Studies have shown that response time is one of the critical determinants of web site quality (McKinney, Yoon, & Zahedi, 2002; Torkzadeh & Dhillon, 2002; Turban & Gehrke, 2000). More specifically, web users have indicated that long web page download times have been a consistent problem (Lightner, Bose, & Salvendy, 1996; Pitkow & Kehoe 1996; Selvidge 1999, 2003). Users constantly request faster page downloads (Nielsen, 2000). Several studies have found that rich web page content (images, multimedia, and text) is the main factor that affects

download speed (Jacko, Sears, & Borella, 2000; Pons). Galletta et al. suggested that, to maintain a positive attitude among web users, site delays should be no longer than eight seconds; to encourage users to "stick with" a task (e.g., an online purchase), this delay should be no more than four seconds. A few studies have also demonstrated a positive relationship between web site response time and online transaction completion (Hoxmeier & DiCesare; Ramsay, Barbesi, & Preece, 1998; Weinberg). To conclude, web designers should always remember that "web pages have to be designed with speed in mind" (Nielsen, 1997).

The Internet currently plays an important role in most, if not all, universities around the world (Hiller & Jones, 2000). The content of the top web pages may influence the decision of potential students or other users (Yamamoto). Universities frequently recognize innovation in research (Hiller & Jones). They should also, therefore, identify and rectify any problems associated with their web sites. This timely study of the download speeds of their web sites will aid universities in this endeavor by providing useful insight into the factors that have a direct impact on the performance of these sites.

METHODOLOGY

The web sites of 331 university tourism and hospitality departments worldwide were analyzed for this study. Web site selection was based on recently published articles on the world's leading tourism and hospitality institutions and scholars (Jogaratname, Chon, McCleary, Mena, & Yoo, 2005; Schmidgall, Woods, & Hardigree, 2007; Ryan, 2005; Zhao & Ritchie, 2007). The universities were grouped into five different geographical regions, namely North America, Asia, Australia and New Zealand, Europe, and Other. Regional web site performance was examined by BP ranking, where a greater than 25% BP rate was considered to be high and a less than 10% rate was considered to be low. These percentages represented the largest gaps in the BP rate, which, in this study, referred to the percentage of broadband subscribers among the general population. Obviously, BP has a strong correlation (0.821) with per capita GDP (Table 1).

Table 1
Number of Universities with Hospitality and Tourism Departments by Geographical Region with BP rankings and GDP

Country/ Independent area	Frequency (%)	BP (%/ Ranking)[1]	BP (High/ Mid/Low)	Population/ GDP[2] (US$)
N. America (n = 2)	**118 (35.65%)**			
Canada	14 (4.23%)	25.1%/14	H	33.0 M/38,600
USA	104 (31.42%)	21.9%/20	M	303.8 M/45,800
Asia (n = 13)	**112 (33.84%)**			
China	39 (11.78%)	3.7%/71	L	1330.0 M/5,400
Hong Kong	2 (0.60%)	25.1%/13	H	7.0 M/42,000
India	3 (0.91%)	0.2%/120	L	1148.0 M/2,600
Indonesia	2 (0.60%)	0.0%/167	L	237.5 M/3,600
Japan	8 (2.42%)	21.1%/23	M	127.3 M/33,500
Korea	12 (3.63%)	28.3%/10	H	48.4 M/25,000
Macau	2 (0.60%)	18.4%/30	M	0.5 M/28,400
Malaysia	1 (0.30%)	3.9%/67	L	25.3 M/14,500
Nepal	1 (0.30%)	0.0%/207	L	29.5 M/1,000
The Philippines	1 (0.30%)	0.1%/122	L	96.1 M/3,200
Singapore	2 (0.60%)	21.8%/21	M	4.6 M/49,900
Taiwan	34 (10.27%)	19.6%/25	M	22.9 M/30,100
Thailand	5 (1.51%)	0.0%/159	L	65.5 M/8,000
Europe (n = 14)	**70 (21.15%)**			
Austria	5 (1.51%)	18.8%/28	M	8.2 M/39,300
Belgium	1 (0.30%)	23.9%/15	M	10.4 M/36,200
Croatia	1 (0.30%)	5.6%/55	L	4.5 M/15,500
Cyprus	2 (0.60%)	7.5%/48	L	0.8 M/27,100
Finland	3 (0.91%)	28.8%/8	H	5.2 M/36,000
Germany	2 (0.60%)	21.2%/22	M	82.0 M/34,100
Greece	5 (1.51%)	6.9%/49	L	10.7 M/30,600
Ireland	2 (0.60%)	15.9%/34	M	4.1 M/46,600
Spain	6 (1.81%)	16.7%/32	M	40.5 M/33,600
Sweden	3 (0.91%)	28.5%/9	H	9.0 M/37,500
Switzerland	7 (2.11%)	30.9%/5	H	7.6 M/40,100
The Netherlands	3 (0.91%)	33.3%/3	H	16.6 M/39,000
Turkey	6 (1.81%)	5.0%/59	L	71.9 M/12,000
The UK	24 (7.25%)	23.8%/16	M	60.9 M/35,000
Australia and New Zealand (n = 2)	**25 (7.55%)**			
Australia	19 (5.74%)	22.4%/19	M	21.0 M/37,300
New Zealand	6 (1.81%)	16.0%/33	M	4.2 M/27,200
Other (n = 6)	**6 (1.81%)**			
The Bahamas	1 (0.30%)	4.0%/66	L	0.3 M/28,000
Fiji	1 (0.30%)	0.8%/97	L	0.9 M/3,900
Israel	1 (0.30%)	19.6%/26	M	7.1 M/26,600
Jamaica	1 (0.30%)	1.7%/82	L	2.8 M/7,400
South Africa	1 (0.30%)	0.3%/111	L	48.7 M/9,700
The United Arab Emirates	1 (0.30%)	6.0%/53	L	4.6 M/37,000
Total (n = 37)	311 **(100.00%)**			

[1]*Source: Internet World Stats (2007)*
[2]*Source: CIA - The World Factbook (2008)*

Many factors affect measurements of web page download time consistency, including clients' broadband performance, computer performance, and server location. To obtain fair measurements in such an environment, web page file size, rather that download time as recorded with a timer, was used in this study. On the basis of a commercially available web site optimization analyzer, the researchers developed a web analyzing tool to collect the file size of each of five web components for an examination of download performance (Table 2): *HTML*, *image*, *external script files*, *external Cascade Style Sheet (CSS) files and multimedia files*. Data for all of the university web sites were collected in July 2008. The test results show the number of files and the file size of each component, which together indicate the download performance of the web sites.

Table 2
Five Basic Web page Design Components

Basic Component	Definition	Benefit for web page
HTML	A computer language used to mark up web pages and display web content.	It is basically the universal language of web design, and HTML size is a key factor in fast page display (King, 2003).
Image & Multimedia files	These files display visual and aural product images such as video, audio and graphics (Chan & Law, 2006).	Multimedia and images have been shown to motivate and attract visitors to use a web site (Hong, Thong, & Tam, 2004). Too many or too large images can lead to download delays (Perdue, 2001).
External Cascading Style Sheet (CSS) files	A new style sheet language that can be applied to any web page and used by both web site designers and users to create elements such as colors, layout and headers (Webopedia, 2007; Wikipedia, 2007a).	CSS-style web elements can save 25% to 50% in file size compared to old-style web elements (King, 2003).
External Script	Script in computer programming languages is commonly called a script language. These languages are typed directly from a keyboard and can be written as an internal or external part of a web page program (Wikipedia, 2007b).	External scripts mean the program is written out of the whole web program, thus making it easier to change the web page.

Source: Adopted from Qi et al. (2008), p. 270.

FINDINGS AND DISCUSSION

HTML

The layouts of the selected web sites in Asian countries with a medium BP rate (mid-BP) showed empirically significant differences from those in other sectors. On average, each web site in this sector contained 1.66 HTML frames, whereas the other sectors contained one to 1.27 frames (Table 3). Moreover, eight of the web sites in Taiwan contained three to four HTML frames, which implied that many universities in that country were still unaware of the disadvantages of adopting multiple frames. The use of so many frames may, unfortunately, result in incomplete information retrieval when web surfers perform searches via search engines. As the majority of web surfers search for information in this manner, the use of multiple HTML frames is not recommended. Universities in Australia and New Zealand, and most of those in North America, use only one HTML frame to generate the best search engine indexing results. Although the results of the ANOVA test demonstrated no significant differences in HTML size with different BP sectors, regionally speaking, Asia was significantly different from North America and Australia and New Zealand. Therefore, Asian universities should focus on enhancing the HTML size of their home pages to align with international practice. One way to decrease HTML size is to make use of CSS in HTML formatting.

Table 3
HTML File Count and Size Analysis

Sector		No. of HTML frames	HTML Size
North America-High	Mean	1.00[1]	17,653.86
(n = 14)	Std.	0.00	
North America-Mid	Mean	1.04[2,10]	21,696.00
(n = 100)	Std.	0.32	
Asia-High	Mean	1.10[3]	22,683.70
(n = 10)	Std.	0.32	
Asia-Mid	Mean	1.66[1,2,3,4,5,6,7,8,9]	34,574.80
(n = 44)	Std.	1.03	
Asia-Low	Mean	1.27[4,10]	34,426.20
(n = 41)	Std.	0.81	
Australia and New Zealand-High	Mean	1.00[5]	17,573.86
(n = 22)	Std.	0.00	
Europe-High	Mean	1.20[6]	18,245.53
(n = 15)	Std.	1.13	
Europe-Mid	Mean	1.13[7]	19,102.03
(n = 40)	Std.	0.52	
Europe-Low	Mean	1.23[8]	14,790.85
(n = 13)	Std.	0.60	
Other-Mid	Mean	2.00	22,708.00
(n = 1)	Std.	0.00	
Other-Low	Mean	1.00[9]	12,328.50
(n = 4)	Std.	0.00	
Total	Mean	1.20	23,898.18
(n = 304)	Std.	0.66	

[1-10]The mean difference for these two sectors is significant at the 0.05 level: 0.000, 0.000, 0.007, 0.002, 0.000, 0.010, 0.000, 0.022, 0.033, 0.039.

Images

The textual information on a web site cannot bring a university's external and internal environment alive for web surfers as well as images can. Therefore, the use of image files can be a good way to equip viewers with a better understanding of the university. The research results shown in Table 4 indicate that the number of image files used on the sites in the different sectors were more or less the same. However, when total image file size was considered, Canada, the North American region with a high BP penetration rate (high-BP), was significantly different from the others, with an average of 418 KB per web page. The web pages in the other regions had image file sizes that ranged from 51 KB to 200 KB. The average image size for the Canadian universities was more than 35 KB

per image, whereas the sizes in the other sectors were only 16% to 27% of that size. This indicates that the Canadian web sites have not optimized image compression. Although Canada's BP rate is ranked 14th in the world, Canadian universities should consider matching their download speeds to those of countries with lower BP rates to cater to the needs of students from those regions. In addition, global awareness of image file compression needs to be increased to enhance web site performance.

Table 4
Image File Comparison between All Sectors and North America's High-BP Sector

Sector		No. of Images	Total Image Size	Sig.[1]	Avg. Image Size	Sig.[1]
North America-High (n = 14)	Mean Std.	20.79 14.35	418,249.07		36,119.98	
North America-Mid (n = 100)	Mean Std.	19.67 20.65	170,028.27	0.032	9,876.33	0.002
Asia-High (n = 10)	Mean Std.	21.40 15.46	75,651.30	0.041	5,845.89	0.013
Asia-Mid (n = 42)	Mean Std.	23.26 17.92	198,745.08	0.045	8,033.00	0.002
Asia-Low (n = 39)	Mean Std.	18.23 11.59	164,865.28		15,242.28	0.023
Australia and New Zealand-High (n = 23)	Mean Std.	20.83 17.59	68,989.48	0.011	6,983.26	0.004
Europe-High (n = 14)	Mean Std.	21.79 28.15	84,664.79	0.003	6,738.66	0.009
Europe-Mid (n = 39)	Mean Std.	25.33 22.94	171,161.69		5,498.74	0.001
Europe-Low (n = 12)	Mean Std.	13.50 10.93	51,746.82	0.025	8,315.56	0.020
Other-Mid (n = 1)	Mean Std.	6.00 0.00	117,315.00		19,552.50	
Other-Low (n = 4)	Mean Std.	9.75 7.50	83,637.50		16,777.95	
Total (n = 298)	Mean Std.	20.60 18.95	164,163.54		10,568.20	

[1]*The mean difference for this sector is significant at the 0.05 level with* ***North America-High.***

CSS

The use of CSS not only speeds up the design process and standardizes the HTML formatting within a web site, but it can also reduce HTML file size. Compared with the other web components, CSS use varied across sectors. Generally speaking, the number and size of CSS files on university web sites in high-BP regions were significantly different

from those in low-BP regions. In North America and Australia and New Zealand, there were averages of 3.55 and 4.08 CSS files, whereas the corresponding numbers for universities in low-BP sectors in Europe and Asia were 1.40 and 1.60. Moreover, the file size for Asian web sites was no more than 8.5 KB, whereas those in other regions ranged from 9.5 KB to 28 KB. The CSS adoption rate in Asia was also relatively lower than that in other regions: 60% to 70% of universities in Asia used CSS to format their web sites, whereas more than 80% of those in the other regions did so (Table 5). This low CSS adoption rate also means that the average HTML file sizes on Asian university web sites are significantly larger than those in the other regions.

Table 5
External CSS Adoption Rate, File Count and Size Analysis

Sector		No. of CSS	Total CSS Size	CSS Adoption Rate
North America-High (n = 13)	Mean Std.	4.08[1,5,9] 3.04	21,023.08[a]	92.80%
North America-Mid (n = 85)	Mean Std.	2.64 2.47	17,997.29[b,h]	85.00%
Asia-High (n = 7)	Mean Std.	1.29[9,10,11] 0.49	3,866.71[f,i]	70.00%
Asia-Mid (n = 28)	Mean Std.	2.36 2.95	8,473.77[g,j]	63.64%
Asia-Low (n = 25)	Mean Std.	1.60[1,2,3,4] 1.26	5,205.48[a,b,c,d,e]	60.98%
Australia and New Zealand-High (n = 20)	Mean Std.	3.55[2,6] 3.14	24,004.00[e,f,g]	90.91%
Europe-High (n = 12)	Mean Std.	4.17[3,7,10] 4.63	23,828.83[d]	80.00%
Europe-Mid (n=34)	Mean Std.	3.76[4,8,11] 3.72	28,093.48[e,h,i,j,k]	85.00%
Europe-Low (n = 10)	Mean Std.	1.40[5,6,7,8] 0.52	9,697.38[k]	92.31%
Other-Mid (n = 1)	Mean Std.	3.00 0.00	17,400.00	100.00%
Other-Low (n = 2)	Mean Std.	1.00 0.00	11,265.00	50.00%
Total (n = 237)	Mean Std.	2.78 2.88	17,281.67	77.96%

The mean difference for these two sectors is significant at the 0.05 level:
[1 to 11]*p = 0.011, 0.022, 0.010, 0.004, 0.025, 0.050, 0.023, 0.020, 0.035, 0.032, 0.035;*
[a to k]*p = 0.045, 0.017, 0.007, 0.022, 0.000, 0.044, 0.022, 0.031, 0.011, 0.001, 0.040.*

External Script Files

Unlike hotels and airlines, which rely on their web sites to increase business volume, universities use their web sites primarily for information dissemination. Many commercial web sites use external script files to handle membership logins, secure payments and validate data, whereas university web sites usually use them for search functions, menu bar handling and content management. This study found no significant differences among the sectors in external script file count or size. On average, each selected web page contained only 2.55 external script files with a file size of 26 KB, whereas the average hotel web site's main page contains 4.69 such files with a file size of 66 KB (Qi, Leung, Law, & Buhalis, 2008). As external script files are all text-based, with a relatively small file size, they are not a critical factor in download time.

Multimedia

The multimedia adoption rate among the selected web sites was relatively low compared to that of commercial web sites. Only 19.08% (58) of them incorporated multimedia files in their home pages, compared to 31.37% of hotel web sites (Qi et al.). Interestingly, the highest multimedia adoption rate was not found in the high-BP sectors. Of the 58 universities that incorporated such files in their sites, 38 and 14 were in mid- and low-BP sectors, respectively, and only six were in high-BP sectors. Only one university each in Europe, and Australia and New Zealand, respectively, adopted multimedia on its web site, which made it impossible to carry out an ANOVA test. The results showed that the universities in Asia's mid-BP sector had an average of 1.87 multimedia files on their web sites, significantly more than the 1.07 files on those in North America's mid-BP sector, and the average file size in the former was almost eight times larger than that in the low-BP sectors (Table 6). Of the 58 universities that make use of these files, only two (one in Taiwan and one in Singapore) incorporate videos in their web pages to demonstrate the characteristics of their programs. The remaining sites use Flash to display photo slide shows and promotion banners. However, some of these Flash files, at around 2.4 MB in size, were found to be even larger than video files. Many web designers are aware of the large size of video files, and thus the majority does not incorporate them into their web sites; however, they may be unaware that Flash files can be equally large and require a long time to download.

Table 6
Multimedia File Count and Size Analysis

Sector		No. of Multimedia Files	Total File Size	Average Size
North America- (n = 1)	Mean Std.	3.00 0.00	311,792.00	103,930.67
North America-Mid (n = 14)	Mean Std.	1.07 [1] 0.27	439,300.43	426,253.96
Asia-High (n = 3)	Mean Std.	2.00 1.73	202,716.33	95,370.33
Asia-Mid (n = 20)	Mean Std.	1.85 [1] 1.50	496,287.15 [2]	300,714.56
Asia-Low (n = 14)	Mean Std.	1.36 0.63	62,618.33 [2]	59,708.05
Australia and New Zealand-High (n = 1)	Mean Std.	3.00 0.00	311,792.00	103,930.67
Europe-High (n = 1)	Mean Std.	1.00 0.00	612,923.00	612,923.00
Europe-Mid (n = 4)	Mean Std.	1.00 0.00	24,860.60	26,378.00
Total (n = 58)	Mean Std.	1.49 1.07	312,564.73	247,616.57

[1]The mean difference for these two sectors is significant at the 0.05 level (p = 0.038).
[2]The mean difference for these two sectors is significant at the 0.05 level (p = 0.036).

Overall Performance

The overall performance of the web sites in each sector was compared by adding up all of the file counts and the sizes of each component. The number of objects in all of the low-BP sectors (16.38 and 21.46) was significantly less than that in Europe's mid-BP sector (31.1 objects). Europe's low-BP sector had the smallest average file size, 70 KB, whereas North America's high-BP sector had the largest, at 485 KB. The second largest file size – only 50 KB less than that in North America's mid-BP sector – was found in Asia's mid-BP sector. To provide the richest information with the smallest file size, a smaller average object size should be adopted. However, in this study, the web sites in the low-BP sectors tended to have larger object sizes. In contrast, those in Australia and New Zealand, a high-BP sector, had the lowest average object size of only 5 KB. The corresponding number for the North American high-BP sector was five times greater (Table 7).

Table 7
Analysis of Number and Overall Size of Objects in Web sites

Sector		No. of Objects	Total Size	Average Object Size
North America-High (n = 14)	Mean Std.	27.64 15.09	496,154.00[3]	29,594.55
North America-Mid (n = 100)	Mean Std.	24.91 21.88	296,172.03	13,302.89
Asia-High (n = 10)	Mean Std.	26.50 15.92	186,456.80	10,313.64
Asia-Mid (n = 44)	Mean Std.	27.50 19.03	449,840.34[4,5,6]	21,914.49
Asia-Low (n = 41)	Mean Std.	21.46[1] 13.57	217,988.51[4]	12,852.22
Australia and New Zealand-High (n = 23)	Mean Std.	26.78 20.16	118,545.48[5]	5,594.38
Europe-High (n = 15)	Mean Std.	27.07 30.94	172,487.40	12,860.19
Europe-Mid (n = 40)	Mean Std.	31.10[1,2] 24.79	233,181.73	6,923.44
Europe-Low (n = 13)	Mean Std.	16.38[2] 12.37	71,880.23[3,6]	6,032.60
Others-Mid (n = 1)	Mean Std.	11.00 0.00	157,423.00	14,311.18
Others-Low (n = 4)	Mean Std.	12.00 7.96	93,704.50	11,609.76
Total (n = 305)	Mean Std.	25.48 20.54	273,004.07	13,365.94

[1-6]The mean difference for these two sectors is significant at the 0.05 level: p = 0.036,· 0.026,· 0.032, 0.040, 0.013,· 0.021.

CONCLUSIONS

The more objects that a web site contains, the more information and functions that a user can view; however, to provide rich content and facilitate speedy downloads, the size of these objects needs to be reduced. It seems that many universities in Asia use multiple HTML frames in their web sites, which can affect their search engine indexing results. Moreover, their HTML file sizes were the largest, and CSS adoption rate the lowest, among all of the regions considered in this study. The adoption of CSS could help these sites to minimize HTML format coding by reducing repetitive text. North America universities, which are located in a relatively high-BP region, are characterized by a larger overall web site file size. Prospective students from low-BP regions may thus experience very slow download times when they access North American university web sites, which factor may reduce their level of satisfaction.

Many web sites use multimedia to enhance their playfulness, even though average multimedia file sizes are larger than those for text and images. Although increased BP means faster downloads, file size should still be carefully monitored to prevent long download times for those without broadband. Given that HTML, CSS and external script files are text-only files, image and multimedia files represent the major bottlenecks with regard to download time. Before such files are uploaded to a server, they need to be fully compressed using image compression software to enhance download performance. Universities also need to be aware of the BP rate in their target regions to maximize the satisfaction of prospective students and other users.

