

Consumer Perceptions of Airline Web Sites: A Three Wave Longitudinal Analysis

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ABSTRACT

During the past ten years the impact of the internet on channel selection has been dramatic and pervasive throughout the business world. Yet strong arguments can be made that few industries have been as invasively affected as has the travel industry. Currently travelers increasingly choose the World Wide Web to search for and book travel. As the internet creates opportunity, it also creates challenge. This study specifically addresses changing consumer perceptions as the airline industry attempts to meet those challenges. In three waves over the past ten years data was collected concerning consumer perceptions of airline websites and the evolution of those sites. Normatively, this work may assist the industry in assessing their progress in meeting consumer needs and increasing customer satisfaction.

Keywords: airline, internet, e-commerce, CRM, travel



INTRODUCTION

With approximately 1,319,872,109 internet users worldwide and average annual usage growth of 256.6% since 2000, as reported by the Miniwatts Marketing Group (2008, 2011), there is no question as to the importance of the internet to retail business. Within the travel industry, predictions were that online travel sales would double in three years and those revenues did grow from \$38 billion in 2006 to \$80 billion in 2007 (Elkin, 2008). Specifically, Elkin's (2008) prediction of revenues from online airline reservations of \$32.8 billion in 2007 have been greatly exceeded in an industry where sales volume is expected to reach \$700 billion in 2011 (First Research, Inc.) and approximately 87% of that will be conducted online (PhoCus Wright). Moreover, online volume is forecast to grow 20% by 2014. In this environment few scholars would disagree that the critical centrality of an airline's website is readily apparent.

Many research studies including Kettinger and Hackbarth (2004) strongly support the importance of companies' ability to "alter their activities to adjust to new ways of conducting business. In this study of airline websites the growing importance of online portals for booking travel and the airline's differing "ability to alter their activities" is strongly indicated by customer's perceptions of those sites.

Even entire countries are recognizing the importance of on-line travel sites. Costa Rica designed, built and operates a national internet reservation system (Raventos, 2006). Research on Malaysian consumers by Lim, Yap and Lau (2010) indicates that company websites are the most common method of searching for travel and other purchases. Interestingly, the work of Lim, Yap and Lau (2010) supports the seminal research by Powell (1995) predicting that online experience increases the probability of future online purchases. As world internet usage increases from current levels of approximately \$5.2 trillion there is little doubt the travel industry will grow apace. Therefore, it is clear that effective and efficient website design is critical to the success of the airline industry.

Several studies exist designed to evaluate internet retailing quality (Francis, 2009), however none specifically address the unique characteristics of the internet airline retail environment. One case by Buchanan and Clinton (2010) utilized actual customer service letters including some concerning online services. In a related study Manzano and Valpuesta (2010) used a "multi-nominal logit model of 27 socio-economic factors and trip attributes" to develop passenger profiles. Yet, none of these studies attempted to determine the specific characteristics of airline websites which either attracted or repelled potential customers. Even more important, no research has studied which airline websites attracted repeat customers as a result of their design features and benefits.

Since many scholars agree with Eckrich, McCall and Wilcox (2005) that long term customer satisfaction is the core of the marketing concept, then the airline industry might be well served by attempting to provide such satisfaction with their online process. Although commercial sites serve many purposes, this study focuses on those sites that allow customers to actually purchase tickets.

As the airline's site may be the primary point of contact between a potential customer and the airline, it logically follows that that consumer's perception of that airline will be influenced by the quality of the site. However, not all of the factors involved in the formation of consumer perception are controllable by the site owner. As an example, navigation systems guiding consumers through ordering scenarios can be controlled. But the airline exerts only marginal

control over page loading speeds and none on the consumer's computer processor speed, keyboarding or mouse skills.

Therefore, those aspects of the site which are controllable, semi-controllable, or uncontrollable should be identified and optimized. In this study, comparisons are made among fifteen airline web sites with particular interest in those aspects within the control of the site owner. More importantly, the changes over the past ten years are tracked and compared. If the voluminous academic research during that period has had an effect, it should be apparent. To increase the external validity of the study, airlines were chosen to increase sample variance using airlines of several countries and various sizes.

Controllable and Semi-controllable Attributes

Previously research has identified several significant factors influencing customer satisfaction and frequency of repeat purchases. Among these, factors identified as controllable include color schemes, font selection, screen layout, and navigation and input systems. Higgins (1998) research strongly supports these attributes as direct significant influences on user search costs and their influence on purchase behavior.

One semi-controllable factor of considerable impact is perceived security. Although network and site security are largely determined by external forces, such as host computers, network design, and site hackers, site owners still have some control over this aspect of the interface experience. Since services retailing of airline reservation systems require detailed personal information, enhanced security measures are essential to perceived and actual security.