This study has several limitations that provide avenues for future research. For instance, we were unable to analyze web sites that were created by .NET applications because of limitations in the tools that are currently available. Given that such applications represent the latest technology, the findings of this study may not reflect the most up-to-date information on the web performance of hospitality and tourism department web sites. In addition, the study considered only a select list of web sites, rather than all university web sites. It can therefore be considered exploratory in nature, and its findings may not represent the general situation. Future research should include more universities to make the findings more representative. Moreover, although home pages are the entry points to web sites, the majority of web browsers use search engines to locate their desired information. Therefore, a university's information page and application page may be as important as its home page. As image and multimedia files affect download performance to the greatest extent, future research could be extended to the use and compression performance of such files on these critical pages.

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Adapting the Customer Satisfaction Index to the Lodging Industry: Foreign Customers' Evaluations

By Dong Jin Kim, Woo Gon Kim, and Kelly A. Way

As a standard form of measuring customer satisfaction, the Customer Satisfaction Index (CSI) has been utilized in many countries. By using the Korean Customer Satisfaction Index (KCSI) methodology, this study attempted to investigate foreign customers' evaluations of luxury hotels in Seoul, South Korea. In doing so, some efforts were made to overcome the methodological problems associated with the KCSI for the lodging industry. Data for this study were collected through a mall intercept survey using a self-administered questionnaire. Precisely 783 responses, collected solely from foreign guests who had stayed at a luxury hotel in Seoul, were included in the study.

INTRODUCTION

In today's fiercely competitive business environment, customer satisfaction is considered a vital requirement for service firms (Choong, 2001). As a matter of fact, customer satisfaction is the ultimate goal of total quality management (Kadir, Abdullah, & Agus, 2000). Further, customer satisfaction has been found to be one of the most common mediators in relationship-marketing literature between antecedents (e.g., perceived service quality and relational benefits) and marketing outcomes (Palmer & O'Neill, 2003; Hennig-Thurau, Gwinner, & Gremler, 2002). In particular, customer satisfaction is viewed as a strong determinant of relationship-marketing outcomes (Hennig-Thurau, Gwinner, & Gremler, 2002). For the most part, customer satisfaction is recognized as being important to all service firms mainly because of its influence on fostering customer loyalty. In addition, higher customer satisfaction insulates current market shares from competitors, reduces the costs of attracting new customers, and creates an opportunity for a price premium, all while building a firm's positive reputation (Anderson, Fornell, & Lehmann, 1994).

In the 1980s, researchers' and practitioners' interests shifted from internal processes and structures to markets and customers after it was determined that the former may no longer provide the basis for a competitive advantage (Pizam & Ellis, 1999). To ensure repeat patronage of customers, it is imperative that a service organization pay close attention to customer satisfaction. The measuring of customer satisfaction provides valuable information for organizations, who can realize changes in their products/services that will better serve their customers' needs and, in the future, exceed their expectations. It is believed that the integration of customer satisfaction into a firm's

strategies and operations contributes to that firm's competitive advantage and long-term profitability (Dube, Renaghan, & Miller, 1994). Customer satisfaction is generally defined as the degree to which a customer's expectations about a product/service are met by the actual experience of that product/service. According to the expectancy disconfirmation theory, consumers purchase products/services with pre-purchase expectations, as yet untried products/services are matched against their actual post-purchase experiences. Disconfirmation occurs when there is a discrepancy between expectations and actual performance. Negative disconfirmation occurs when the actual performance is less than the expectation, while positive disconfirmation occurs when the performance is better than expected. Positive disconfirmation or confirmation results in customer satisfaction and, presumably, loyalty.

In the hospitality business, customer satisfaction is imperative to ensure repeat stays and to enrich customer loyalty. The hospitality industry has relied heavily on the conceptual framework of SERVQUAL to measure a customer's perceived performance of the hotel and services performed. SERVQUAL is a well recognized tool commonly used by the service industry to measure a customer's perceived performance provided by firms; in addition, SERVQUAL also involves a comparison between customer expectations and perceptions of actual performances (Brown, 1997).

Although customer satisfaction has been stressed as a troubling relevance in hospitality since its genesis, Enz revisited this age-old concern in a 2001 study. Enz surveyed hotel managers in 25 different countries and found that "human resource management issues" was the most troubling issue that the hotel managers encountered, while "understanding the customer" was the second most troubling one. She also identified that developing guest satisfaction measures was an important aspect related to understanding customer issues; in addition, she discovered that to achieve a competitive advantage in hospitality, hotel managers must implement strategic thinking in connection with the customer information they obtained. Enz elaborated that hotel managers seemed to agree that a proper method for measuring customer satisfaction was one of the key elements in a business's success.

Recognizing that customer satisfaction is the lifeblood of a business, researchers and practitioners have given widespread attention to measuring customer satisfaction and, consequently, various approaches and methodologies have emerged. However, the academic literature largely focuses on the underlying processes of the construct, while

tending to pay less attention to its more practical implications. This type of research provides insufficient actionable information for marketing managers (Ennew, Reed, & Binks, 1993; Heide, Gronhaug, & Engset, 1999) due to the complexity of employed statistical techniques such as confirmatory factor analysis and structural equation modeling. In this article, a way of measuring customer satisfaction is demonstrated that retains the much-desired simplicity. The objective is to offer hotel managers and related business operators a diagnostic, easily implementable method of measuring customer satisfaction. In doing so, the customer satisfaction index (CSI) approach is adopted and adjusted.

CUSTOMER SATISFACTION INDICES LAUNCHED

Both Fornell et al., (1996) and Pizam and Ellis (1999) acknowledged that modern-day corporations (which are facing intensive competition) must evaluate the qualitative, as well as the quantitative, aspects of their performance to remain sustainable. Customer satisfaction, as a qualitative success of firms, is considered of great importance for on-going businesses. Current corporate marketing strategies reflect the importance of customer satisfaction, and they focus on protecting the current customer base through customer atonement and loyalty as well as by attracting and establishing new customers. A comprehensive and systematic measurement tool for customer satisfaction is crucial for any firm's success. This is why customer satisfaction indices have been developed, launched, and utilized in many countries.

In the last two decades, national indices of customer satisfaction have been established in many countries. First, the Swedish Customer Satisfaction Barometer (SCSB) was developed in 1989, followed by the German customer barometer-quality and satisfaction in 1992 and the American Customer Satisfaction Index (ACSI) in 1994. There is a general consensus that national Customer Satisfaction Indices (CSIs) contribute to a better standard of living due to their efforts to build economic policy decisions, and to measure the overall quality of goods/services as experienced by customers (Eklof & Westlund, 1998). National CSIs are also a more fundamental indicator of a firm's performance than transaction-specific satisfaction measures (Anderson, Fornell, & Lehmann, 1994; Fornell et al., 1996).

In summary, many countries have suggested using CSIs as a standardized measurement of a customer's overall satisfaction. CSIs can be used for individual firms, entire industries, or nationwide consumption of products and services. A nationwide CSI can describe a cumulative evaluation of a firm's market offering, thereby making the benchmarking

process of firms much more manageable and substantial. A CSI, then, is a useful tool on the national level, and its application both in the industry and in individual companies is widely accepted. An industry CSI can describe customers' overall purchase and consumption experiences across an entire industry, while companies in the same industry can use an industry CSI for a comparison. Finally, an individual firm's CSI can describe its customers' overall evaluation of its market offering (Hackl, Scharitzer, & Zuba, 2000; Bruhn & Grund, 2000).

DATA EXTRACTED FROM THE ACSI

Knutson et al. (2003) extracted the lodging industry scores from the ACSI database for the year 2000, which included six major hotel firms: Ramada, Holiday Inn, Marriott, Hilton, Starwood, and Hyatt (see Table 1 for details). Particularly, the study included three key elements of the ACSI (i.e., the guest's overall satisfaction, expectancy-disconfirmation, and guest experience compared to an ideal product). The study then analyzed each element not only for the hotel industry as a whole but also for each individual hotel firm. The results indicated that the ACSI score for the lodging industry (72.0 on the maximum of 100) was higher than that of the service sector (69.4) but slightly lower than the national ACSI score (72.6). It was found that customer satisfaction levels significantly differed across the hotel firms. Hilton (77.0) acquired the highest ACSI score followed by Marriott (74.0), Hyatt (74.0), Starwood (73.0), Holiday Inn (71.0), and Ramada (69.0). The results also showed that the American customer's satisfaction level with the lodging industry was relatively high (8.17 on the 10-point scale). However, the satisfaction level deteriorated when compared to the expectation level (7.24). When the American customers were asked to compare their experiences to their ideal hotels, the satisfaction level indicated even more deterioration (6.75).

Table 1
Hotel firms represented in
American Customer Satisfaction Index (2000)[a]

Hotel Firm	Description of Hotel Firm	N[b]
Ramada	Franchisor with three hotel brands: Ramada Limited, Ramada Inn, and Ramada Plaza. Operating in the lower- and middle-market price segments. Approximately 120,000 rooms and 978 properties. Brand is part of Cendant Hotels.	251
Holiday Inn	Franchisor with four hotel brands: Holiday Inn, Holiday Inn Express, Holiday Inn Select, and Sunspree Resort. Operating in the lower- and middle-price segments and multiple market segments. Approximately 320,000 rooms and 2,300 properties. Brand is part of Six Continental Hotels.	250
Marriott	Franchisor and management company of multiple brands in the luxury-, upper-, middle-, and lower-price segments and multiple market segments. Approximately 436,000 hotel rooms and 2,600 properties.	250
Hilton	Owner, management company, and franchisor of multiple brands in luxury-, upper-, middle-, and lower-price segments and multiple market segments. Approximately 326,000 hotel rooms and 1,986 properties.	310
Starwood	Owner, management company, and franchisor of multiple brands in luxury- and upper-price segments and multiple market segments. Approximately 224,000 rooms and 743properties.	253
Hyatt	Management company of multiple Hyatt brands such as Grand Hyatt, Hyatt Regency, and Park Hyatt, primarily focusing in the luxury- and upper-price segments and mainly in the business and resort market segments. Approximately 55,000 rooms and 120 properties.	149
Total		1,463

[a] Knutson, B. J., Singh, A. J., Hung-Hsu, Y., & Bryant, B. E. (2003). Guest satisfaction in the U.S. lodging industry using the ACSI model as a service quality scoreboard. *Journal of Quality Assurance in Hospitality & Tourism 4*,(3/4),101.

[b] N: Number of customers responding to that firm

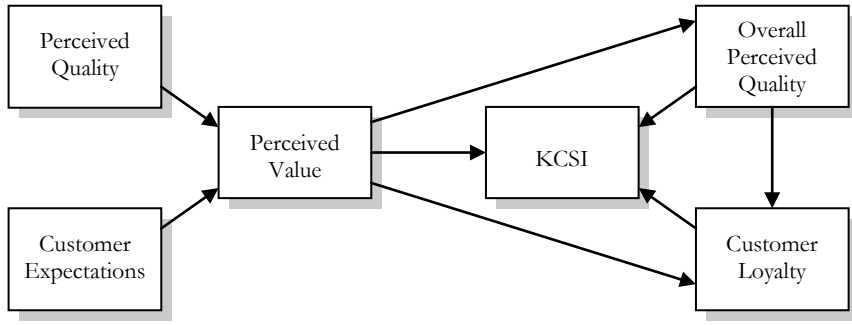
By extracting the ACSI for the lodging industry, Knutson et al. (2003) not only diagnosed the satisfaction level of the U.S. lodging guests in comparison with the satisfaction levels of other sectors, but they also demonstrated the different satisfaction levels of guests across hotel firms. This was possible because of the large sample size. As seen in Table 1, the

ACSI hotel industry database for the year of 2000 covers 1,463 responses. On the other hand, the Korean Customer Satisfaction Index (KCSI) hotel industry database does not release results for each hotel. Because the KCSI industry database does not divulge individual results for each hotel, it can be speculated that an insufficient sample size was utilized, suggesting the need for a large-scale survey.

KOREAN CUSTOMER SATISFACTION INDEX LAUNCHED

The KCSI was developed in 1992 and has subsequently been performed every year by the Korea Management Association Consultants (KMAC). The goal was to measure the level of the nation's customer satisfaction. Like other NCSIs, the KCSI was designed to measure the quality of the goods/services experienced by the Korean customers. Within five short years of its inauguration, the KCSI was implemented by 12 different industries including luxury hotels. By 2004, the KCSI was being utilized to measure customer satisfaction in many different sectors, including manufacturing/nondurables (38 industries), manufacturing/durables (25 industries), services/general (33 industries), and services/public administration (14 industries) (KMAC, 2004). As shown in Figure 1, the KCSI assumes causal relationships among the constructs and provides information about the satisfaction drivers for organizations and/or industries. However, the KCSI is not able to identify causal relationships among the constructs since the calculation of the KCSI does not involve a structural relationship among the constructs. In other words, the focus of the KCSI lies only at the micro level; under the frame of the structural relationship among the constructs lies the conceptual model of the KCSI, which is based on the expectancy disconfirmation theory.

Figure 1
The conceptual model of the KCSI



The KCSI is measured by three elements: perceived value, overall perceived quality, and customer loyalty. The first element is perceived value, which indicates customers' levels of satisfaction compared to their expectations. The second element of the KCSI is overall perceived quality, which refers to a customer's overall satisfaction level, and the third element of the KCSI is customer loyalty, which indicates repurchase intention. The KCSI utilizes 10 to 15 industry-specific measurement items for each industry, which are used to measure a customer's perceived value, while employing a single-item approach to measure the overall perceived quality and customer loyalty. The KCSI uses a five-point Likert-type scale to measure the perceived value (attribute), while adopting a seven-point Likert-type scale to measure the overall perceived quality and customer loyalty. The calculation of the KCSI for individual companies and industries is represented in the following equation.

$$\text{KCSI} = (.4 \times \sum_{i=1}^{n} CiWi) + (.4 \times \text{OPQ}) + (.2 \times \text{CL})$$

Where: n: the number of product/service attributes

Ci: % of top two answers at attribute i

Wi : the importance weight assigned to attribute i

$\sum_{i=1}^{n} CiWi$: perceived value

OPQ: % of top two answers at overall perceived quality

CL: % of top two answers at customer loyalty

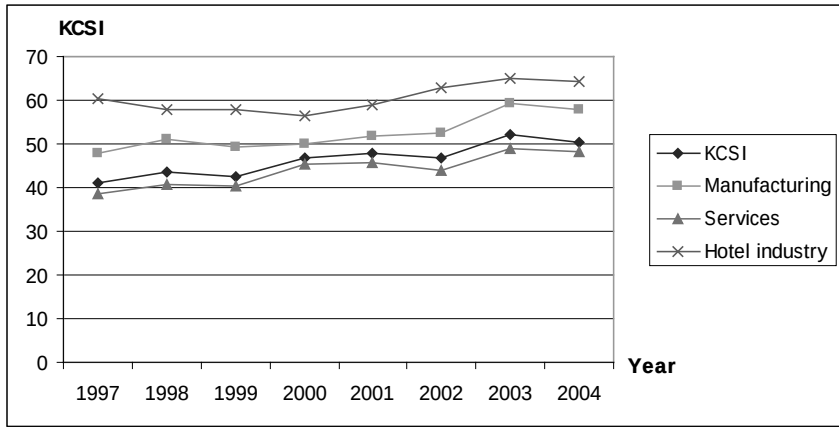
As shown in the equation, the KCSI is a weighted average of perceived value (40%), overall perceived quality (40%), and customer loyalty (20%). Perceived value is the sum of the percentages of the top two answers at attribute i (Ci) multiplied by the importance weight assigned to attribute i (Wi). The importance weight is assigned to each attribute based on the customer ratings of each item compared to the ratings of all items. Overall perceived quality is measured by the percentage of the top two answers at the overall perceived quality. Finally, customer loyalty is determined by the percentage of the top two answers at customer loyalty.

The population desired by the KCSI was 20- to 60-year-old Korean consumers. The sampling was conducted in Seoul and its surrounding cities, as well as six other major South Korean cities, including Busan, Daegu, Incheon, Gwangju, Daejeon, and Ulsan. Taken as a whole, the sampling represented more than 70% of the Korean population. In addition, a purposive quota sampling was adopted to select a sample considering population and gender distribution.

THE KCSI HAS METHODOLOGICAL PROBLEMS

According to the results of the KCSI, the hotel industry performed exceptionally well, as seen in Figure 2. The KCSI scores for the hotel industry were 60.3 (1997), 58.0 (1998), 57.7 (1999), 56.5 (2000), 58.8 (2001), 62.7 (2002), 65.1 (2003), and 64.2 (2004), which were higher than scores in both the Services and Manufacturing sectors. Furthermore, unlike the hotel industry ACSI scores, the hotel industry KCSI scores have always been higher than the national KCSI scores. Indeed, the luxury hotel segment has ranked the highest, with the exception of 2004, when it ranked second after the movie theater industry (64.8).

Figure 2
KCSI trends



There are, however, several problems concerning this rather pleasing outcome for the hotel industry, especially for luxury hotels in Seoul. The first problem is associated with the sampling procedure. Even though the KMAC's sampling procedure covered more than 70% of the Korean population, the validity of the sampling procedure for the hotel industry is questionable, because the sampling procedure included only domestic customers. Therefore, it ignored the international clientele, who

are the primary patrons in the rooms division of luxury hotels in Seoul; in fact, they account for more than 80% of total room guests. Second, the sample size for the hotel industry was not large enough. While the results for the hotel industry are reported, the results for individual hotels are not available in the KMAC's annual report due to insufficient sample sizes. The final problem is associated with the measurement items. KMAC reported that it utilized 10 to 15 industry-specific measurement items for each industry. However, the measurement items for the hotel industry were not disclosed; therefore, they cannot be assessed.

The present study adapts the KCSI methodologies and applies them to the hotel industry in an effort to measure foreign customers' satisfaction levels with their experiences at luxury hotels in Seoul, South Korea. Since the large majority of guests staying at the luxury hotels in Seoul are international guests, this study completely excludes domestic guests. To conduct this study, measurement items were developed from related literature (i.e., Lewis, 1984, 1987; Heide, Gronhaug, & Engset, 1999) and formulated into a survey that was delivered in the form of a mall intercept survey. Mall intercept surveys are widely used and are theoretically able to reach a large segment of the population. According to the Council of American Survey Research Organizations (CASRO) membership survey, about 25% of all marketing research and 64% of personal interviews are conducted at malls (CASRO, 2008).

MEASUREMENT ITEMS DEVELOPED

In order to measure customer satisfaction, it is essential to develop proper measurement items as a fundamental foundation. Consequently, many scholars and practitioners have tried to construct customer satisfaction measurements for lodging operations. Oh and Park (1997) argued the need for industry-specific studies in order to properly measure customer satisfaction within unique market environments. Heide, Gronhaug, and Engset (1999) developed an industry-specific measurement of customer satisfaction for business hotels and tested it through a field survey that emphasized the need for such measurements. The "Scorecard" system of Marriott is a prime example of customer satisfaction measurements in the lodging industry. For example, while staying at a Fairfield Inn, guests are asked to rate the quality of their stay by using a monitor. The collected data is centrally analyzed to provide a customer satisfaction level for both the chain and the individual properties. In addition, the information is used as a motivational tool for Fairfield employees in the form of incentive pay for quality performance and high customer satisfaction marks (Berkley & Gupta, 1995). In a

related business, Enterprise Rental Car uses the "Enterprise Service Quality Index" to measure their customers' satisfaction, and the resulting information is used to improve service consistency (Taylor, 2002).

For the present study, the initial questionnaire was devised based on previous studies related to customer satisfaction measurements in the hotel industry and was translated into the Korean language. The questionnaire was first pre-tested by distributing it to three marketing managers in three different luxury hotels in Seoul in order to test face validity. The questionnaire was then revised based on the comments and suggestions collected during the pre-testing period. Afterward, the questionnaire was translated into English by the researchers and verified by two individuals whose native language was English. The questionnaire was designed to include additional items related to the guestroom versus other hotel facilities such as restaurants. The rationale for the additional items was based on the belief that a guest's perception is that the guestroom represents the core benefits of a hotel's products and services (Kandampully & Suhartantok, 2000; Heide, Gronhaug, & Engset, 1999). This belief is supported by the observation of guests who often patronize local restaurants instead of the restaurants housed in the hotel itself or who do not make use of the in-room services offered by the hotel. Table 3 lists 17 items included on the final questionnaire, which are accompanied by their means and standard deviations. The reliability of the 17 items was tested with Cronbach's α and also reported in Table 3. The Cronbach's α coefficients for both importance and satisfaction measures were .901, demonstrating the high reliabilities of the measurement items.

MALL INTERCEPT SURVEYS UTILIZED

A field study was conducted at the Incheon International Airport and the COEX Mall, a convention and exhibition center in Seoul, South Korea. The majority of the luxury hotels involved in this study were reluctant to authorize customer surveys on their properties. Therefore, the researchers selected the airport and convention center as their survey sites. Six trained graduate students majoring in hospitality and tourism management conducted the intercept surveys during a two-week sampling period. Data were collected for three weekdays and two weekend days from each site within the two-week sampling period. Prior to receiving the questionnaire, the subjects were asked if they had stayed at a luxury hotel in Seoul during the past year. Foreign travelers who met this criterion were given a copy of the self-administered questionnaire and were asked to answer the questions in accordance to their previous

experiences at luxury hotels in Seoul. The reason why subjects were limited to international samples was that guests who had stayed in luxury hotels in the Seoul metropolitan area were made up primarily of international travelers. Upon the completion of the survey, a packet of pocket tissue was given to each respondent as a gift. A total of 1,000 questionnaires were distributed. Of the 887 questionnaires that were returned, 783 were deemed usable.

DESCRIPTIVE STATISTICS SUMMARIZED

The demographic profiles of the respondents are shown in Table 2. The distribution of the respondents in the study included 428 males (54.9%) and 352 females (45.1%). The majority of the respondents were less than 50 years old (89.2%), and the nationalities of the respondents were as follows: 284 (36.5%) were from Japan and 223 (28.6%) were from North America. Lastly, when asked for their purpose of visit, 335 (42.9%) respondents indicated that they were traveling for business purposes, 143 (18.3%) cited pleasure, and 95 (12.2%) reported that they were traveling for both business and pleasure.

Table 2
Demographic profiles of the respondents

	Variable	Frequency	Percent
Gender	Male	428	54.9
	Female	352	45.1
Age	20-29	170	22.4
	30-39	252	33.2
	40-49	256	33.7
	50 or older	82	10.8
Origin	North America	223	28.6
	South America	51	6.5
	Europe	130	16.7
	Japan	284	36.5
	China	16	2.1
	Other	75	9.6
Purpose of visit	Business	335	42.9
	Pleasure	143	18.3
	Business & pleasure	95	12.2
	Other	208	26.6

Table 3 summarizes the foreign customers' assessments of the 17 items with regard to their importance and the actual performance of the luxury hotels in Seoul. The items with the highest importance level were as follows: "cleanliness of guestroom" (4.14), followed by "communication ability of employees" (4.05), "friendliness of employees" (4.03), and "location" (3.97). The attribute with the highest performance level was "cleanliness of guestroom" (4.04), followed by "friendliness of employees" (4.00), "good reputation" (4.00), and "convenience of check-in/check-out" (3.95). It is encouraging that "cleanliness of guestroom" scored highest in both importance and performance assessments.

However, as can be seen in the second column from the right in Table 3, there are discrepancies between importance and performance assessments among the respondents. It is interpreted that the lower the number in the column of Table 3, the more the need for the hotels to improve in performance. For example, price-value relationship (-8) ranked ninth in importance but seventeenth in performance, which indicates that luxury hotels in Seoul performed poorly in terms of price-value relationship as compared to the perceived importance of the respondents. This poor ranking further indicates a serious problem regarding lower price competitiveness among the hotels.

The hotels also performed poorly in "communication ability of employees" (-5), "handling of customer complaints" (-5), and "location" (-5). Without question, it is difficult for hotels to relocate their properties, yet they can surely enhance the employees' communication abilities and the methods by which complaints are handled. International guests likely feel that the Korean hotels are inadequate at handling customer complaints due to their employees' lack of proficiency in foreign languages. Thus, it seems imperative that Korean hotels incorporate foreign languages into their employee training programs to enhance the satisfaction level of international guests. The discrepancies between perceived importance, and experiences reported by international guests regarding the above two items further suggest that Korean hospitality education programs need to emphasize foreign language proficiency to contrive a more valuable workforce for the lodging industry.

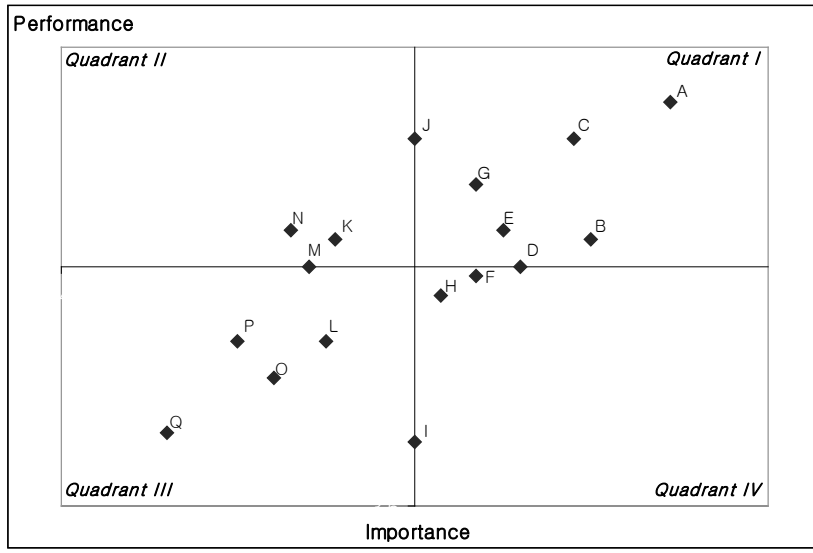
A statistical analysis is also possible in interpreting the data. For the current data, the paired sample t-test is an appropriate technique because the importance scores and the satisfaction scores are matched. This statistical procedure tests whether there are any significant differences between the perceived importance and the satisfaction. The results show significant differences between the perceived importance

and the satisfaction for 10 of the 17 items, indicating the need for resource allocation by the studied hotels.

Table 3
Importance and performance ratings for luxury hotels in Seoul

Symbol	Item	Importance[a]			Performance[b]			A – B	t-value	
		Mean	SD[c]	Rank order (A)	Mean	SD	Rank order (B)			
A	Cleanliness of guestroom	4.14	0.78	1	4.04	0.81	1	0	3.60	*
B	Communication ability of employees	4.05	0.86	2	3.89	0.76	7	-5	5.02	*
C	Friendliness of employees	4.03	0.83	3	4.00	0.77	2	1	0.80	
D	Location	3.97	0.84	4	3.86	0.90	9	-5	3.25	*
E	Promptness of services	3.95	0.82	5	3.90	0.81	5	0	1.63	
F	Handling of customer complaints	3.92	0.85	6	3.85	0.80	11	-5	1.87	
G	Convenience of check-in/check-out	3.92	0.86	6	3.95	0.80	4	2	-0.90	
H	Reservation system convenience	3.88	0.87	8	3.83	0.80	12	-4	1.51	
I	Price-value relationship	3.85	0.87	9	3.67	0.87	17	-8	4.74	*
J	Good reputation	3.85	0.90	9	4.00	0.78	3	6	-4.70	*
K	Benefits for other facilities	3.76	0.88	11	3.89	0.78	7	4	-3.83	*
L	Amenities in guestroom	3.75	0.86	12	3.78	0.77	13	-1	-1.14	
M	Room service	3.73	0.80	13	3.86	0.81	9	4	-3.25	*
N	Décor, furnishings of guestroom	3.71	0.76	14	3.90	0.71	5	9	-5.73	*
O	Size of guestroom	3.69	0.81	15	3.74	0.80	15	0	-1.36	
P	F&B facilities	3.65	0.77	16	3.78	0.81	13	3	-4.07	*
Q	Variety of guestroom	3.57	0.93	17	3.68	0.78	16	1	-3.11	*

[a] Measured on a five-point scale: 1 = least important, 5 = most important (Cronbach's α = .901)
[b] Measured on a five-point scale: 1 = very dissatisfied, 5 = very satisfied (Cronbach's α = .901)
[c] SD: standard deviation
* $p<.01$



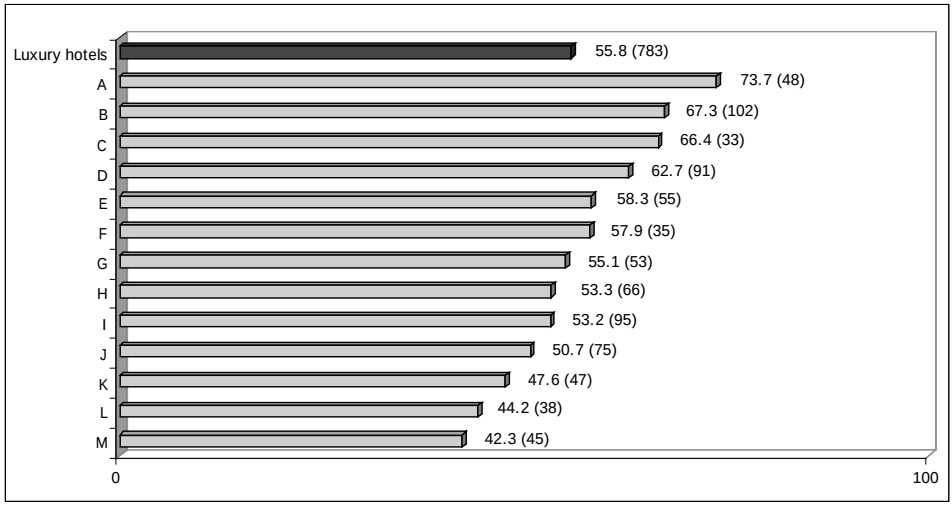
A two-dimensional plotting, referred to as the importance-performance (I-P) matrix, could also be developed through a comparison between customer expectation (importance) and experience (performance). The I-P matrix consists of perceived importance that is plotted on a horizontal axis and performance measures that are plotted on a vertical axis, which then yields four quadrants. This matrix indicates the strong and weak points of products/services provided by a hotel and defines the required improvement efforts. Quadrant I displays variables high in both importance and performance. Quadrant II comprises variables low in importance but high in performance. Quadrant III contains variables low in both importance and performance. Finally, Quadrant IV houses important variables on which hotels performed poorly. Items located in Quadrant I do not need to be changed, and those items located in Quadrant III are considered low priority. However, organizations need to focus on items located in Quadrants II and IV. For the items in Quadrant II, organizations need to transfer their resources because they are over-investing in imprudent items. Further, organizations could find action opportunities in Quadrant IV because these items represent areas in which organizations need to make additional efforts at improvement.

HOTEL A SCORED HIGHEST

Following the KCSI methodology, this study calculated the CSI with the perceived value of 40%, overall perceived quality of 40%, and

customer loyalty of 20% for luxury hotels in Seoul. Figure 3 shows the CSI scores for the luxury hotels included in this study. Overall, the CSI for the 13 luxury hotels in Seoul was found to be 55.8, which was slightly lower than the domestic customers' evaluations reported by the KMAC. The following is a summary of the findings for the luxury hotels, whose names will remain anonymous for the purposes of this study: Hotel A scored the highest (73.7), followed by Hotel B (67.3), Hotel C (66.4), Hotel D (62.7), Hotel E (58.3), Hotel F (57.9), Hotel G (55.1), Hotel H (53.3), Hotel I (53.2), Hotel J (50.7), Hotel K (47.6), Hotel L (44.2), and, finally, Hotel M (42.3).

Figure 3
CSI scores



* The number of samples are in parentheses.

While explaining the interpretation of customer satisfaction measures, Brown (1997) introduced two types of norms—population-based and time-based—for a better understanding of customer satisfaction scores, both of which are applicable in evaluating the CSI scores of hotels. Population-based norms refer to the scores of competitors, while time-based norms indicate a company's own scores from the past. It is natural for a hotel's CSI score to be interpreted by using other hotels' scores, as well as the industry average; this is referred to as population-based norms. By using these population-based norms, hotel managers can identify their hotels' CSI scores in comparison with competing hotels' scores. In other words, a hotel's CSI score can be more meaningfully evaluated when it is judged against the competitors' scores.

In many cases, it is difficult for a hotel to develop population-based norms since that requires large-scale sample surveys. A hotel can more readily develop a time-based norm by tracking its own performances over time; this approach is particularly useful when population-based norms are unobtainable. A hotel chain can implement time-based norms by tracking the CSI scores for each of its own properties over a specific time.

IMPLICATIONS DISCUSSED

It is an old adage that "perception is reality," but because there is truth in that statement, the hospitality industry has spent years and unlimited resources in the tireless attempt to find the correct formula to ensure service quality and safeguard customer loyalty. This study has demonstrated one method of measuring customer satisfaction for the lodging industry through the adaptation of the CSI method. The study found the CSI method to be very useful in determining perceived value and overall perceived quality of the luxury hotels surveyed. This study enabled the luxury hotels that were included to construe how their guests ranked them on these two factors in comparison to the competition in the luxury hotel market segment in Seoul, South Korea.

Hotel management and personnel can benefit from this study by examining the areas that ranked low on the CSI; these are the areas that focus on poor performance. The main attribute that ranked poorest in performance was "communication ability of employees," followed by "handling of customer complaints." It is easy to see the relationship between these two attributes: the lack of understanding (due to a communication error) can lead to an unintentional mishandling of a customer complaint or situation. Therefore, the results of this study regarding training issues in luxury hotels in Seoul, South Korea, are of obvious implication.

An additional implication of this study relates to the importance and performance ratings of hotels. Although there have been many studies published regarding the importance and performance ratings in hotels, few have used the CSI method. This study should validate and solidify previous studies published in the area of hospitality. It should also motivate hospitality leaders to continue to weigh the importance of such studies and strive to meet guest expectations, while strengthening their reputations and market shares. In addition, the study should compel and inspire hospitality researchers to investigate the importance of the CSI method and to incorporate the method into future research.

RESEARCH HAS LIMITATIONS

In this study, the authors demonstrated a straightforward way to measure customer satisfaction for the hotel industry by adapting the CSI methodology. However, this study is not free from limitations. Therefore, care should be taken when interpreting the results of this study. The first limitation is related to the sample size. Although the study incorporated a large-scale sample survey, the number of respondents was less than 50 per several hotels cited in this study. This small number was due to the limited available resources that made it difficult for the researchers to generalize the findings. Thus, future research including a larger sample size would be desirable. Second, the questionnaire for the study was collected using only the English version. The questionnaire should be developed and translated into several different languages so that various versions can provide complete communication with the international consumers whose first language is not English. Finally, this study was conducted using a cross-sectional design making tracking changes over time difficult. A longitudinal study that tracks changes in customer preferences and evaluations over time would be ideal. This would also allow an opportunity for consultants in customer satisfaction and related areas.

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The Influence of Purchase Confidence on Information Source Selection: Implications for Hospitality Industry

By Nelson Barber and Tim Dodd

Whether the product of choice is a restaurant, vacation resort or hotel, it is important for hospitality marketers to understand how consumers treat purchase decisions and the influence purchase confidence and situation play on that decision. This study investigated the role purchase confidence plays with knowledge in the selection of sources of information during purchase decisions. The results indicate sources of information are perceived differently by consumers and depending on the purchase situation, subjective knowledge is influenced by purchase confidence affecting the source of information considered when making a purchase decision. The results also indicated that those with high purchase confidence and subjective knowledge will rely on themselves as a source when making a purchase rather than a retail clerk or published material.

INTRODUCTION

Most marketing and consumer-behavior textbooks depict consumer purchase decisions as a series of steps progressing from problem recognition, to information search, to post-purchase behavior. In the information-search stage, consumers actively collect internal or external information to make potentially better decisions (Brucks, 1985; Williams, 2002). Internal searching occurs when consumers use information already stored in memory, whereas external searching involves information sought from the environment because the required information was not previously acquired or is unable to be recalled from memory.

The investigation of consumer external-search behavior has identified a number of individual factors, such as internal knowledge, purchase confidence, and purchase situation, that influence the extent of the information search. Research on purchase confidence in the hospitality industry (Barber, 2005) and in general consumer products (Wells & Prensky, 1996), has sought to understand product-specific uncertainty and its influence on purchase search behavior. Several risk-reduction strategies may be adopted by consumers depending upon their level of purchase confidence and the purchase situation. One strategy is for uncertain consumers to search for additional sources, types, and amounts of information that seem most likely to satisfy their particular needs.

Whether the product of choice is a restaurant, vacation resort, or hotel, it is important for hospitality marketers to understand how consumers treat the purchase decisions they face and how much influence

purchase confidence and situation have on that decision (Barber); Dodd, Laverie, Wilcox, & Duhan, 2005; Olsen, Thompson, & Clarke, 2003). Understanding the tendency to seek varied sources of information will aid in designing promotional plans and staff training programs. Toward those ends this study investigated the role that purchase confidence plays in the selection of information sources during purchase decisions.

LITERATURE REVIEW

Purchase Behavior

Consumers are faced with purchase decisions every day, and not all of these decisions are acted upon equally. Some decisions are more involved and thus entail greater effort by the consumer. Other decisions are fairly routine and involve little or no effort.

Purchase decisions start when the consumer recognizes a need and reflects a set of attitudes toward a product category. When the consumer has a need—whether it be the selection of a vacation resort or a bottle of wine for a special occasion--he or she becomes goal oriented. Unrelated cognitive activities become organized to satisfy the perceived need (Srinivasan & Ratchford, 1991). Next the consumer must decide what to do. Most often this involves searching for information.

Usage Experience

To make decisions, a person has to rely on knowledge acquired about the problem and on information gathered during the decision process. The extent of prior experience with a product is an important determinant of subsequent information searching. Williams suggested that in order for hospitality consumers to resolve their need to purchase or consume something, such as a hotel room or meal at a fine dining restaurant, they must first look to past experience or memory of prior usage or consumption of a particular product. For example, Bieger and Laesser (2004) found that for tourists planning a trip, a number of common denominators regarding information collection were identified. These include the composition of the vacation group, the presence of family and friends at the destination (situational use), and prior visits to the destination (usage experience). Thus, previous experience can influence the decision.

Internal Knowledge Search

Mattila and Wirtz (2001, 2002) and Park and Lessig (1981) identified two major approaches for measuring internal knowledge: how much a person actually knows about the product (*objective knowledge*) and how much a person thinks he/she knows about a product, or self-assessed

knowledge (*subjective knowledge*). Differentiation between objective and subjective knowledge occurs when consumers do not precisely recognize how much or how little they actually know. It is often influenced by the consumers' psychological set, as well as their ability to retrieve the information from memory.

Research has found that when the internal knowledge proves inadequate, consumers may decide to collect information external to their memory (Barber; Engel, Blackwell, & Miniard, 2001; Williams). Sometimes short cuts are taken in this search process that Williams described as heuristic strategies. An example is availability. When the consumer knows that the information can be obtained easily from accessible external sources, there will be less internal searching.

External Knowledge Search

Traditionally, one reason consumers search for information prior to purchase is to reduce their uncertainty (knowledge or choice) to acceptable levels, with greater uncertainty leading to more extensive searching. Thus, the sources of information hospitality consumers choose to assist in a purchase decision will vary (Barber; Cheney, 2000; Dodd et al; Vogt & Fesenmaier, 1998).

For example, Thomas (2000) noted that individual experiences, rather than symbolic influences, seem to have the stronger impact on wine purchase behavior. Therefore, regardless of context, it is likely that the customer will be his/her most important source based on ready availability and salience. External sources are also likely to be important depending upon the situation (Dodd et al.). Bieger and Laesser found that travelers make extensive use of informal information sources that they consider more trustworthy, such as a friends/family members, or travel agents they have known or used before.

External sources of information include friends/family members, travel agents, and retail sales personnel (personal); or point-of-sale material, wine critics, and magazines (impersonal). These various sources have their advantages. One advantage of personal sources of information, according Kinley, Conrad and Brown (2000), is that they are considered credible sources whose opinions consumers respect. The benefit of impersonal sources of information is they likely have greater expertise than personal sources about the product under consideration.

Whatever the source of information, purchase confidence has been mentioned as an important construct in the selection of an information source, particularly if the level of internal knowledge is low

(Bearden, Hardesty, & Rose, 2001; Evans, Moutinho, & Raaij, 1996; Williams).

Purchase Confidence

Self-confidence has been separated into personal confidence and purchase confidence. Personal confidence relates to a person's ability to feel confident in typical social situations, whereas purchase confidence relates to a consumer's product knowledge and the extent to which he/she feels capable and assured with respect to marketplace decisions and behaviors (Bearden et al.;Veale & Quester, 2007).

As such, purchase confidence reflects consumers' subjective evaluations of their ability to generate positive experiences in the marketplace. Bearden et al. proposed that consumer purchase confidence is a collection of prior market experiences that varies across product categories and can be differentiated among individuals within product categories and purchase situations, thus resulting in different risk-reduction strategies.

Wine purchasers are highly risk-sensitive. Their wine purchase behavior is governed by the dynamics of expectation and risk, and modified by risk-reduction strategies. Risks include functional, social, economic, and psychological aspects of a product purchase (Lee, Zhao, & Ko, 2005; Spawton, 1991). An example of functional risk is the taste of the wine; an economic risk is associated with the value, or price, of the wine and whether the perceived risk was higher when an unfamiliar bottle, grape varietal, or brand of wine was purchased (Olsen, Thompson, & Clarke,). A psychological risk relates to self-confidence in choosing the correct wine. These same strategies were found to be considered by tourists when selecting a destination (Hudson, 1999).

Thus, depending on the level of internal knowledge, the level of purchase confidence, and the importance of the purchase situation, consumers may use different sources of information as risk-reduction strategies.

Purchase Situation

Theory-based research efforts have advanced marketers' understanding of hospitality consumers' purchase behavior, yet enhancement of these theories and methods is needed for a better understanding of hospitality consumption situations (Oh & Parks, 1997). These situations in which consumers find themselves are not always controllable and can strongly affect their purchase decision. In such cases

consumers may not follow their normal process for making a purchase decision.

Studies have examined the social influence of situational factors in consumer behavior, such as gift-giving or personal usage (Oliver & Bearden, 1985), at home or away from home wine usage (Dodd et al.), and selecting a vacation resort (Bieger & Laesser) . Research has also examined situational influence among various product categories, including apparel (Stoltman, Gentry, Anglin, & Burns, 1990), snacks (Gehrt & Shim, 2003), leisure travelers (Bieger & Laesser,; Fodness & Murray, 1999) and wine (Barber; Dodd et al.).

Very few studies, however, have specifically considered the combined effects of situational and individual factors on consumer behavior. Recently, wine studies by Barber; Dodd et al. ; and Olsen et al. have investigated this relationship. Their research specifically analyzed the importance of hospitality product attributes in consumer choice. The number of brands considered, depth of search, and type and sources of information sought are all likely to vary with the consumption situation, suggesting that consumers' intention to purchase depends upon the degree to which they associate the product attributes with their anticipated consumption situation.

Research Hypotheses and Proposed Model

A considerable amount of effort has been devoted to understanding how consumers arrive at a purchase decision. Although broad generalizations can be made regarding choice processes, the ability to predict and understand a consumer's behavior is still weak.

Previous hospitality research demonstrated that information searching is thought to play a decisive part in the decision-making process regarding wine purchase and consumption (Barber; Dodd et al.), leisure travel (Fodness & Murray), and wine purchase (Barber; Cheney; Olsen et al.).

In the study by Dodd et al. a model was adapted from Raju, Lonial, & Mangold (1995) that mapped the experience with a product, the building of consumer knowledge, and the influence of knowledge on sources of information sought (Baseline model). The following research, however, shows that the relationships among these components can be inconsistent:

- Brucks (1985) suggested there is a positive relationship between knowledge and the use of various sources of information.

- Brucks suggested objective knowledge is related to the kind of impersonal information that is often found in advertising and that subjective knowledge is related to using the self and other personal sources when making a decision.
- Park, Mothersbaugh, and Feick (1994) considered and measured general self-confidence ("global self-esteem") as it relates to self-assessed knowledge. They found that general self-confidence had a very weak relationship with self-assessed knowledge and did not connect to the specific assessment of knowing a product.
- Park et al. found a stronger connection between prior experience and subjective knowledge than with objective knowledge, suggesting that consumers believe they know more than they actually do.

It has been recognized that consumer knowledge has a significant impact on consumer decision making, and that both are related to purchase confidence. Purchase confidence, in turn, has an important impact on information searching behavior (Dodd et al).

Figure 1
Hypothesized Model: Modified from Dodd et al. (2005).

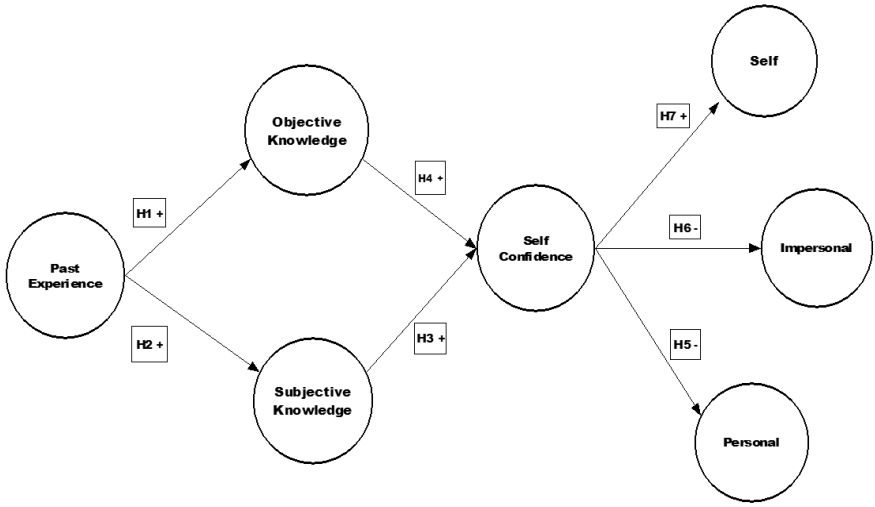


Figure 1 was adapted from the Dodd et al. Baseline model and modified to consider the influence of purchase confidence on the selection of an information source. The following hypotheses were proposed in testing this hypothesized model.

H_1: Prior experience is related positively to objective knowledge.

H_2: Prior experience is related positively to subjective knowledge.
H_3: Subjective knowledge is related positively to purchase confidence.
H_4: Objective knowledge is related positively to purchase confidence.

The study by Dodd et al. also noted several reasons for a negative path between subjective knowledge and personal information sources. First, it is probable that consumers with greater subjective knowledge of a product simply do not feel the need to ask store salespeople or family members for their opinions despite the complexity of the product category. Instead, they feel confident using themselves as sources of existing knowledge. Therefore, the following were proposed:

H_5: Purchase confidence is related negatively to the use of "Personal" sources of information.
H_6: Purchase confidence is related negatively to the use of "Impersonal" sources of information.
H_7: Purchase confidence is related positively to the use of one's "Self" as a source of information.

METHODOLOGY

The Context of the Study

Studies have investigated the importance of consumer product knowledge and search behavior for general consumer products (Mittal, 1988), leisure travelers (Fodness & Murray), and wine (Barber; Dodd et al.; Flynn & Goldsmith, 1999; Spawton). The purchase of wine has been researched primarily because purchasing wine, and information searching have been found to be associated with purchase confidence.

With the wine market changing at such a fast pace, wine producers, restaurants, and retailers could be at great advantage if they had a tool to market their products and services to consumers. Wine is similar to many other hospitality-related consumer products because it is difficult for consumers to know exactly what they are getting just by looking at the product. For example, when planning a ski holiday to Switzerland, viewing only pictures may not give the consumers enough information to determine the destination's true quality (Bieger & Laesser). The same is true for selecting a restaurant, where situational use (Auty, 1992) and past dining experience (Joon-Wuk Kwun & Oh, 2006) are important factors in the selection. Mitra & Reiss (1999) found this to be true for hotels. Often access to the quality and functional performance characteristics of the product, such as the color, texture, taste and aroma of a wine, the comfort of a hotel room bed, or the quality of restaurant meal, cannot be judged without purchasing and using the product.

In these situations, consumer behavior is governed by the dynamics of expectation and uncertainty, relying heavily on sources of information as risk-reduction strategies. These strategies can be internal knowledge, as well as external knowledge from friends and family, or descriptions from sales personnel (Barber; Dodd et al.; Lockshin, 2003). Therefore, wine is an appropriate product category because it provides a variety of consumption situations, thus allowing the testing of distinct situational scenarios while allowing for the examination of the influence that knowledge and purchase confidence play in the purchase-decision process.

Design of the study

The sample for this study, a self-selected, non-probability, judgment sample, was drawn from employees in companies known to the researchers across diverse geographic locations in the United States. With the agreement of the companies, 1,200 URL survey links were randomly distributed by the companies in June 2007,and a total of 602 questionnaires were collected. After data screening, 59 surveys were eliminated because the respondents did not consume wine. The 543 remaining surveys resulted in a 45% response rate.

Measures

Usage experience

Usage experience was assessed by the subjects' self-reported experience with the product category. Two consumption measures were developed based upon the study of wine by Dodd et al. and Flynn and Goldsmith. A general consumer-product study by Dahl, Manchanda, and Argo (2001) consisted of free-response questions concerning how much wine the consumers purchased in a given month, and for how long they had been wine consumers.

Objective knowledge

Modifying the wine studies by Dodd et al. and Flynn and Goldsmith, as well as the consumer products studies by Park et al., researchers asked respondents to answer ten questions, each with four multiple-choice answers from which to choose. The questions ranged in content from styles of grapes to locations of wine regions.

Subjective Knowledge

The instrument construction followed subjective wine-knowledge questions developed in previous wine studies by Barber and Dodd et al., and general consumer- products studies by Park et al. Coefficient alphas of .90, .90, and .91 were reported by Dodd et al., Flynn and Goldsmith, and Park et al., respectively. Four 7-point scale questions were used in this

study. Three were anchored at either end with "strongly agree" and "strongly disagree," and a single item with "not at all knowledgeable" and "very knowledgeable."

Purchase confidence

The purchase confidence construct followed the Bearden et al. study. Coefficient alpha in that study was reported at .89. The four-item, 7-point statements, each anchored with "strongly disagree" and "strongly agree," were modified towards wine as a product.

Sources of information

Following the wine purchase study by Dodd et al., this construct measured respondents by asking them five 7-point scale items, anchored with "not very important" and "very important." The indicator variables to support the sources of information constructs were: two personal sources of information (recommendations from a retail clerk and a friend/family member), two impersonal sources of information (recommendations provided by wine critics, and published material), and information stored in memory.

The purchase-confidence variable was categorized as "high purchase confidence," "neutral," or "low purchase confidence," with 163 (30%) reporting low purchase confidence, 149 (28%) neutral, and 231 (42%) reporting high purchase confidence. The subjective knowledge variable was categorized as "high subjective knowledge," "some subjective knowledge," and "low subjective knowledge," with 133 (24%) reporting low subjective knowledge, 129 (24%) some subjective knowledge, and 281 (52%) high subjective knowledge. These two new variables were based on the mean for the characteristics evaluated and one standard deviation from the mean (Barber; Bearden et al.).

To gain information about the data collection process and identify problems with regard to the questionnaire, the researchers conducted a pilot study during the first week of June, 2007. The primary purposes were to determine whether the instrument could be clearly understood by respondents and to ensure its reliability. For the pilot test, a web link to the instrument was e-mailed to 25 individuals in Lubbock, Texas; Boston, Massachusetts; Charlotte, North Carolina; and West Lafayette, Indiana.

Using Cronbach's alpha coefficients for the item scales and *Kuder Richardson Formula 20 (KR – 20)* for the objective questions, all reported above .70, with the exception of objective knowledge (K - R 20 = .58). The calculation on objective knowledge was below the minimum

recommendation for reliability. However, the result was similar to work published by Sapp (1991), KR-20= .61. An analysis of the pilot respondents' demographics did not reveal any unusual characteristics that would require modification of the survey.

Data Analysis

Statistical analysis was computed using the Windows versions of *Statistical Package for the Social Sciences* (SPSS 15.0) and *AMOS* (*Analysis of Moment Structures*, release 7.0/SPSS 15.0). The underlying structures of the seven constructs, objective and subjective product knowledge, purchase confidence, and sources of information were not separately tested because the measures of these constructs were composed of items from several scales purporting to measure these constructs with reliabilities all in excess of .75 (Dodd et al.; Bearden et al.; Park et al.). Therefore, since these measures had been developed and tested elsewhere, they were examined in a confirmatory factor analysis. This study used purchasing wine as a gift for model testing.

Structural Equation Modeling

The testing centered on two basic concepts: validating the measurement model, then testing, fitting, and modifying the structural model. The first was achieved through confirmatory factor analysis and the latter completed through path analysis (Tabachnick & Fidell, 2001). As suggested by Tabachnick and Fidell, construct items were restricted to their respective factors but allowed to correlate with the other constructs. In the cases where the construct was measured by a summate (objective knowledge) or single items (personal, impersonal, self, and expenditures), no measurement error was assumed.

Three models were tested. First, the model used by Dodd et al. that established the theoretical baseline. This model reflects only the direct effects of objective and subjective knowledge on sources of information.

Second, the Hypothesized model in Figure 1 tested the hypotheses set out in this research study. The Hypothesized model assumed no direct effects of the objective and subjective knowledge constructs to sources of information, but rather presented purchase confidence as a mediating variable. The final model tested was the Nested model that combined the prior two models. This was analyzed to determine whether purchase confidence influenced consumers' selection when making a purchase decision.

RESULTS

Descriptive statistics

Forty-five percent of the respondents were male (n=242) and 55% were female (n=301). The average age of respondents was 41 years. Respondents had high levels of education, with 80% of the sample having earned graduate college degrees. Fifty-four percent of the respondents had annual household income above $75,000. Overall, the socio-demographic background of all respondents (middle-aged, educated, higher income) mirrored the profile of wine consumers in general (Motto Kryla Fisher, 2000), and was similar to data collected in surveys conducted by Barber, and Kolyesnikova (2006).

The average number of years the respondents had been consuming wine was 18.9, with the average number of bottles (750 ml) purchased per respondent 6.5 per month. Forty-eight percent of respondents reported they purchased wine at retail stores, followed by restaurants (25%), grocery stores (15%), and wineries (11%).

Respondents reported moderate levels of subjective knowledge (M=3.9, SD = 1.0), which result was supported by their low score on the objective questions (overall mean 66% correct); this indicated that they considered themselves somewhat knowledgeable about wine. Those respondents with high purchase confidence (81%) answered the objective questions significantly better than those with low purchase confidence (64%), $t(355) = 3.11$, $p = .01$. Those respondents with high purchase confidence (M = 4.2, SD = 1.2) were significantly more likely $t(355) = 3.17$, $p < .02$ than low purchase confidence respondents (M = 3.0, SD = 1.4) to feel very knowledgeable about wine. This was expected considering their high score on the objective knowledge questions.

Data Reduction

A confirmatory factor analysis was performed to identify whether the measurement items reliably reflected the a priori latent constructs of past experience, objective and subjective knowledge, purchase confidence, and the three sources of information (Dodd & Gustafson, 1997); Ryu & Jang, 2007).

All the factor loading scores were above .70, indicating acceptable internal consistency. The individual item reliabilities (squared multiple correlations) ranged from .58 to .85, indicating an acceptable level of reliability (Hair, Anderson, Tatham, & Black, 1998).

Cronbach's alpha was used to test internal consistency and ranged from .70 to .90, indicating acceptable internal consistency. In summary, the measurement of the specified model showed good evidence of reliability and validity for the operationalization of the latent constructs.

Baseline Model

Based upon the model-fit-indices ($\chi^2/df = 5.4$, GFI = .89, CFI = .89 and RMSEA = .09), the model provided a reasonable fit to the data.

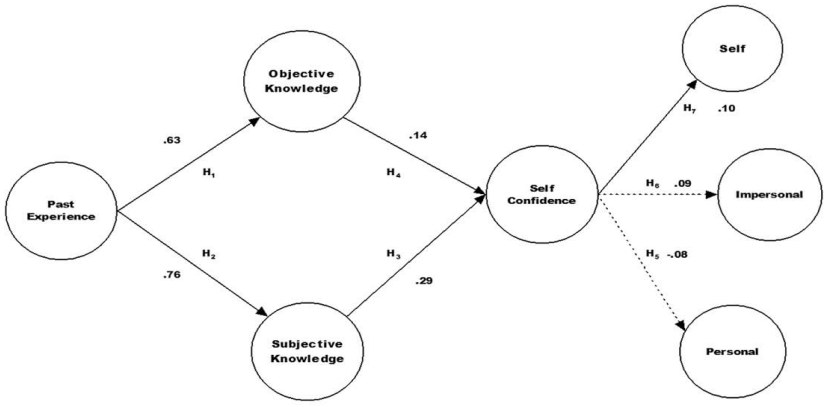
The results revealed causal relations between consumers' past experience with wine and their objective and subjective knowledge, suggesting that more usage experience directly enhances subjective knowledge ($\beta = .76$, $p < .01$) and objective knowledge ($\beta = .63$, $p < .01$), with the strongest relationship being subjective knowledge. These findings supported the results of studies by Raju et al. and Dodd et al.

Subjective knowledge related positively with the sources of information "Impersonal" ($\beta = .31$, $p < .01$) and "Self" ($\beta = .19$, $p < .01$), and from objective knowledge to "Impersonal" ($\beta = .19$, $p = .04$). These results supported the previous research study by Dodd et al.; however, the results of this study were much stronger in the causal relations reported.

The Hypothesized Model

Based upon the model-fit-indices ($\chi^2/df = 4.59$, GFI = .91, CFI = .91 and RMSEA = .08), the Hypothesized model fit the data well (Figure 2). Dotted lines indicate non-statistically significant paths, and solid lines show significant paths.

Figure 2
Hypothesized Model Showing Standardized Path Estimates.



As shown in Table 1 and Figure 2, the results revealed causal relations between consumers' past experience with wine and their objective and subjective knowledge; the strongest relationship was with subjective knowledge ($\beta = .76$, $p < .01$), supporting Hypotheses one and two, and the results in studies by Raju et al. and Dodd et al.

Table 1
Hypothesized model:
standardized coefficients and p-values (n=543)

Hypothesized Path	Standardized Coefficients Path	P-Value	Hypothesis
Purchase confidence -→ Oneself	.10*	.03	H_7: Supported
Purchase confidence -→ Impersonal	.09	.07	H_6: Not supported
Purchase confidence -→ Personal	-.08	.16	H_5: Not supported
Objective -→ Purchase confidence	.14**	.00	H_4: Supported
Subjective-→ Purchase confidence	.29**	.01	H_3: Supported
Past experience -→ Subjective knowledge	.76**	.00	H_2: Supported
Past experience -→ Objective knowledge	.63**	.00	H_1: Supported

Overall Goodness-of-Fit Comparisons for the Specified Model

Model	χ^2	*df*	χ^2 Ratio	p	GFI	AGFI	NFI	CFI
Hypothesized Model	454.023	99	4.586	.00	.91	.87	.89	.91

Note: GFI = Goodness-of-fit index; AGFI = Adjusted goodness-of-fit index; NFI = Normed fit index; CFI = Comparative fit index; RMSEA = Root mean square error of approximation. *$p < .05$. ** $p < .01$.

Both objective and subjective knowledge were significant predictors of a customer's purchase confidence. A significant influential coefficient on purchase confidence, albeit more so than objective knowledge, was subjective knowledge ($\beta = .29$, $p < .01$), supporting Hypothesis three. This result indicated that subjective knowledge is a stronger predictor of purchase confidence than objective knowledge. The results showed that objective knowledge influenced a consumer's level of purchase confidence positively ($\beta = .14$, $p < .01$), supporting Hypothesis four.

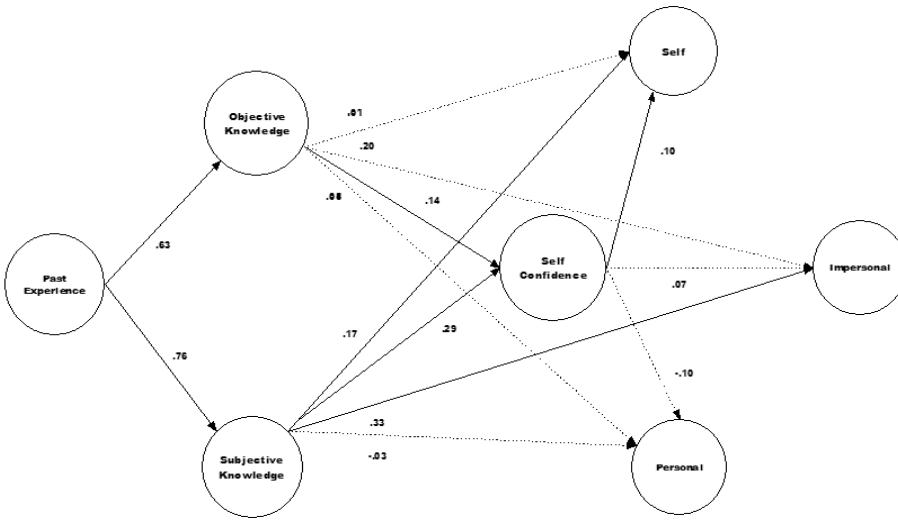
Hypothesis seven was supported ($\beta = .10$, $p < .03$), indicating that purchase confidence influences the reliance on oneself as a source of

information. In the Hypothesized model, more usage experience has an indirect effect of increasing a consumer's purchase confidence (β = .31, p < .01) and an indirect effect on using "Self" as a source of information (β = .41, p < .01).

Nested Model

The purpose of this research study was to determine the influencing effect, if any, of purchase confidence as a construct, and the resulting strength of predicting the influence of purchase confidence on information sought during purchase situations.

Figure 3
Nested Model Showing Standardized Path Estimates



This model (Figure 3) represents the Nesting of both the Hypothesized and Baseline models and thus is considered a saturated model. The results of the standardized parameter estimates and significance values are shown at the top of Table 2. Based upon the model-fit-indices (χ^2/df = 4.27, GFI - .92, CFI = .93 and RMSEA = .07), the data fit well to the model.

The only direct, significant paths from subjective knowledge to the sources of information were to "Impersonal" (β = .33, p<= .01) and to "Self" (β = .17, p < .01). There were no significant, direct paths from objective knowledge to sources of information, which finding was different than reported in the baseline model, where a significant result was found from objective knowledge to the "Impersonal" source of

information. Interestingly, as in the other two models tested above, there were significant direct paths from subjective knowledge (β = .29, p < .01) and objective knowledge (β = .14, p <= .01) to the purchase confidence construct; and a significant path from purchase confidence to the "Self" source of information (β = .10, p < .02).

Table 2
Partial mediating model: standardized coefficients and p-values (n=543)

Hypothesized Path	Standardized Coefficients Path	P-Value
Objective -→ Oneself	.01	.81
Objective -→ Impersonal	.20	.72
Objective -→ Personal	.05	.45
Subjective -→ Oneself	.17**	.00
Subjective -→ Impersonal	.33**	.00
Subjective -→ Personal	- .03	.42
Purchase confidence -→ Oneself	.10*	.02
Purchase confidence -→ Impersonal	.07	.33
Purchase confidence -→ Personal	- .10	.14
Subjective -→ Purchase confidence	.29**	.00
Objective -→ Purchase confidence	.14**	.00
Past experience -→ Objective knowledge	.63**	.00
Past experience -→ Subjective knowledge	.76**	.00

Overall Goodness-of-Fit Comparisons for the Partial Mediated Model

Model	χ^2	*df*	χ^2 Ratio	*p*	GFI	AGFI	NFI	CFI
Partial Mediated Model	393.67	93	4.23	.00	.92	.88	.90	.93

Note: GFI = Goodness-of-fit index; AGFI = Adjusted goodness-of-fit index; NFI = Normed fit index; CFI = Comparative fit index; RMSEA = Root mean square error of approximation. * = p < .05. ** = p < .01.

There is an indirect effect of subjective knowledge on the source of information "Self" through purchase confidence of .03 (.29 * .10). This indicates that although subjective knowledge has a direct effect on purchase confidence of .29, only part of this effect (.10) is transmitted to the "Self" variable.

The total effect of subjective knowledge on "Self" is .20 (.17 + .03), suggesting that increasing a consumer's subjective knowledge by one standard deviation increases the selection of "Self" as a source of information by this amount (.20). The situation for objective knowledge is very similar but not as strong as subjective knowledge, with an indirect

effect of .01 (.14 * .10), and a shrinking of the effect from objective knowledge to "Self", indicating that purchase confidence also mediates objective knowledge, but to a lesser extent.

DISCUSSION

The purpose of the study was to investigate the role that purchase confidence plays with knowledge in the selection of sources of information. Hypotheses one and two were supported with strong positive, causal relationships reported between prior experience and knowledge constructs, particularly subjective knowledge. The implication here is that what wine consumers believe they know about a product is more closely associated with their experiences than with what they actually know about the product. This supports previous research on wine purchasing (Dodd et al.), leisure travelers (Fodness & Murray), and electronic consumer goods (Park et al.) that has shown the relationship between usage experience and objective knowledge is not as strong as the relationship with subjective knowledge

Hypotheses three and four were supported with strong causal relations between objective and subjective knowledge and purchase confidence, with subjective knowledge having a stronger relationship. Interestingly, those respondents with high purchase confidence also reported higher levels of subjective and objective knowledge. Olsen et al. found similar results in their study of wine purchases. However, Park and Lessig, and Raju et al. admitted that both subjective and objective knowledge measures are valid; however, they suggested that subjective measures are better measures of consumer strategies.

Finally, Hypothesis seven reflected the only positive and significant relationship between purchase confidence and "Self" as a source of information. This result was expected, given that higher levels of purchase confidence should lead to consumers using themselves as trusted sources of information when making the wine purchase decision, rather than using an external source, such as a retail clerk, magazine, or newspaper advertisement. This result is similar to the study by Dodd et al. Testing the Nested model resulted in strong, direct, significant paths from subjective knowledge to "Self" and "Impersonal" sources of information, results similar to the research of Dodd et al. Objective knowledge did not report any significant direct paths. Consumers with higher levels of subjective knowledge rely on themselves or on published materials, such as magazines or newspaper articles, to make wine choices. This may be the result of how confident they feel about the purchase decision-process because, in part, of the belief in their self-assessed knowledge.

When considering the direct paths from purchase confidence, only one significant path to "Self" as an information source was reported. There was an indirect, yet small, effect of subjective knowledge on the source of information "Self" through purchase confidence.

This finding suggests that although subjective knowledge has a significant direct effect on purchase confidence, only a portion is transmitted to the "Self" variable. The result of this partial effect suggests that "Self" is expected to increase by only .03 standard deviations for every increase in subjective knowledge of one full, standard deviation via its prior effect on purchase confidence. Therefore, with this result and the shrinking of the effect from subjective knowledge to "Self", it appears that purchase confidence does in fact influence subjective knowledge on the selection of "Self" as a source of information.

HOSPITALITY IMPLICATIONS

The major contribution of this research is to highlight the role of purchase confidence in decision-making research. The current study provides hospitality marketing professionals with new insights into developing better communication strategies. They need to be aware that customers' purchasing decisions may be driven not only by product knowledge and product characteristics, but also by less obvious factors, such as purchase confidence and the purchase situation.

For example, does uncertainty about selecting a honeymoon resort impact whether consumers use family/friends or rely on an expert, such as a travel agency, as a source of information when selecting the destination? Or is consumers' level of purchase confidence high enough to induce them to rely on themselves or published material? This understanding will lead hospitality providers to a more critical look at marketing strategies aimed at establishing relationships and re-think their communication strategies toward hospitality consumers.

It is apparent from this study that respondents avoid interaction with personal sources of information. In fact, with higher levels of purchase confidence, the use of these sources of information declined. This does not bode well for direct sales individuals, such as retail wine store clerks or event planners. One possible method to address this could be through staff engagement of consumers in open discussion, creating an environment wherein it is acceptable to ask questions and exchange ideas and comments about their need for the product.

For example, when purchasing wine, rather than the one answer question of "Do you need any help?" an employee in a winery, retail

store, or restaurant may use a conversation starter such as "What is this wine purchase for?" This approach may allow staff to focus the consumer on new releases and specials while developing a rapport that could lead to long-term relationships and possibly increased sales.

Another example would involve hotel event planners. They could be trained to assess a potential customer's level of confidence (uncertainty) in scheduling an important business meeting or conference. This assessment could lead to suggesting an alternative source of information, such as a prior event attendee (personal source).

LIMITATIONS AND FUTURE RESEARCH

One limitation is the sampling method. The sample was a non-probabilistic sample from geographically diverse groups known to the researchers. Although the individuals were independently and randomly selected from each group, the results of this research may not be generalized to the entire population.

A suggestion for future research would be to test the hypothesized model when consumers are choosing other hospitality services and products, such as a vacation resort or travel destination. An example of this application would be the source of information a couple would seek for a resort on their honeymoon. The selection of an information source to use for this decision may be affected by the couple's level of purchase confidence on making the right choice, regardless of their level of past experience or knowledge about the resort or its location. Another possible research topic would be to use this model comparing males to females to determine what influence, if any, purchase confidence plays in the selection of a source of information.

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Demographic, Behavioral and Perceptual Comparisons of U.S. Visitor Experiences with Group Package Tours and Free Independent Travel to China

By Mark A. Bonn, Howook "Sean" Chang, Jerome Agrusa, Leslie Furr, Woo Gon Kim and Hae Young Lee

U.S. visitor demand for the China travel experience is anticipated to rise significantly through 2105, causing the Chinese government to employ 100 million service providers over the next six years and raising concern about service delivery and perceptions of the on-site China experience. In an effort to better understand these issues concerning U.S. visitors, this study investigated two specific types of U.S. travelers to China: Group Package Tour (GPT) visitors and Free Independent Travel (FIT) visitors. Results indicated that GPT visitors were more likely to be older and have higher household income than FIT visitors. Four trip-related characteristics of GPT and FIT visitors were found to be significantly different, with GPT visitors showing higher levels of satisfaction with the overall China on-site travel experience.

INTRODUCTION

As the U.S. dollar weakened considerably against much of the world's currency during 2006 and 2007, it might have been expected that Americans would cut back on overseas travel. During this same time, the U.S. dollar lost 11% against the Euro and registered an 8.2% decline against an index of global currencies. However, according to a 2007 report by the Office of Travel and Tourism Industries of the U.S. Department of Commerce, the number of U.S. residents who traveled abroad reached record levels: 64 million person trips. Travel expenditures by U.S. residents traveling abroad also set a record high during 2007 at US$104.7 billion, up by 5% percent from 2006 (U.S. Department of Commerce, 2008). A closer look at American's top 20 international destinations reveals a diverse and geographically widespread selection of destinations. Specifically, countries in the Far East appear to be rising as destinations of choice for U.S. residents. The most popular destination in this region is the People's Republic of China (PRC), which now has achieved a top-10 ranking, moving up from the 16th position since 2000. This performance represents an increase of over 100% more U.S. visitors over eight years (2000-2007), as shown in Table 1.

Table 1
Historical U.S. resident visits to China (in thousands)

Year	Visitors	Change (%)
2000	644	-
2001	682	6%
2002	725	6%
2003	**562**	**-22%**
2004	1,067	90%
2005	1,295	21%
2006	1,327	2%
2007	1,374	4%

According to the Office of Travel and Tourism Industries, 1,374,000 U.S. residents visited China in 2007, a 4% increase from a year earlier, and a 100% increase over 2000, when there were only 644,000 U.S. visitor trips. As shown in Table 1, the number of U.S. residents visiting China has continued to increase for the last 8 years except in 2003, when SARS broke out in China. Additionally, U.S. travel spending in China has also jumped 35% during the same period, recording $3.3 billion in expenditures in 2007 (U.S. Department of Commerce).

At the same time, China welcomed 54.7 million inbound travelers in 2007, a 10% increase from that of 2006 (World Trade Organization [WTO], 2008), making China the fourth-ranked nation for inbound travelers, following France, Spain, and the United States. Baedeker (2007) illustrated that visitors from the United States appeared to be a fundamental component of China's increased growth in tourism. Zhang, Pine, and Zhang (2000) attributed this growth to Deng Xiaoping's government's initiating tourism development in China in 1986. China grasped the fact that the tourism industry could be strategically developed as a potential source for obtaining outside currencies. During this period, the development of the Chinese tourism industry was expedited by Deng's encouragement of economic impact through tourism, which resulted in hosting the 2008 summer Olympic games (Zhang, Pine, & Zhang). As a result of the 1986 tourism development initiative, China's national economy has grown at an average rate of 10%, as measured by its Gross Domestic Product (GDP) per year from 1986 to 1997 (Lewis, 2003). On November 11, 2000, China became a World Trade Organization (WTO) member (Zhang & Wu, 2004). As a result, China opened its doors to international investors, and travel became much

easier. Fewer political barriers were placed upon inbound visitors to China compared to past years. Additionally, the Chinese government encouraged international investors to engage in joint ventures with Chinese nationals (Qiu & Lam, 2004). These are the primary factors contributing to China's growth as a preferred international destination. Hence, the WTO predicts that China will be the most visited nation in the world by 2020. Thus, the Chinese government recently announced its intent to employ a total of 100 million service providers for China's tourism industry over the next six years ("China to Boost," 2008). This major initiative involving many new service providers for China's tourism industry suggests that issues related to homogeneity of service and visitor satisfaction may impact visitors to China.

Although the number of U.S. travelers to China is increasing, there is a dearth of research illustrating the travel perceptions and experiences of American outbound travelers to China.

RESEARCH QUESTIONS

This paper explores travel perceptions pertaining to two specific classifications of U. S. international travelers to China: Group Package Tour (GPT) travelers and Free Independent Travelers (FIT). The well-documented, growing popularity China now holds as a travel destination raises several interesting research questions. First, within what structure are U.S. visitors to China traveling? Are they traveling with other groups of U.S. travelers or as individual travelers? Second, does their travel structure affect their perceptions of the service delivery experience? Third, do U.S. visitors to China traveling as GPT or FIT visitors experience the same levels of trip satisfaction? Fourth, do GPT and FIT overall trip-satisfaction experiences differ, and if they do, to what can these differences be attributed?

The Group Package Tour (GPT)

Outbound travel can be essentially classified into two types of travel modes: the Group Package Tour (GPT), also referred to as the Group Inclusive Tour (GIT), and the Free Independent Traveler (FIT), also referred to as the Independent Traveler (IT) (Kotler, 2007; Wang et al., 2000).

Mak (2004) defined the Group Package Tour (GPT) as an all-inclusive package tour with a specified minimum size and as a group or groups traveling on scheduled ground and air transportation. The GPT combines elements of a pleasure trip, such as air and ground transportation, baggage handling, accommodations, sightseeing, meals

and other items, into a single product that is then sold to the consumer at a single price. GPT's are generally put together by tour operators and tour wholesalers, who purchase the components from their suppliers, such as airlines, motor coach companies, hotels, restaurants, and related companies. GPT products were originally created for travelers in order to provide them with a convenient way to purchase travel-related services. GPT companies maintain a volume-pricing advantage and in many cases have access and priority to destinations otherwise difficult and expensive to visit, despite advantages offered through the Internet.

Through volume, GPT companies gain contracting power with suppliers as frequent buyers of their products and services. GPT companies maintain influence over entities such as tourism boards, hotel associations, attractions, famous foodservice establishments, and other travel-related components. Because of this competitive advantage, GPT companies represent a large segment of the travel market to many international governments (Mak). Tours include a tour escort who travels with the group and coordinates all meals, sightseeing, entertainment, and accommodations. GPT companies offer special interest tours often associated with outdoor adventure activities, eco-tourism, gourmet-oriented experiences and themed cruises that involve day visits to exotic cultural destinations.

Research documented that travel mode (structure) is affected by unfamiliar environments, diverse languages, and complex societies. In these situations, visitors are more likely to choose group package tours when they travel to such destinations (Li, 2000). Additionally, when traveling to unfamiliar environments, GPT's can create feelings of security when group members experience the strangeness of unfamiliar cultures. Recent research supports the notion that GPT's are generally more popular among travelers on overseas pleasure trips (Mak). During 2001, 17% of Americans traveling abroad on pleasure trips did so through GPT's. Similarly, 27% of foreign tourists visiting the United States did so by purchasing GPT's. In fact, the package tour is one of the most popular modes of outbound travel in Asian countries (Prideaux, 1998; Tsaur & Wang; Wang et al., 2000). For example, two-thirds of Japanese outbound travelers in 1998 were on prepaid package tours to international destinations (Mak). In the U.S. travel industry, the group package tour accounted for 13% of overseas travelers in 2007, down 2% from 2006 (U.S. Department of Commerce, 2008). The personal computer/Internet may be partially contributing to this gradual decline in purchasing prepackaged tours. The Internet continues to grow as an important source of information for international trip planning,

surpassing the use of travel agents as the top information source for U.S. overseas travel in 2007. Travel agents (35%) continue to be the primary means of booking U.S. international pleasure travel vs. on-line Internet bookings (32%), although this gap has been continually narrowing since 2006.

Free Independent Travel (FIT)

With general public access to the Internet, the world travel market has undergone significant changes since 1997. It has become easier to plan for leisure/pleasure travel through Free Independent Travel (FIT). Through the Internet, FIT's in increasing numbers have been purchasing airlines tickets, rental cars, and hotel rooms directly from suppliers for the past ten years. As a consequence, FIT leisure travelers no longer rely upon travel agents or tour operators to buy travel packages (Kotler, Bowen, & Makens, 2003).

FIT is considered to represent a customized trip. The FIT segment customizes trips by gathering pre-trip information from friends, performing on-line searches, communicating with specialty providers, and trying other methods. FIT's are described as individuals over 35 years of age with above-average income who like to travel on their own. They tend to travel in smaller groups or in couples and avoid mass tourism and the holiday packages offered by travel wholesalers. In addition, they prefer an individualistic approach to travel and tend to pass on their tour experiences, ideas, and knowledge to others ("Free Independent Traveler," 2008).

Demographic Profiles of GPT and FIT

According to the China National Tourist Office, 1,710,292 U.S. nationals visited China in 2006. This figure differs from information reported by the U.S. Department of Commerce because the U.S. Department of Commerce figure represents only U.S. residents traveling to China, while the China National Tourist Office counts all U.S. nationals arriving in China from the United States and all other destinations. As shown in Table 2, China National Tourist Office statistics indicate that U.S. travelers of 25 to 64 years of age account for more than three-quarters of U.S. travelers to China (78%). The number of U.S. male travelers (1,123,217) is more than double the number of female travelers (587,075) to China.

Table 2
Demographic profiles of U.S. travelers to China

Year 2006	Number of Travelers	Percent
Total U.S. Travelers	1,710,292	100%
Age		
Under 14	113,598	7%
15-24	108,632	6%
25-44	564,511	33%
45-64	768,117	45%
Over 65	155,434	9%
Gender		
Male	1,123,217	66%
	587,075	34%
Trip Purpose		
Meeting/Business	454,707	27%
Leisure/Sightseeing	983,750	58%
Visiting Relatives & Friends	22,444	1%
Worker & Crew	72,818	4%
Others	176,573	10%

Classifying tourists based on personal traits and characteristics has been found useful to understanding travelers' behavior. Alvarez and Asugman (2006) identified *risk taking, attitude to tourism as a new experience, variety seeking, and attitude towards planning beforehand* as factors influencing mode of travel between group package and free independent tours. These researchers classified travelers into two distinct groups entitled "Spontaneous Explorers" and "Risk-Averse Planners" (Alvarez & Asugman). Their study found that female travelers were more likely to travel via package tours because they were "Risk-Averse Planners." On the contrary, "Spontaneous Explorers," considered free independent travelers, were less likely to be concerned with risk, and more likely to exhibit a degree of involvement and exploratory tourism behavior (Alvarez & Asugman). As well, the study documented that elderly people tend more often to visit attractive destinations with tour groups (Li). Thus, gender and age are demographic profiles historically used to distinguish GPT from FIT. Personal traits also can determine the appropriate products and communication strategies used to address various segments. In another research study, Wickens (2002) found that "Security" and "Familiarity" are determinants individuals use to select pre-paid holiday package tours. Furthermore, the technique of visitor segmentation can greatly assist destinations to better manage their resources and design policies.

Study Hypotheses and the Research Strategy

A series of research hypotheses was developed to meet the objectives for this study. They were based upon current international trends in travel to China, the recognized need for China to employ over 100 million new service providers during the next several years (up to 2015), and recent literature addressing significant differences in perceptions, demographics, and behaviors of international visitors traveling with groups (GPT) and with individuals (FIT).

H1: There are significant differences with regard to the demographic profiles of U.S. GPT and FIT travelers to China.
H2: There are significant differences in trip-related characteristics between U.S. GPT and FIT travelers to China.
H3: There are significant differences between U.S. GPT and FIT traveler perceptions pertaining to behavioral issues related to the China visitation experience.

Methods: The Study Sample

The sample frame for this study was developed from a list of U.S. residents who purchased airline tickets or escorted group tours to China during a two-year period. The list was obtained from a U.S.-based travel agency that books and sells individual airline tickets to China and provides escorted group tours to China marketed specifically to U.S. citizens. A total of 300 names/addresses was selected at random (using a random numbers table) from a list of 1,255 names. Questionnaires were mailed out via first class U.S. mail. First-class postage-paid, self-addressed envelopes were provided. Using no incentives and only a one-time mailing, a total of 198 questionnaires was returned within three (3) weeks that had been completed by U.S. citizens who had visited China during the previous two years. Nine questionnaires were discarded because they were returned as undeliverable. A total of 189 usable surveys was obtained from this method, resulting in a 63% usable return rate. A non-response bias check was conducted using 20 randomly selected non-respondents from the list of the 102 overall non-respondents. A brief travel survey was developed to compare selected demographics of respondents with non-respondents. After two weeks, a total of 12 responses, or 60%, of the 20 randomly selected non-respondents was obtained. No demographic differences were found between the original list of 189 respondents and the 12 responses received from the non-response bias check.

The Survey Instrument

In this study, twenty-four items were examined that measured attitudinal and behavioral characteristics of U.S. tourists (GPT and FIT) who had visited China during the two years previous to the study's mail-out survey process. The items chosen addressed visitor motivation, attitude and behavior and have been widely used in the international travel literature (Jang & Cai, 2002; Kim, Lee, & Klenosky, 2003; Kim & Prideaux, 2005; Kozak, 2002; Tyrrell, Countryman, Hong, & Cai, 2001; Uysal & Hagan, 1993; Yuan & McDonnald, 1990; Bonn, Furr, & Dai, 2006). A 10-point rating scale (1=*Least Important,* and 10= *Most Important)* was applied to quantify the responses to the items. Overall level of satisfaction was measured with a 10-point rating scale (1=*Poor,* and 10= '*Excellent'*). Additional questions of value included, but were not limited to, items such as specific purposes of the trip; primary on-line and off-line information source used in the pre-planning process; accommodation type(s) used during the trip; spending behavior; party size; length of stay; intent to revisit; and demographics, such as gender, marital status, and educational level.

Questionnaires for the respondents were written in English. To insure clarity and avoid ambiguity, the researchers pilot tested the questionnaire on 20 U.S. tourists who had previously traveled to China. A few items were edited prior to data collection. Participation in this study was completely voluntary. Respondents were assured of absolute confidentiality.

In order to investigate whether there were statistically significant levels of association between selected socio-demographic characteristics and tour-related or preference variables, the chi-square tests were applied. A series of t-tests was conducted in order to identify attitudinal and behavioral differences. Factor analysis was used to identify important dimensions of the China travel experience. Regression analysis was used to compare the effects of each dimension.

Analysis

Data analysis was performed in four steps. First, a chi-square analysis was conducted to understand the differences in demographics between the GPT visitor group and the FIT visitor group. Second, a chi-square test was also employed to investigate the differences for the primary purpose of the trip, information sought through Internet use, and activities sought between the two groups. Additionally, independent *t*-tests were used to examine group differences in terms of trip-related

characteristics, such as travel frequency and overall satisfaction level. Third, a factor analysis was performed to examine the underlying structure of the measurement of U.S. travelers' perceptions of overall trip satisfaction with their China experience. Finally, a multiple regression analysis was employed to estimate the association between perceived quality and satisfaction. The Chow test (1960) was subsequently performed to determine whether the independent variables impacted the subgroups (GPT and FIT) in different ways. In this case the Chow test (which is an application of an F statistics test) was performed based on the residual sum of squares (RSS) from the two subgroups (GPT and FIT). A statistically significant Chow test suggests there are one or more differences between independent variables across the two traveler subgroups (Hardy, 1993). Unfortunately, as Schmidt (2005) indicated, this test does not tell about the causal nature of those differences.

Results

The demographic profiles of the respondents are reported in Table 3. Of the 189 travelers who responded, 108 (57.1%) were GPT travelers and 81 (42.9%) were FIT travelers. The χ^2 tests confirmed that the two travel groups differed in age ($\chi^2 = 34.11$, $p = .00$), and income ($\chi^2 = 10.83$, $p = .06$). Results also validated the fact that GPT visitors represented older travelers, with 57% of the group being 50 years of age or older. The largest age group of GPT travelers (35.2%) was 60 years and older. GPT travelers between the ages of 50-59 represented 22.2% of this group. The youngest group of GPT travelers (ages 18-29) accounted for 16.7%. The FIT visitors, in contrast, represented a much younger age of travelers. Over 83% of those respondents were identified as 49 years of age or less. FIT visitors within 30-39 years of age (30.9%) and 18-29 years of age (29.6%) accounted for the two largest age-group percentages. FIT visitors 40-49 years of age accounted for 23.5% of all FIT survey participants. Over 40% of GPT participants indicated that their household income was more than $75,000. FIT travelers indicated that their household income varied from $20,000 to $75,000, or more. GPT travelers were significantly more likely to be older and to have higher household income than FIT travelers. However, there were no statistically significant differences in gender and education between GPT and FIT. Thus hypothesis H1 was partially accepted.

Table 3
Demographic profiles & primary purpose of visit of respondents

Variable	Travel type		χ^2	*p*
	GPT(n=108)	FIT(n=81)		
Gender				
Male	39 (36.1%)	35 (43.2%)	0.98	.32
Female	69 (63.9%)	46 (56.8%)		
Age				
18-29	18 (16.7%)	24 (29.6%)		
30-39	13 (12.0%)	25 (30.9%)	34.11	.00
40-49	15 (13.9%)	19 (23.5%)		
50-59	24 (22.2%)	6 (7.4%)		
Over 60	38 (35.2%)	7 (8.6%)		
Education				
High school	9 (8.3%)	6 (7.4%)		
Some college	21 (19.4%)	17 (21.0%)	0.81	.85
College graduate	47 (43.5%)	39 (48.1%)		
Post graduate	31 (28.7%)	19 (23.5%)		
Household income				
Under 20,000	7 (6.5%)	5 (6.2%)		
20,000-29,000	8 (7.4%)	12 (14.8%)	10.83	.06
30,000-39,000	26 (24.1%)	24 (29.6%)		
40,000-49,000	17 (15.7%)	13 (16.0%)		
75,000 or more	45 (41.7%)	18 (22.2%)		

Table 4 shows the results of chi-square tests conducted on trip purpose, Internet usage, and motivation variables. Independent *t*-tests were conducted on the behavioral variables. Seven trip-related characteristics between GPT and FIT travelers were significantly different at the 95% level of confidence with +/- 0.05 error. The primary trip purpose for GPT travelers to China was leisure/vacation (93%). On the contrary, FIT travelers indicated a variety of purposes for their trips to China. FIT respondents indicated visiting family, friends, and relatives (40%); leisure/vacation (39%); and business (20%) as primary travel purposes. FIT travelers were identified as more likely to acquire trip information about price through Internet searching (60%) than were GPT travelers (40%). GPT travelers sought more cultural and historical experiences during their China visit, while FIT travelers experienced more activities associated with local foods and shopping. On average, GPT group size was much larger, at 16.78 people, than FIT group size (2.83). This difference was found to be significant at the 0.000 level. FIT travelers were considered to travel more frequently to China and to have had more extensive international travel experience over the previous five years. By contrast, GPT travelers demonstrated higher levels of

satisfaction towards China and tended to travel with larger numbers of individuals than did those responding FIT travelers. Thus hypothesis H2 was accepted.

Table 4
Comparison of trip-related characteristics and satisfaction level

Variable	Travel type		χ^2	*p*
	GPT(n=108)	FIT(n=81)		
Primary Purpose				
Leisure/Vacation	100 (93%)	33 (39%)	63.83	.000
Convention/Meeting	2 (2%)	1 (1%)		
Business	2 (2%)	17 (20%)		
Visit Friends/Relatives	4 (4%)	34 (40%)		
Acquire Price Information through Internet				
None	59 (60%)	33 (40%)	8.89	.031
Rarely	5 (5%)	11 (13%)		
Sometimes	20 (20%)	18 (22%)		
Frequently	15 (15%)	20 (24%)		
Motivation Variables for Travel to China				
Culture	41 (38%)	26 (32%)	64.432	.011
Food	5 (5%)	17 (21%)		
History	58 (54%)	13 (16%)		
Shopping	4 (4%)	2 (2%)		
Business	0	5 (6%)		
Family	0	18 (22%)		
Variables	GPT(n=108)	FIT(n=81)	*t*-value	*p*
A number of persons in travel party	16.78	2.83	8.016	.000
Trip frequency				
Frequency of visiting China in the past 5 years	2.17	3.68	-2.02	.05
Frequency of traveling outside US in the past 5 years	4.72	7.59	-2.71	.00
Travel expertise	4.56	5.34	-1.69	.09
Overall satisfaction level	4.30	4.00	2.51	.01

Factor Analysis

Table 5 exhibits the results of the factor analysis conducted on dimensions related to perceived quality of visitor trips to China. To examine the underlying perceptions of structure of this measure, researchers analyzed eight (8) items related to U.S. travelers' perceptions of visiting China using principal factor analysis with varimax rotation. The factor analysis resulted in four underlying factors with eigenvalues greater than 1 and explained 74.5% of the variance in the data. Only the factors with factor loadings greater than .5 and cross-loadings above .4

were retained for further study. Cronbach's coefficient alpha was then used to assess the reliability of the indicators, ranging from .63 to .72.

The first factor was named *service friendliness*, which explained 23.9% of the variance and had an eigenvalue of 1.91. The three items representing this factor were friendliness of residents, level of service, and signage. The second factor, labeled *climate and environment*, accounted for 18.5% of the variance with an eigenvalue of 1.48. The two items relating to this factor were climate and clean environment. The third factor, *getting around*, was composed of two variables and explained 18.3% of the variance in the data, with an eigenvalue of 1.47. The two items representing this factor were ease of getting around and ground transportation. The fourth factor, *value of dollar*, loaded with one item (i.e., value of dollar),explained 13.8% of the variance with an eigenvalue of 1.11.

Table 5
Results of factor analysis of perceived quality

Variables	Mean	SD	Factor Loading	Eigen Value	Variance Explained (%)	Reliability coefficient
F1: Service friendliness						
Friendliness of resident	6.76	2.38	.85	1.91	23.87	.72
Level of service	6.66	2.28	.80			
Signage	5.26	2.70	.60			
F2: Climate and Environment	5.85	2.15				
Climate	4.58	2.30	.89	1.48	18.46	.63
Clean environment			.70			
F3: Getting around	7.08	1.99	.89	1.47	18.33	.64
Ease of getting around	6.74	2.35	.73			
Ground transportation						
F4: Value of dollar						
Value of dollar	7.22	2.58	.90	1.11	13.83	-
Total variance explained					74.50	

Regression Analysis

To compare the effects of each perception dimension, researchers conducted two multiple regressions for both GPT and FIT travelers. Four factors relating to the perception of trip quality were entered and regressed on their overall satisfaction with the trip to China. Results showed that the goodness-of-fit of the regression model is

satisfactory for both groups. The R^2 values across the two groups were .25 (25% of the variance in overall satisfaction with the trip) and .19 (19% of the variance in overall satisfaction with the trip), respectively. The Chow test was then used to test whether the effects of quality of China's trip service on the level of satisfaction were the same in the two different sub groups (Chow, 1960; Sharma & Patterson, 2000). The F statistic results of the Chow test indicated that there were significant differences ($F = 9.02$, $p < .01$) in the perceptual effects between the two subgroups, thus accepting study Hypothesis H_3. *Service friendliness* and *ease of getting around* were significant factors for both groups, whereas *climate & environment* and *value of dollar* were significant factors for only the GPT group. Also, the impact of *service friendliness* on *satisfaction* was stronger for the FIT group. The standardized coefficient of *service friendliness* in the GPT group was .29 ($t = 3.33$, $p < .001$) as compared to .38 ($t = 3.63$, $p < .001$) for the FIT group. The other three factors (*climate & environment, ease of getting around,* and *value of dollar*) had greater effects on *satisfaction* for the GPT group. The regression coefficient for *ease of getting around* for the GPT group was .26 ($t = 3.02$, $p < .01$) compared with .22 ($t = 2.12$, $p < .05$) for the FIT group. The standardized regression coefficients of *climate & environment* were .21 ($t = 2.39$, $p < .05$) for the GPT group and .07 ($t = .63$, n.s.) for the FIT group. Finally, the standardized regression coefficients of *value of dollar* were .18

($t = 2.10$, $p < .05$) for the GPT group and − .08 ($t = -.76$, n.s.) for the FIT group. Table 6 illustrates the results of the regression analysis.

Table 6
Results of regression of overall satisfaction level

	Travel type			
	GPT (n=108)		FIT (n=81)	
Factors	β	t-value	β	t-value
F1: Service friendliness	.29	3.33***	.38	3.63***
F2: Climate & Environment	.21	2.39*	.07	0.63
F3: Ease of getting around	.26	3.02**	.22	2.12*
F4: Value of dollar	.18	2.10*	-.08	-.76
	R^2=.25, F=8.43, p=.00		R^2=.19,F=4.31, p=.00	
	Chow test (F) = 9.02 (d.f.=5,179), p<.01			

* p<.05, * p<.01, * p<.001

Limitations, Conclusions and Recommendations

All studies have limitations, and this study is no exception. One important limitation for this research study was the use of a sampling of travelers generated from only one travel company source. Therefore, results are strictly limited to this company's proprietary list of China travel consumers and cannot be generalized upon other U.S. travel company consumers of the China product. A second study limitation was that for financial reasons only one mail-out was employed for data collection. Perhaps additional numbers of responses to the follow-up mailing would have provided a larger data set for analysis. However, the randomization process used in the original sample formulation was deemed methodologically correct to support study findings obtained from these respondents.

The purpose of this research study was to investigate aspects of demographics, behaviors, and perceived quality of trip experiences between two different travel groups to China: Group Package Tour visitors and Free Independent Travel visitors. There were significant differences in demographics between the two groups (Wang et al., 2000). As Alvarez & Asugman indicated, this study supported higher numbers of female visitors among those GPT respondents. GPT travelers were found to be older and have higher reported household income than FIT travelers. Over one-third of GPT travelers were 60 years of age or older. This supported Li's and Wickens' earlier findings that older travelers are more likely to select the security and comfort that group package tours offer. They do not use on-line trip information sources as much as those younger FIT visitors, and over 90% of all GPT travelers experienced activities related to Chinese history and culture during their leisure/vacation trip to China.

Although GPT travelers as a group represented fewer trips made to both China and overseas than FIT travelers during the five-year period of this study, GPT visitors stayed significantly longer times and spent much more money during their on-site experiences than did FIT visitors. The presence of tour guides throughout the GPT trip may have tended to make GPT travelers feel more secure and allow for faster service recovery when necessary. Thus the overall GPT satisfaction level was significantly higher than that of FIT visitors. GPT visitors recorded higher overall satisfaction levels with dimensions related to service friendliness, comfortable transportation, acceptable climate and environment, and value of money spent.

Research indicated that the majority of FIT visitors are younger travelers who take more frequent and shorter overseas trips (Caprioglio, 2006). Our study confirmed these findings. In addition, FIT visitors tend to take more overseas trips, 7.59 times on average for the past 5 years, compared to 4.72 with GPT travelers. FIT visitors to China in our sample indicated that over the past five years, an average of 3.68 trips to China were made compared with 2.17 trips by GPT travelers during the same period. As in Caprioglio's study of backpackers, FIT visitors indicated the primary purposes of their China experience were leisure/vacation travel and visiting family/friends/relatives. The FIT visitors were more likely to acquire trip information online, and they rated food as a much higher motivator during their trip to China.

The overall satisfaction level of FIT visitors to China was lower than that of GPT visitors. Perhaps this could be partially explained by trip structure and related issues. Pre-planned and pre-paid GPT itineraries offer full services during the entire travel experience, including pre-set menus, accommodations, entertainment, controlled on-site experiences at attractions, VIP preferences for avoiding long queues, baggage handling including daily pick-up and drop-off services, and many other tangible services. Thus, the value of the dollar becomes important and affects satisfaction scores. The repetitive nature of the GPT program allows opportunities for the same on-site service providers to work with GPT service providers, thus controlling and providing for a more homogeneous level of service for GPT visitors. FIT travelers face a much more heterogeneous situation. Thus, service friendliness becomes the critical factor that influences FIT overall trip satisfaction. Value of the dollar and trip environment were not important factors related to FIT overall satisfaction. FIT visitors did not partake of all-inclusive, prepaid trips, suggesting FIT travelers could possibly be more price conscious, thus explaining the importance of shopping as a trip activity.

Findings from this research may be readily employed by GPT companies and tour operators to accurately position their GPT products and services. Factors influencing overall GPT trip satisfaction should be emphasized in all on-line and off-line GPT communication channels.

This research presents an analysis of consumer satisfaction using data from recent U.S. visitors to China representing different travel structures. The results outlined above allow for a much better understanding of the study hypotheses. However, because effects are statistically significant but leave a portion of the variability in responses unexplained, the researchers see the real importance of this analysis to be

determining how China and perhaps similar developing countries can improve tourism net income by controlling the number of GPT and FIT travelers allowed to enter the country.

To get a better explanation of responses, it must be understood that acceptance of satisfaction is a significant, but far from perfect, predictor of future travel behavior. This work is one piece of the puzzle that will ultimately reflect a formula for creating more precise relationships between travel service providers and consumers. It is only through the process of building logically on past work and "observed reality" that we can understand the admittedly large percentage of unexplained variance in travel behavior. In that vein, *a priori* logic, logical deduction based on information available, e.g., prior to data collection (Luchins & Luchins, 1965, pp. 297-303) is used in examining how variables can be expected to be associated with traveling to a destination. Anderson, Burnham and Thompson (2000) noted that: "Care must be given to *a priori* scientific thinking" in order to address an array of hypotheses relevant to a study's objectives so that viable research is formulated. Additionally, it is important for Null Hypothesis Statistical Testers to control for Type II errors by collecting data from enough respondents to detect all the phenomena that the researcher might expect from the research plan (Green, 1994).

Certainly causation research can be a difficult and complicated issue for tourism investigators. For instance, the planning horizon for a time-series study represents more time required than most scholars have available for data collection and analysis. Perhaps research has passed the time when exclusive reliance on null hypothesis testing with reports of significant effects can aid the travel industry. Even though this paper was not designed to deliver causal connections, it would be interesting to understand the effect of information found in the paper on the destination service provider. For example, would China consider choosing 300 GPT travelers with higher incomes (who are likely to be more satisfied with a GPT trip) over 300 FIT counterparts with relatively lower incomes and trip satisfaction levels? From a purely hypothetical point of view, restriction of supply at the destination level, based on these basic information bits, could create an opportunity to create marketing schemes that are more attractive and affordable for GPT travelers. True causal analysis of international travel is a mixture of researchers, contrast, and control groups, where convenience samples are far more prevalent than truly random samples. Gigerenzer, a behavioral scientist, said it well when he stated, "we need statistical thinking, not statistical rituals" (1998).

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Hotel and Restaurant Entry-Level Job Competencies: Comparisons of Management and Worker Perceptions

By Dana V. Tesone and Peter Ricci

This article presents the findings of a central Florida study of lodging and restaurant managers as well as entry-level workers who were graduates of hospitality management programs. It provides a theoretical construct as a basis of the methodology employed. The article then reports the findings of perceptions of desired knowledge, skills and abilities, and attitudes associated with entry-level employees. It further compares desired levels of preparation for entry-level positions in the industry as reported by respondents of both groups. Finally, the authors present conclusions and implications for central Florida practitioners and educators.

COMPETENCIES AND EDUCATION

A number of hospitality and tourism college and university programs boast of substantial growth since the inception of the first such school more than 80 years ago (*Guide to College*, 2004). Enrollments have continuously increased in business administration schools at both the secondary and tertiary levels. At the same time, the number of hospitality and tourism magnet schools, and college and university programs has continuously increased. In fact, over the past 30 years, the number of hospitality-degree-granting programs has grown from just 41 in 1974 to over 170 in 2004 (Brady, 1988). This rapid pattern of program expansion includes wide variations among curricular styles and content, which fact could be the cause for managers' criticism of the graduates they hire from these institutions (Beckley, 2002; Chang & Yeado, 2003). Therefore, the authors of this study sought to ascertain how graduates of these programs perceived their preparation level when they became entry-level employees.

It has been reported that the hospitality industry and, in particular, the lodging and foodservice sectors, have suffered from high employee turnover (Birdir, 2002). Educators, human resources professionals, and operations managers strive to reduce turnover numbers by identifying valid job competencies in future managers, improving hiring practices, and recruiting from educational programs known for producing future managers with strong industry success potential (Chung-Herrera, Enz, & Lankau, 2003; Guglielmino & Carroll, 1979; Kay & Russette, 2000; Milman & Ricci, 2004).. Anecdotal evidence, as well as reports from the respondents in this study, indicate that a small number of lodging and foodservice managers possess degrees in business administration or hospitality. The majority of degreed

managers who participated in this study were trained in arts and sciences. Possibly many of these managers did not have the choice to study hospitality management in college. Further, the majority of the managers took no baccalaureate hospitality management courses. Even in 2002, only 8.46% of U.S. colleges and universities offering baccalaureate degrees had a hospitality management program (U.S. Dept. of Education, 2000-2001). Conversely, one could speculate that larger hospitality-school enrollments generate larger numbers of program graduates who accept entry-level industry positions. For these reasons, it seems appropriate to understand the competency perceptions of industry management practitioners, as well as those individuals who are entering the hospitality industry after graduating from colleges and universities.

Educators could profit from understanding the job competencies that hospitality managers expect from high school and college graduates. The relationship of educational factors to potential industry success remains an important and understudied area of the hospitality human resources literature (Dittman, 1997; Getty, Tas, & Getty, 1991; Hsu, Gilmore, & Walsh, 1992; Tas, 1983; Tas, 1988). Educators might also gain insight from knowing hospitality graduates' perceptions of entry-level job competencies. From a practical perspective, senior managers are ultimately responsible for accomplishing organizational objectives by supervising employees (Walker, 2004). Further, the perceptions of entry-level workers might provide a mirror to the knowledge, skills and abilities, and attitudes deemed important for successful job performance based on views assimilated from the educational program.

COMPETENCIES DEFINED

One view of worker competency begins with the goal of job performance and looks back at the strategies and tactics used to accomplish that objective (Naquin & Holton, 2003). This is consistent with longstanding viewpoints on the relationship of knowledge and skills as requirements for task performance leading to comprehensive job performance (McClelland, 1973). While knowledge and skills do facilitate task performance, many lodging and restaurant hiring executives claim they hire for attitude and train for skills. Hence, there are affective components that may be considered to be included in the competency package of newly hired entry-level workers (Adler, 1986; Grace, 1994; Morrison, 1992; Schreiber, Price, & Morrison, 1993). In fact, over the past few decades the ample definitive literature identifies mostly knowledge, skills, and attitudes as attributes associated with worker competency at all levels of organizations (McLaugan, 1996). Human

resources professionals have been known to infuse a fourth category, called *abilities,* under the commonly noted Knowledge, Skills, Abilities, Attitudes (KSAA) model of job competencies (Tesone, 1995). However, it could be argued that abilities consist of blended attributes that could be combined factors of knowledge and skills. Existing literature that is specific to the areas of lodging and foodservice operations seems to concur with the KSAA approach to defining worker competencies (Perdue, Woods, & Ninemeier, 2001; Rutherford, 1987; Sapienza, 1978).

ATTITUDINAL COMPETENCIES

The inclusion of the category of *attitudes* within the competencies model led the researchers to examine theoretical foundations surrounding personality states (individual preferences for responses to environmental stimuli) that are purported to exist within the minds of individuals (Cattell, 1957; Holland, 1997; Jung, 1954). Intuitive thinking on the part of experienced hospitality practitioners would indicate anecdotal typologies of personality types that should profile the appropriate attitudes of the ideal hospitality worker. For instance, the Jungian-based models of personality profiles would suggest that an extroverted, perceptive individual is suitable for employment in the industry. From Holland's perspective, a social, enterprising, artistic person might be expected to gravitate toward the hospitality profession. Cattell's model would suggest that gregarious, nurturing, and creative individuals might be best suited for hospitality careers.

These models are helpful for understanding personality types, but less so for identifying attitudes compatible with hospitality competencies. At least this was the case with a couple of studies that attempted to fit an anecdotally based hospitality profile into the categories provided by these models (Chen, 2004). In fact, another study provided a description of these models, only to demonstrate that inconsistencies existed among attributes associated within compared model categories (Zohar & Marshall, 2000). However, one could posit that individual descriptors extracted from the literature surrounding various theoretical constructs might be used to hypothesize a unique combination of suitable factors. These could be preliminarily tested as components of attitudinal competencies associated with entry-level hospitality workers.

The literature yielded a small number of studies that identified unconscious mental strategies that may contribute to the attitudinal competencies of hospitality entry-level workers (Bandler & Grinder, 1975). One strategy identifies individual *reference* preferences. *Self-referent* people will take care of their own needs before the needs of others, while

others-referent individuals will do the opposite, which ties to selflessness. Internal *movement* strategies determine a predisposition for an individual to move toward possibilities (achievement) versus avoiding negative outcomes (avoidance). A third internal strategy has to do with *contextual intelligence*, in which an individual possesses the capacity to rapidly process information and alter behaviors based on various environmental factors (Bennis & Thomas, 2002). A person with this internal strategy is commonly referred to as a *quick study*. These people are acutely aware of the realities surrounding a situation and have a knack for anticipating the needs of others. They tend to deal with environmental uncertainties through adaptation and change. This unconscious mental strategy connects with concepts of assertiveness and social collaboration, both of which could contribute to teamwork.

THE STUDY

The researchers hypothesized that managers might consider one or many of the mentioned traits and strategies to be important competencies for entry-level hospitality workers. However, no attempt was made to influence these participants during any phase of the study. Instead, the researchers compared the information presented by the managers with the concepts and strategies listed above.

During the initial phase of the study, the researchers took from the literature a list of personality descriptors that seemed to typify ideal lodging and restaurant workers (Bandler & Grinder; Bennis & Thomas; Cattell; Holland; Jung). These included intrinsic motivations toward the following: empathy, creativity, nurturing (helping others), assertiveness, achievement, social collaboration, selflessness, contextual awareness, and environmental aesthetics.

The findings from initial focus groups were used to develop a 42-item questionnaire rating the levels of importance of each entry-level competency. The questionnaire was administered to a pilot group of managers in central Florida (n=40). The purpose of this preliminary investigation was to explore the factor structure underlying the items in the questionnaire, thereby verifying consistency with previously published literature. The maximum likelihood estimation procedure was used to extract the factors. Kaiser's rule was used to determine which factors were most eligible for interpretation. This is not unreasonable given that factor analysis has as its objective reducing several variables into fewer factors. Using this rule, three factors (categories) were extracted, explaining roughly 74.08% of all the variable variances. Additionally, respondent ratings of knowledge, skills and ability, and attitude for new-

hires in the lodging industry were judged to be highly reliable for the managers to whom it was given, with a reliability of .9509.

The sample consisted of experienced lodging and restaurant managers (*n*=137, 51.7% of the total sample) and new entrants to the hospitality workforce (*n*=128, 48.3% of the total sample). The investigators administered the questionnaire to the managers and received 137 appropriate responses. The rank order of Likert-type 5 point scale responses (5=strongly agree, 1=strongly disagree) are listed in Table 1.

Table 1
Knowledge, Skills/Abilities, and Attitudes Expected by Managers

Rank		N	Mean	Std. Deviation
	Knowledge			
1	Knowledge of grooming and professional image standards	137	4.43	0.83
2	Knowledge of guest services standards	137	4.28	0.82
3	Knowledge of the realities involved in this type of work	137	4.11	0.94
4	Knowledge of business management and ethics	137	3.97	0.83
5	Knowledge of hospitality products and services	137	3.78	0.93
6	Knowledge of basic terminology used in the industry	137	3.69	0.89
7	Knowledge of the leadership and organizational structure	137	3.69	0.99
	Skills and Ability			
1	Ability to work as part of a team	137	4.57	0.73
2	Effective listening, verbal and written communication skills	137	4.51	0.70
3	Ability to project a professional image	137	4.50	0.73
4	Ability to empathize with the guest experience	137	4.41	0.75
5	Ability to anticipate guest wants and needs to provide service.	137	4.40	0.80
6	Ability to deal with daily uncertainties and changes in routine	137	4.26	0.87
7	Ability to balance the needs of multiple guests at a given time	137	4.25	0.78
8	Ability to generate an attitude of trust among co-workers	137	4.18	0.74
9	Ability to make creative decisions to achieve service standards	137	4.15	0.87
10	Ability to minimize use of resources while providing services	137	3.82	0.96
11	Administrative skills for cash/credit settlements, forms, and reports	137	3.81	0.86

	Attitude			
1	Takes personal pride in satisfying the needs of others	137	4.31	0.76
2	Prefers helping others before the satisfying the needs of the self	137	4.23	0.79
3	Tendency to move toward possibilities, as opposed to avoiding negative outcomes	137	4.18	0.83
4	Defines self as empathetic to the needs of others	137	4.13	0.74
5	Prefers working with people over working with administrative tasks	137	4.10	0.84
6	Defines self as outgoing and social	137	4.06	0.84
7	Prefers solving problems over following procedures	137	4.04	0.84
8	Prefers working in pleasant surroundings over clinical environments	137	4.00	0.86
9	Prefers working as part of a team over doing individualized work	137	3.97	0.81
10	Prefers each day to be different over each day being the same	137	3.95	0.93
11	Prefers challenging work over regimented work	137	3.94	0.93
12	Believes hard work is rewarded through promotion	137	3.91	0.97
13	Prefers creative work over analytical work	137	3.84	0.90

For the next step in the study, researchers administered the same survey to respondents (*n*=128) who were entry-level workers and graduates of hospitality management baccalaureate-degree programs. The results of entry-level worker ratings as compared with those of practicing managers are listed in Table 2.

Table 2
Perceived Competencies of Importance to New Workers and Practicing Managers

Manager Rank	Worker Rank		Worker Mean	Manager Mean
		Knowledge		
2	1	Knowledge of guest services standards	4.63	4.28
1	2	Knowledge of grooming and professional image standards	4.31	4.43
6	3	Knowledge of basic terminology used in the industry	4.22	3.69
3	4	Knowledge of the realities involved in this type of work	4.16	4.11
4	5	Knowledge of business and management ethics	4.13	3.97
5	6	Knowledge of hospitality products and services	4.13	3.78
7	7	Knowledge of the leadership and organizational structure	4.06	3.69

		Skills and Ability		
1	1	Ability to work as part of a team	4.69	4.57
2	2	Effective listening, verbal and written communication skills	4.63	4.51
3	3	Ability to project a professional image	4.56	4.50
5	4	Ability to anticipate guest wants and needs to provide service.	4.50	4.40
8	5	Ability to generate an attitude of trust among co-workers	4.47	4.18
4	6	Ability to empathize with the guest experience	4.44	4.41
7	7	Ability to balance the needs of multiple guests at a given time	4.38	4.25
9	8	Ability to make creative decisions to achieve service standards	4.25	4.15
10	9	Ability to minimize use of resources while providing services	4.16	3.82
6	10	Ability to deal with daily uncertainties and changes in routine	4.16	4.26
11	11	Administrative skills for cash/credit settlements, forms and reports	4.09	3.81
		Attitude		
1	1	Takes personal pride in satisfying the needs of others	4.53	4.31
12	2	Believes hard work is rewarded through promotion	4.44	3.91
6	3	Defines self as outgoing and social	4.34	4.06
2	4	Prefers helping others before satisfying the needs of the self	4.31	4.23
8	5	Prefers working in pleasant surroundings over clinical environments	4.31	4.00
3	6	Tendency to move toward possibilities, as opposed to avoiding negative outcomes	4.28	4.18
4	7	Defines self as empathetic to the needs of others	4.28	4.13
9	8	Prefers working as part of a team over doing individualized work	4.25	3.97
11	9	Prefers challenging work over regimented work	4.22	3.94
10	10	Prefers each day to be different over each day being the same	4.19	3.95
7	11	Prefers solving problems over following procedures	4.06	4.04
5	12	Prefers working with people over working with administrative tasks	4.03	4.10
13	13	Prefers creative work over analytical work	4.03	3.84

ANALYSIS

Respondents from both groups within the sample (managers and workers) were given the same precise and consistent set of instructions during survey administration sessions. As might be expected, the range of mean scores for each competency attribute in all three categories was high and narrow for entry-level worker respondents (4.03-4.69) when compared with management practitioners (3.69-4.57). This suggests that worker respondents perceived each factor to be important, while experienced managers seemed to differentiate between more and less important perceptions.

Prima facie assessment of the compared rankings between means for both groups showed highly symmetrical ratings for the *knowledge* category of attributes. The ratings patterns of factors in the *skills and abilities* category were also somewhat consistent between respondent groups. The ranked perceptions in the third category of *attitude* rankings varied between groups for most attributes.

An independent samples *t* test evaluation was applied to determine differences between the means of the two independent groups in the sample (Green & Salskind, 2003). These data corroborated the researchers' initial observations by showing a statistical difference between groups for just one attribute in the *knowledge* category and two statements in the *skills and abilities* category. The category of *attitudes* had the highest number of statements: Five items had statistically significant, different mean competency-perception scores.

DISCUSSION

Both groups (managers and workers) within the sample reported similar rankings of responses concerning the perceived importance of attributes that constitute both *knowledge,* and *skills and abilities* competencies for entry-level lodging and foodservice workers. It might be assumed that the managers' reports were based on anecdotal observations of worker performance over years of experience (m =13.5 years for the respondent group). However, this could not have been the case for the worker-respondent group, which reported an average of less than one year of full-time work experience. This group did report an average of 3.75 years of college-level training as hospitality management majors. The researchers speculated that this training may have influenced the perceptions of worker respondents. Future studies to compare these competency ratings among similar entry-level workers without hospitality college training could provide insight concerning the influence of

industry-specific preparatory programs on the competency perceptions of newly hired lodging and foodservice employees.

If hospitality management education was a factor of influence for the participants in this study, it appears as though school competency training and industry perceptions are consistent between educators and industry practitioners. At least this seems to be the case in the areas of *knowledge,* and *skills and abilities* competency categories. Future studies may compare perceptions among groups of practitioners and educators to test this relationship. Should the findings of such testing demonstrate a relationship, the researchers would be compelled to inquire about the disparity in the pattern of perceptions within the category of competency *attitudes*. The findings could call for the inclusion of affective competency training on the part of hospitality educators.

IMPLICATIONS FOR EDUCATORS AND INDUSTRY PRACTITIONERS

The findings of this study provide direct implications for the metropolitan statistical area (MSA) in which it was conducted, as well as speculative consideration for the entire hospitality universe. One key implication is that hospitality workplace competencies may be adequately described in terms of *knowledge, skills and abilities,* and *attitudes*. This is consistent with the broad array of business and hospitality literature (Adler; Chung-Herrera, Enz, & Lankau; Grace; McClelland; Morrison; Perdue & Ninemeier; Rutherford; Sapienza; Schreiber et al.; Tas; and others). While training in the areas of *knowledge,* and *skills and abilities* are somewhat straightforward, *attitudinal* learning requires affective outcomes associated with values and beliefs (Tesone, 2005). It is likely that these are shaped experientially over time in the absence of specific training interventions. Hence, experienced hospitality managers should tend to possess strong convictions in these areas relative to practitioners with minimal levels of experience. One by-product of participation in these types of studies is the "shared awareness" of attitudinal convictions on the part of experienced managers, which was evident in anecdotal responses to presentations of results provided as part of this investigation. This raises the question as to whether training interventions could influence the opinions of attitudinal competency attributes among less experienced workers.

The majority of management practitioners who participated in the study were not graduates of hospitality programs. In fact, the majority of those with college degrees had been educated in the arts and sciences. Conversely, all of the entry-level worker respondents were hospitality

management graduates. It may be possible to influence the attitudinal perceptions of learners in academic environments by incorporating values-based instruction across the curriculum (Giannoni, 2004). This type of learning would require the use of active-learning techniques to create virtual experiential grounding that is conducive to whole-brain discovery (Tesone, 2004). This technique poses applications to workplace affective training programs as well as those provided by academic institutions. Future studies might investigate relationships of values-based learning methods with entry-level worker attitudinal perceptions. It may be found that such training promotes this category of competency perceptions to levels consistent with workers with years of experience.

One factor that seems to be shaped in a person's early, formative years is a preference for responses to environmental stimuli (Cattell; Holland; Jung). Numerous instruments attempt to relate these tendencies to the occupational preferences of new entrants into the workforce. While off-the-shelf indicators may be used to create levels of general career interests in the minds of young workers, they seem to provide inadequate descriptions of the actual preference aspects of competent hospitality workers. In fact, preliminary steps in this study found that inconsistencies exist among descriptors as applied to the preferences of hospitality workers, which concurs with at least one report in the literature (Zohar & Marshall). Further, it was found that unconscious strategies were appropriate for inclusion in the *attitude* profile used in this study. Anecdotal observation suggests that some hospitality human resources practitioners rely upon off-the-shelf temperament indicators as part of pre-employment processes. This study suggests that industry-specific instruments would be more useful for pre-employment testing. Further replications of this study format may be used to benchmark profiles of successful workers for this application.

Similar studies may be used to develop preference testing instruments for institutions of higher learning. Applications might include hospitality program admissions, curriculum development, learning outcomes assessment, and internship/job placement services. The outcomes of these studies may pose implications for industry collaborative programs aimed at improving education/corporate relations, training initiatives, and the enhancement of practitioner competency-awareness levels among hiring executives. The most natural implication arising from the findings of this study would be a continuous stream of collaborative studies and initiatives producing mutually beneficial outcomes for industry practitioners, as well as representatives of hospitality educational programs.

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The use of Thermal Capacity in Measuring the Effectiveness of Meals on Wheels Transport Containers

By Lionel Thomas, Jr., Douglas Nelson, Barbara Almanza and Margaret Binkley

The Meals on Wheels (MOW) program is designed to help combat hunger in persons needing assistance. MOW has a duty not only to provide food but also to ensure that it reaches eligible clients safely. Given the population that MOW serves, transporting food safely takes on increased importance. This experiment focused on the major food safety issue of maintaining temperature integrity through the use of transport containers. For containers that did not contain electric heating elements, several factors influenced how fast the food temperature fell. Those factors included the U-value and size of the container as well as how many meals were in the container. As predicted, the smaller the U-value, the longer it took the temperature to fall. Larger containers did better at maintaining food temperatures, provided they were fully loaded. In general, fully loaded small and medium containers were better at maintaining food temperatures than larger containers loaded with the same number of meals.

INTRODUCTION

The ability to acquire and prepare nutritious, appealing meals; eat independently; dine in an environment that promotes proper caloric intake; and receive dietary assistance contributes to an adequate diet for elderly Americans (Payette & Shatenstein, 2005). Payette and Shatenstein affirmed that both individual and collective determinants are influential in motivating healthy aging in older Americans. Individual determinants that motivate dietary practices include demographic, physiological, health, and lifestyle practice stimuli. Collective determinants include access to information, nutritious food, healthy eating communication, social support, and community-based food delivery services, such as those provided by Meals on Wheels (MOW).

MOW is designed to help combat hunger and poor diets for the homebound, disabled, and frail, as well as individuals at risk socially, physically, nutritionally, and economically (Johnson & Fischer, 2004; Meals on Wheels Inc. of Tarrant County, 2004; Wellman & Kamp, 2004). The individuals served by this program have no means of receiving regular nutritional meals. Federal nutrition programs for the elderly provide more than 250 million congregate and home-delivered meals annually (Gollub & Weddle, 2004; Johnson & Fischer, 2004; Wellman & Kamp, 2004). The program typically provides five midday meals weekly for about three million qualified adults (Gollub & Weddle, 2004; Johnson & Fischer, 2004; Wellman & Kamp, 2004).

MOW is important because a large proportion of the elderly population in the United States is not consuming a balanced diet required to maintain good health (Connor, 1999). According to the Centers for Disease Control (CDC), a great deal of the illness and disability in older adults stems from detrimental behaviors, such as poor nutrition and the lack of physical activity (Lang, Moore, Harris, & Anderson, 2005). Many of the complications associated with aging can be improved through good nutrition (Holmes, 2006; Johnson & Fischer, 2004; Wellman, 2004).

Poor diet can contribute to frailty, functional limitations, loss of muscle mass, metabolic abnormalities, and diminished immunity (Payette & Shatenstein). Elderly persons also suffer from a number of the following complications that decrease their appetite and food intake: (1) a lessened ability to taste, smell, and digest food, affecting food selection (Johnson & Fischer, 2004; Schiffman, 1997; Schiffman & Graham, 2000); (2) chronic health problems (Holmes, 2006; Johnson & Fischer, 2004; Wellman, 2004); (3) slower gastrointestinal function, such that the stomachs of older persons release food more slowly into the intestines, leading to longer sensations of satiety and reduced energy intake (Johnson & Fischer, 2004); (4) medications that may adversely affect their immune system (Winkler, Garg, Mekayarajjananonth, Bakaeen, & Khan, 1999); (5) a reduction of appetite, sensory perception, and thirst sensation (Poehlman & Toth, 1996); (6) chewing problems (Brodeur, Laurin, Vallée, & Lachapelle, 1993); and (7) cognitive decline (Morely, 2001; Phillips, Bretheron, Johnston, & Gray, 1991; Schiffman, 1997; Volkert, 2005). MOW meals are intended to provide one-third of the daily caloric intake or recommended dietary allowance; however, studies have shown that clients' meals actually account for at least half of the food intake for the day (Wellman & Kamp, 2004).

Equally as important as providing a nutritious meal to elderly individuals is ensuring their meals are safe to eat. According to the US Food and Drug Administration (FDA), failure to hold food at the proper temperature is one of the five most common factors responsible for foodborne illness (US Food and Drug Administration Center for Food Safety and Applied Nutrition, 2005). Prevention of foodborne illness takes on an increased emphasis because the majority of the clients served are elderly individuals whose bodies have a diminished ability to combat illness. MOW operations bear the responsibility to protect their high-risk clients from harm by maintaining proper food- safety procedures throughout the flow of food service (Bertagnoli, 1996). This means that they must ensure that food stays out of the temperature range conducive to bacterial growth (temperature danger zone): 41°F (6°C) to 135°F

(57°C). The FDA mandates that hot food be kept above 135°F (57°C) and cold food be kept below 41°F (6°C) throughout the service process. If a hot food item is below 135°F (57°C) for a period of four hours, the item is to be discarded because of the increased potential for the rapid growth of bacteria (US Food and Drug Administration Center for Food Safety and Applied Nutrition). While the four-hour limit is recommended by the FDA, some states have adopted more stringent requirements: The New York State Department of Health Sanitation Code recommends holding potentially hazardous foods no longer than two hours in the temperature danger zone before discarding (Kraak, 1995).

Because of elders' susceptibility to foodborne illness, MOW must maintain food temperature during transportation from facility to client. According to Elaine Brovont, the director of Midland Meals, Inc., of Lafayette, IN, a MOW site that prepares roughly 1,500 meals daily, operations may use many means of transporting meals, including heated trucks, passenger vans, and individual vehicles (2005). Given this wide range of transport vehicles, some of which are not conducive to maintaining food temperature over an extended period of time, the actual containers used to transport the meals take on added significance. This study focused on maintaining temperature during transportation; more specifically, the effectiveness of different transport containers.

Given the time and temperature constraints during delivery, choosing the correct transport unit is vital. When choosing the proper transport unit, it is important to consider the type of food product as well as the endpoint destination and the intended user. If the transport container fails to function as intended, there is the possibility that much of the time, energy, and expense used in the production of the food product will be wasted, and the health of the recipient could be placed in jeopardy (Robertson, 1993). Insulated nylon bags, insulated hard plastic containers, corrugated paper boxes, plastic bags, and standard thermal coolers are some of the more typical MOW transport containers (Brovont, 2005).

Food transport containers come in various shapes, sizes, and colors, and employ various types of insulation and padding to help maintain food temperature. Also affecting the ability of these containers to maintain food temperature are the types of sealing techniques employed, such as buckles, latches, zippers, and Velcro. Although all MOW operators desire to have the best transport units available, choice is dependent upon cost, ability to maintain temperature, functionality, and

durability. Companies test their products before they place them on the market; however, no performance data published by an independent researcher were found for the containers tested in this study.

One way to compare transport units is to determine how fast they lose heat. According to Bertagnoli (1996), even the best packaging will not keep food hot if it has to sit in a car for an hour before it is delivered. Advances in container and insulation design have since improved so that longer holding times are possible for some containers. Theoretically, it is possible to slow the rate of heat loss to the point that the food can maintain its temperature for many hours. In general, the rate of temperature change for food in a container depends upon the rate of heat loss through the container and the heat capacity of the food (Geankoplis, 1983). Once the rate of heat entering one side of the wall of the container equals the rate of heat leaving the other side of the wall, steady-state heat transfer has occurred. Initially, when the food is placed in a container, the temperature of the container's walls will adjust to that of the food. During this time the rate of heat transfer will not achieve steady state. Since the majority of the time that the food is in the container the heat transfer rate will be at steady state, this study's focus was on steady-state heat transfer through the container. The rates of steady-state heat transfer through a container and the heat lost/gained by the food are defined by the equations in Table 1.

Heat or energy leaving the container comes primarily from the food. As the energy leaves the food, the food's temperature falls. The rate that the temperature falls depends not only on the rate that energy is leaving the container, but also on the mass of the food and its heat capacity. Heat capacity (thermal capacity) is the amount of heat required to change the temperature of a substance by one degree (Sears & Salinger, 1975; Wolfram Research, 2006). Table 2 shows the thermal capacity for selected items that may be delivered by MOW. The higher the thermal capacity, the more energy the food can lose before its temperature drops significantly.

Table 1
Steady-State Heat Transfer and Heat Capacity Equations
(Geankoplis, 1983)

Steady-State Heat Transfer Equation	**Heat Capacity Equations**
$q = U A \Delta T$	**$q = C_p M \Delta T$**
Where: q is the rate of heat loss U is the overall heat transfer coefficient A is the surface area of the container ΔT is the temperature difference between the inside and the outside of the container	Where: q is the measure of the amount of heat lost or gained by the food item C_p is the heat capacity of a food item M is the mass of food item ΔT is the initial food temperature - final food temperature

Table 2
Thermal Capacity (C_p) for Food Items

Food Item	**C_p (kJ/kg*K)**
Water	4.185
Pea Soup	4.10
Milk, skim	3.98 - 4.02
Tomatoes	3.98
Milk, whole	3.85
Cantaloupe	3.94
Apple Sauce	3.73 – 4.02
*Potatoes	3.52
Cream Corn	3.06 – 3.27
Bread, white	2.72 – 2.85
Butter	2.30
Ice	1.95
Ice Cream, frozen	1.88
Flour	1.80 – 1.88
***Note:** Item was used in study to test equipment	

From the steady-state heat transfer equation in Table 1, it is easy to see that the transport container selected has a major impact on how fast the food temperature will drop. The overall heat-transfer coefficient (U) is a function of the amount of insulation, and the surface area (A) is a function of the size and shape of the container. The smaller the overall heat-transfer coefficient, the less heat a container loses. The smaller the surface area, the less heat the container loses. The surface area of the container is minimized compared to the mass of the meals contained when the capacity of the container equals the number of meals contained. Once the U-value and the surface area of the container are determined, one can predict the rate of temperature change given the food's heat capacity and temperature, the mass of food in the container, and the outside temperature. The rate of heat loss by a transport unit divided by the mass and heat capacity of the food defines the rate of temperature drop by the food item (Weast, 1974). It is important to note that the U-value is relatively constant for a container; this means that the food type in the container will not affect U-values. Therefore, the results of this study are applicable regardless of the type of food in the containers.

The final parts of the heat-transfer equations that operators can control are the starting temperature of the food in the container and the temperature of the delivery vehicle. By ensuring that the hot food is as hot as possible and the cold food is as cold as possible when they are placed in their respective containers, the time it takes for food to lose/gain sufficient heat to enter the temperature danger zone can be extended. The difference between the food temperature and that of the air around the transport container is the driving force for heat to move in or out of the food. If the vehicle used to transport the container is too warm in the summer, then the rate of heat transfer into containers with the cold food will increase. Likewise, if the vehicle is too cold in the winter, the rate of heat loss from containers with hot food will increase. As the rate of heat transfer increases, so does the speed at which the food will enter the temperature danger zone.

The purpose of this study was to determine the temperature maintenance capabilities of commonly used transport containers and predict how long they will keep food out of the temperature danger zone. To obtain an appropriate measure of transport equipments' abilities to maintain temperature integrity throughout the delivery process, a U-value or overall heat transfer coefficient was calculated for each container. The overall heat transfer coefficients determined in this study were then used to compare different containers to determine which are better at maintaining meal temperatures.

METHODOLOGY

Thermal characteristics, specifically the ability to maintain temperature, and the rate of heat loss over a period of two hours for 14 containers, were determined by fully loading each of the containers with simulated meals and monitoring the temperature over time with Dynasys'® CyTherm™ Temperature Datalogger Keys. The meals were simulated by using mashed potatoes to represent the 3 oz. of entrée, 6 oz. of vegetables, and 3 oz. of starch. Those amounts are consistent with the revised requirements for MOW meals (Brovont, 2005). For this experiment, mashed potatoes were chosen for several reasons: (1) Mashed potatoes are cost effective, (2) they are easy to prepare, and (3) their thermal properties are relatively consistent between batches. The mashed potatoes were placed in aluminum meal trays sealed with foil-lined lids. The lids were sealed to the trays by crimping the sides of the trays. Meal temperatures were stabilized by placing them in a 120 Volt CresCor® Banquet Cabinet (Holding cabinet) set at 170°F (77°C) for one hour before putting them in the transport containers for testing. Once the meal trays were placed in the containers, the containers were left closed for the duration of the test. Temperatures were measured every minute for two hours using CyberTherm™ Temperature Datalogger Keys.

CyberTherm™ Temperature Datalogger Keys are programmable, key-sized temperature trackers with the capability of displaying visual representations of temperature fluctuations over specified time intervals. In addition to recording the temperature, the Datalogger also records the exact time the temperature was taken. This allowed the data to be synchronized among trays. These thermal characteristics, quantified by Datalogger temperature readings at one-minute intervals, were used to create a linear model describing the ability of these containers to maintain food temperature. The Datalogger keys were initialized using the remote start, then inserted into a small plastic bag to protect the Datalogger key from moisture. The bag with the Datalogger key was then placed in the center of the six-ounce portion of the mashed potatoes, which was in the entrée section of the meal tray. One Datalogger key was placed in each meal tray. When the test was complete, each Datalogger key was downloaded, and the data stored in Microsoft® Excel™ 2003 spreadsheets.

The potatoes were prepared according to the directions on the box. Seven ounces of powered potatoes were mixed with four cups of water. Then the mixture was heated on a gas range until it reached 150°F

(65.6°C). Immediately after the potatoes were removed from the stove, they were portioned into the trays, and Datalogger keys were added. The trays were covered and then placed in the warming unit for one hour to equilibrate the temperatures before they were placed into individual transport units.

The heat capacity of the potatoes was determined by combining 378.41 grams of potatoes at 143.7°F (62.06°C) with 371.25 grams of water at 72.23°F (22.35°C). The change in temperature between the temperature of the water and the potatoes just prior to mixing, and the final mixture temperature, was used to determine the heat lost by the potatoes and gained by the water. Given the mass of the potatoes, their temperature change and the amount of heat they lost, their heat capacity was calculated (refer to Table 1 for formula).

Data were analyzed using Microsoft® Excel™ 2003 spreadsheets to calculate average temperature drop per minute and the rate of heat loss. The rate of temperature loss mutliplied by the heat capacity of the potatoes multiplied by the weight of the potatoes was the calculated rate of heat loss for the container. Using the surface area of the transport containers, the temperature of the laboratory (70°F), the heat loss of the potatoes, and the average temperature of the potatoes in the container, a U-value was calculated for each transport container. The food trays were left in the transport containers for 30 minutes before collecting the data used to calculate the U-value. This was to ensure that steady state heat transfer had been achieved. Steady state was confirmed by graphing the temperature data for each test. Due to resources required to perform each test, each container was tested only one time unless temperature tag anomalies were detected. The final step was to predict the temperature of the food inside the containers when they were one-third full, two-thirds full, and completely full.

Fourteen containers were included in this study. A brief description of each of the containers can be found in Table 3. Three of the containers had built-in electric heaters; the remainder relied only on the insulating properties of the sides, bottoms, and tops to maintain food temperature.

Table 3
Container Descriptions

Container	Description
Cooler	Rigid plastic construction with double-wall urethane insulation, rigid plastic frame with a pressure seal enclosure, and rigid plastic hinge handle
Blue Nylon Two-Compartment Box	Dual compartment nylon box with preformed foam, reflective mylar liner, rigid frame, zipper closure, and straps with plastic clasps for carrying
Purple Plastic Two-Compartment Box	Double-wall polyethylene construction with foam insulation, four side-open doors with recessed stainless steel latches to prevent accidental opening, and gaskets to help ensure an airtight seal
Black Nylon Bag with Lighter Connection	Nylon thermal bag with padded insulation, an electric AC adapter connection plug for use in vehicles, straps with plastic clasps for carrying, and held closed with fabric hook-and-loop fasteners
Box-type Small	Corrugated board box with handles and removable, reflective thermal lining
Box-type Large	Corrugated board box with handles and removable, reflective thermal lining
Red Nylon Bag	Nylon thermal bag with wire support rack, padded insulation, straps with plastic clasps for carrying, and held closed with fabric hook-and-loop fasteners
Gray Plastic Box	Rigid plastic contruction with double-wall blown-foam insulation, recessed stainless-steel latches, and a top that fits into the container to create a seal
Electric Red Nylon Bag	Nylon thermal bag with plastic-covered, padded insulation, cigarette-lighter connection with zipper closure, semi-rigid frame, electric AC adapter connection plug for use in vehicles, and padded insulated insert to place over contents before closing container
Blue Nylon Bag	Nylon thermal bag with foam padding held closed with fabric hook-and-loop fasteners and a padded insulated insert to place over contents before closing container
Electric Plastic Two - Compartment Box	Double-wall polyethylene construction with foam insulation, side- open doors with recessed stainless steel latches to prevent accidental opening, gaskets to help ensure an airtight seal, and electric AC adapter connection plug for use in vehicles
Blue Nylon Bag with	Nylon thermal bag with plastic-covered padded insulation with zipper closure and semi-rigid frame, padded insulated

Zipper	insert provided to place over contents before closing container, and lighter connection for use in vehicles
Cardboard box	Corrugated board box
Plastic bag	T-shirt-style plastic bag (standard grocery bag)

RESULTS

As shown in Table 4, eight of the 14 containers maintained an average food temperature above 135°F (57°C) for the entire two-hour test. Of the remaining six containers, three had final temperatures greater than 130°F (54°C). It is conceivable that those three would have maintained temperatures above the temperature danger zone had the starting food temperature been higher. Table 4 clearly shows the importance of the starting temperature in maintaining temperatures above the temperature danger zone. For example, both the blue, nylon bag with zipper and the blue, nylon two-compartment box had an 18°F (10°C) temperature drop, but the final temperature for the blue, nylon two-compartment box was 8°F (5°C) higher because its starting temperature was higher.

The differences in starting temperatures were due to thermal stratification within the warming cabinet. Because the starting temperature varied, it was hard to accurately compare all containers based on temperature alone. The majority of the non-electrical, commercially available containers appeared to have comparable performance; the range of temperature drop for six of the nine was 5°F (3°C) over a two-hour period. As expected, the three electrical containers were the top performers, and the plastic bag (with basically no insulation) was the worst. The biggest surprise in the study was the performance of the gray, plastic container. Possible reasons for the poor showing by this container will be discussed in the next section.

Because of differences in the containers' starting temperatures, the information in Table 4 can not be used to accurately compare containers. A much better criterion for comparing the temperature-maintenance capability of the containers is their U-value. The results of the calculations for the U-values for each container except the three electic containers are shown in Table 5. The energy used by the electric containers was not measured as part of this study; without knowing how much energy was added to the container during testing, it was not possible to estimate the U-value for the container. For that reason, no U-values were calculated for the electric containers.

The two-compartment containers had the lowest U-values, indicating that they were better insulated and therefore better at maintaining temperature. Though the gray plastic box had the second-highest temperature drop during the test, its U-value was the fifth best among those tested. The U-value is only one of the factors that impacts temperature drop. The others include the surface area of the container, the amount of food contained within, and the food's heat capacity. The gray, hard-plastic container had a relatively high ratio of surface area–to-number of meals contained. This resulted in a larger-than-expected temperature drop based on its U-value. As expected, the corrugated board box and the plastic bag had the highest U-values.

From the U-values it was possible to theoretically predict temperatures in each container if the starting temperature was 150°F (66°C) and the air temperature outside the container was 70°F (21°C). The results of those calculations are shown in Table 6. Those calculations assumed steady-state heat transfer and estimated the energy that would be pulled from the food to warm the container when the food was initially placed in the container.

Table 6 clearly shows the importance of the volume of food and its thermal capacity on the temperature of the food after two hours. Only one of the containers maintained the temperature out of the temperature danger zone. The next three—red, nylon bag; purple, plastic two-compartment box; and blue, nylon bag with zipper--all maintained temperatures of 133°F (56°C) or higher for two hours. The top four performing full containers were the largest four containers. This is because of their thermal mass. That is, they contained the greatest number of meals and consequently the largest amount of energy. Two of those containers—red, nylon bag and blue, nylon bag with zipper—maintained their temperatures better than the two containers with better U-values. The performance of the containers was better than expected as a direct result of the larger amount of meals they contained. The effect of the amount of food on the final temperature was even more evident for the temperatures calculated when the containers were not full. Of the containers that were only two-thirds full, none was able to maintain the temperature above the danger zone for two hours. The temperatures dropped even faster when the containers were only one-third full. The containers with larger surface areas did not fare as well when only partially full because there was more surface area through which energy was lost. This has serious implications when delivering meals to geographically separated individuals.

Table 4
Results of the two-hour holding test in rank order[1] of their ability to maintain temperature.

		Temperature in °F (°C)				
			Temperature drop[2]			
Container	**Meal Capacity**	**Initial**	**30 min [3]**	**1 hr [3]**	**2 hr [3]**	**Final**
Electric Red Nylon Bag	14	161 (72)	3 (2)	0 (0)	-4 (-2)*	165 (74)
Electric Plastic Two-Compartment Box	10	161 (72)	0 (0)	-2 (-1)*	-4 (-2)*	165 (74)
Black Nylon Bag with Lighter Connection	14	149 (65)	1 (1)	3 (2)	5 (3)	144 (62)
Red Nylon Bag	16	154 (68)	5 (3)	9 (5)	17 (9)	137 (58)
Blue Nylon Bag with Zipper	14	157 (69)	6 (3)	10 (6)	18 (10)	139 (59)
Blue Nylon Two-Compartment Box	14	165 (74)	7 (4)	11 (6)	18 (10)	147 (64)
Blue Nylon Bag	10	151 (66)	5 (3)	10 (6)	20 (11)	131 (55)
Cooler	12	157 (69)	8 (4)	13 (7)	22 (12)	135 (57)
Purple Plastic Two-Compartment Box	16	171 (77)	11 (6)	16 (9)	22 (12)	149 (65)
Box-type Large	12	159 (70)	7 (4)	14 (8)	25 (14)	134 (57)
Box-type Small	5	161 (72)	6 (3)	14 (8)	28 (16)	133 (56)
Cardboard Box	12	161 (72)	12 (7)	21 (12)	35 (19)	126 (52)
Gray Plastic Box	6	169 (76)	23 (13)	32 (18)	42 (23)	127 (53)
Plastic Bag	8	159 (70)	14 (8)	26 (14)	44 (24)	115 (46)

*Temperatures with a negative sign increased in temperature during the test.
[1]Based on the total temperature change after two hours.
[2]Temperatures are an average for all meal trays in the container.
[3]Temperature changes over time were calculated by subtracting the new temperature from the initial temperature.

Table 5
Results of the U-value analysis in rank order of the U-value along with surface area and meal capacity

Container	Meal Capacity	Surface area in m^2	U-value in w/m^2 °K	Product of surface area and U-value in w/ °K
Electric Red Nylon Bag	14	0.0129	N/A	N/A
Electric Plastic Two-Compartment Box	10	0.0112	N/A	N/A
Black Nylon Bag with Lighter Connection	14	0.0156	N/A	N/A
Blue Nylon Two-Compartment Box	14	0.0197	0.442	0.00871
Purple Plastic Two-Compartment Box	16	0.0192	0.582	0.01117
Box-type Small	5	0.0107	0.624	0.00768
Blue Nylon Bag	10	0.0127	0.670	0.00851
Gray Plastic Box	6	0.0134	0.711	0.00953
Cooler	12	0.0141	0.731	0.01031
Blue Nylon Bag with Zipper	14	0.0129	0.774	0.00998
Red Nylon Bag	16	0.0140	0.782	0.01095
Box-type Large	12	0.0166	0.801	0.01330
Cardboard Box	12	0.0152	1.236	0.01879
Plastic Bag	8	0.0074	2.590	0.01917

Table 6
Projected temperatures[1] after two hours with containers that were full, two-thirds full, and one-third full of meal trays containing 12 ounces of mashed potatoes.

	Full		Two-thirds full		One-third full	
Container	**Trays**	**Temp.[2]**	**Trays**	**Temp. [2]**	**Trays**	**Temp. [2]**
Blue Nylon Two-Compartment Box	14	137(58)	9	131(55)	5	118(48)
Purple Plastic Two-Compartment Box	16	133(56)	11	126(52)	5	109(43)
Box-type Small	5	123(51)	3	110(43)	2	99(37)
Blue Nylon Bag	10	131(55)	7	124(51)	3	103(38)
Gray Plastic Box	6	119(48)	4	109(43)	2	94(34)
Cooler	12	130(54)	8	122(50)	4	104(40)
Blue Nylon Bag with Zipper	14	133(56)	9	126(52)	5	112(44)
Red Nylon Bag	16	134(57)	11	128(53)	5	110(43)
Box-type Large	12	127(53)	8	118(48)	4	99(37)
Cardboard Box	12	119(48)	8	109(43)	4	90(32)
Plastic Bag	8	111(44)	5	97(36)	3	83(28)

Note: Containers are arranged in order of increasing U-value as shown in Table 5.
[1]Based on the experimental U-value, a starting temperature of 150°F (66°C), and an outside temperature of 70°F (21°C).
[2]Temperature in °F (°C).

DISCUSSION AND CONCLUSIONS

Clearly the type of transport container used is very important for maintaining temperature and food integrity during transport. Unfortunately, the high cost associated with some of the better-performing containers makes them too expensive for many "budget-strapped" MOW providers. The best-performing containers, those with electric heating units, were two- to three-times the cost of the non-electric

unit. If an operation can afford the transport containers with electric heating units, it is recommended that they do so because these containers can maintain safe temperatures much longer than other containers (see Table 4). Of the remaining containers, only one was projected to maintain temperatures above 135°F (57°C) for two hours given the conditions in Table 6. None of the containers was projected to keep the food outside the temperature danger zone if only one-third or two-thirds full. This has serious implications because the temperature-maintenance capabilities of the containers are significantly decreased as meals are delivered.

To ensure that food temperature is properly maintained during delivery, MOW can take a number of actions even if they cannot afford the electric units. First, they need to select durable containers with adequate insulation; cardboard boxes and plastic bags do not provide adequate barriers to heat loss and do not safely maintain food temperatures. Another selection criterion should be the size of the container. It is important that the size of the container be matched to the number of meals on the delivery route. For example, while both the blue, nylon, two-compartment box and the purple, plastic, two-compartment box maintained higher food temperatures than the box-type, small container when they were full, both performed worse than the box-type, small container when they held only five meals – the same number as the full, box-type, small container. As meals are delivered, the temperature maintenance capacity of all containers decreases; however, if an appropriately sized container is used, the temperatures can be maintained for a longer time.

Another important selection criterion is the resistance to heat flow through the container. The measure of the resistance to heat flow is the U-value; the lower the U-value, the better. While the U-value is important, by itself it does not provide a complete picture of the container's ability to hold heat and temperature. The total surface area of the container also impacts the rate of heat loss. For example, the U-value for the blue, nylon bag with a zipper was 1.75 times that of the blue, nylon, two-compartment box. Since both hold 14 meals, the projected temperature loss by the blue, nylon bag with a zipper should have been almost twice that of the other container. According to Table 6, the temperature drop was only 4°F (2°C) different for the two containers. The reason for the similar performance of the two containers, despite the great disparity in U-values, was the total surface area of the containers. The surface area of the blue, nylon bag with a zipper was only 65.5% of the surface area for the blue, nylon, two-compartment bag. A better

measure of how a container is expected to perform would be the product of U-value and surface area. The resulting product for the two containers was 0.00871 w/°K and 0.00998 w/°K for the nylon, two-compartment box and the blue, nylon bag with zipper, respectively. This difference is more in line with the predicted temperature loss in Table 6. Therefore, it is possible to purchase a container with a much better U-value than its competitors, but not gain any significant increase in holding time. When selecting a container, operators must also consider the size of the container. It is important that the container have the smallest surface area possible and still hold the required number of meals.

After selecting the best container, a MOW operation can take a number of actions to help ensure that the food stays out of the temperature danger zone during delivery. First, it needs to maintain as short a route as possible. By shortening the routes, there is less time for the food to lose heat and drop in temperature. While this is a logical way to protect food integrity, it is likely not a practical solution for most operations. A better solution is to ensure that the food be as hot as possible when placed into the containers. In the temperature ranges seen during delivery, the rate of heat loss and temperature drop will be relatively constant. Ensuring a higher starting temperature means that it will take longer for the temperature to enter the danger zone. One point of concern when electing to start with a higher starting temperature is the effect it will have on the food. Higher temperatures can seriously degrade the quality of a number of different food items. This is not a problem for many of the foods served by MOW programs. To ensure food safety, many of the foods served are cooked to temperatures of well over 165°F (74°C) -- temperatures well above the 150°F (66°C) used in the theoretical evaluation of the containers.

In addition to starting with a higher temperature, MOW can help maintain meal temperature in additional ways. First, the containers can be preheated before the food is added. Preheating the containers will reduce the initial heat lost by the food as the container temperature rises to that of the food. The amount of heat required to bring the container up to temperature varies, depending upon the container. The resulting temperature drop is further impacted by the number of meals in the container. For the containers evaluated in this study, the temperature drop due to not preheating the containers ranged from 8°F (4°C) for a full gray plastic box, to basically 0 for the plastic bag. The effect for partially loaded containers was even greater: The meals in the gray plastic container experienced a 20°F (11°C) temperature drop when only two meals were placed in the container. In general, the rigid containers

required more energy, resulting in greater meal temperature drops to warm the container than did the bag-type containers. Preheating can be done by placing plastic containers of hot water in the containers prior to adding the food.

Operators also have the option of adding "heat sinks" to containers in order to help maintain temperature. A heat sink is an object with a high heat capacity. Examples of heat sinks include non-toxic gel packs and metal or ceramic plates. Without a heat sink, the heat that leaves the container comes from the food. If material with a high heat capacity is added to serve as a heat sink, then a significant portion of the heat leaving the container will come from the heat sink and not the food. With less of the heat that leavesthe container coming from the food, the temperature drop of the food will be slowed, and it will stay out of the danger zone longer.

Considerable attention must also be given to some of the containers' practical features, which include safety, capital costs, and ease of use. Given that many of the delivery drivers are older volunteers, precaution must be taken to ensure that these individuals are not injured when opening, closing, and transporting the containers. The containers with recessed stainless-steel latches could seriously injure the typical volunteer delivery driver because of the pressure necessary to open and close and the effort necessary to fasten the pieces of a given container. These individuals also run the risk of getting their fingers caught in the buckle or latch. The recessed stainless-steel latches are associated with the hard, plastic, box-type containers, which are bulkier and weigh considerably more than the other types of containers. This presents a huge obstacle to maintaining the temperature integrity of the meals until the point of delivery at the participant's doorstep. These containers come with a hefty price tag, and the cost of the electric attachment to a hard plastic box makes it unaffordable for most MOW operations.

The containers with the zipper enclosure do not pose a significant safety threat; however, they can prove to be very impractical. These containers come with an easy-to- manage strap for carrying and are relatively affordable, given their durability. The cardboard boxes and plastic bag options do not have any noteworthy safety risks. These containers also have handles that over time may succumb to wear and tear. They are very affordable for MOW operations; however, they are largely ineffective. To keep food safe during delivery, personnel must not allow food temperature to enter the temperature danger zone. To ensure that this does not happen, MOW programs should take a hard look at

how they are transporting meals. Just putting the meals in an insulated transport container may not be enough to properly maintain appropriate temperatures.

This study has provided information that can be used by MOW programs in selecting transport containers based on their ability to maintain temperature when they are closed. Several operational considerations that affect container selection were not addressed by this study. The first of these is heat loss when containers are opened to remove meals. Different closure designs are very likely to impact the amount of heat lost during opening. Next, would be the overall durability of the container. This is an extremely important characteristic, particularly if an operation uses volunteer drivers, and the vehicle is not designed to transport food. Finally, although preheating the containers and using heat sinks to help maintain temperature are theoretically sound recommendations, the exact impact of each should be tested under both laboratory and field conditions.

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