There is little doubt that attributes used in this study significantly affect site efficiency and effectiveness. Interestingly, controllable attributes used on e-commerce airline sites appear to more directly and strongly influence consumer choice than the semi-controllable.

METHODOLOGY

Each of the processes and approaches detailed below were consistently applied in the three waves of data collection. As e-commerce research has increased in both intensity and rigor, other factors have emerged including challenge, interactivity and site involvement that may play significant roles in site effectiveness (Richard and Chandra, 2005). Unfortunately it was not possible to include these interesting factors, since such additions would impair the temporal comparisons.

As shown in Table One, font, color, orientation and other visual variables were individually measured. Among others, ease of ordering and quality of help were specifically rated. In the summary shown in Table One the most critical results are reported.

Each wave is designated by the year as 01/05/09. Individual rater bias was reduced by choosing 27/32/41 individuals randomly from pools of 63/81/76 volunteers. Within selected raters, 18/24/34 had previously used on-line airline booking services during the past year; the remaining 9/8/5 had no experience with on-line booking. Raters took a one-hour training session in color wheel usage, font identification, color intensity, text/graphics density and general site navigation. No airline sites were selected for training. Each training site was a consumer e-commerce site from other industries which included examples of the variables under study.

<u>Year</u>	<u>2001</u>	<u>2005</u>	<u>2009</u>
Number of Raters	27	32	41
Previous On-line Booking	18	24	36
Rater Pool	63	81	76

Specific Controllable Attributes

Since prior research found web page backgrounds influence viewer attitudes, this variable was included (Stevenson, Bruner and Kumar, 2000). Certainly, speed of page loading influences site traffic (Turban and Gehrke, 2000). In a similar fashion, page complexity has a significant effect on site traffic (Bucy, Lang, Potter and Grabe, 1999). Each rater examined the physical layout of the opening page including orientation, background color, font color, font size, secondary color, color density, graphic density, text density and overall density of information. Work in cognitive psychology strongly suggests that human response is affected by color, orientation, size, and information density. Advertising studies show that density of text or graphics frequently effects reader interest. So our raters counted the number of words on each opening page to estimate information density. Graphics, including differentiation between photographic type-material and non-photographic artistic material was noted.

Attention span studies suggest web site users lose interest and exit sites if they are unable to accomplish their intended task in a reasonable time frame (Weinberg, 2000). Therefore, the number of screens required to actually place an order was recorded. Ease of data entry was assessed as well as clarity of site instructions. Availability of on-line help is noted and the quality of that help function was assessed. Assessments of ease of use, usefulness, clarity of instructions, and speed of response, density, color intensity, and overall evaluations are operationalized using a ten point scale with 1 being the lowest or negative rating and ten being the best or positive rating. For instance, a speed of 10 would be the fastest possible site response. Since speed is determined by many factors outside the control of the company, such as the server, user's computer, available bandwidth, we correlated this measure with page density and found significant levels of correlation ranging from .65 to .97. It seems that companies do have some control on the response speed of their site.

RESULTS

In this section the changes that have occurred over the past ten years in specific attributes of airline web sites are reviewed. The most important of these, namely, ease of use, usefulness, aesthetics and overall rankings are summarized in Tables One and Two 2 (Appendix). Other attributes including color and are discussed in the following paragraphs. As reported herein results are displayed from the three waves as 2001 / 2005 / 2009.

Web-site designers have considerable flexibility in their choice of screen color schemes (Jutkins, 1998). In this work the description of color schemes focused on three screen attributes: primary background color, secondary background color, font color and the intensity of these colors.

In 2001 selected airline sites used one of four colors as primary backgrounds (white, blue, red, and gray). Eleven of the fifteen sites (73%) used white, two used blues, one red and one

gray. By 2009 only nine companies used white with five blue and one black. This finding coincides with prior research by Powell and Conca who found that 75% of 184 general EC sites examined had white or gray as primary background colors (Powell and Conca, 2001). By 2009 color intensity varied from 5 to 8.3 on a scale of 1 to 10 with 10 indicating 100% intensity. The mean for all background intensities was 6.4.

The most common secondary color was blue, eight out of fifteen and in the second study six used blue. Others included three white, two reds, and an orange and a green. In 2009 all but three airlines used blue with Quantas using red, Luftansa gray and KLM white. Intensities for secondary colors ranged from 5.2 to 7.3 with a mean also of 6.4. However these intensities decreased rapidly over the course of the study reaching a mean of only 4.03 in 2009.

Font colors were more varied ranging through seven black, three blue, two gray, and one each green, orange and white. Although font size varied with each page, the dominant size on all pages visited in both studies was 10. By far the most common typeface was Ariel at twelve with Helvetica at two, and Veranda only one. Interestingly the font size by 2009 had risen to an average of 12pt. This finding may be a reflection the changing demographics of the traveling public.

Since contrast plays an important role in perceptions of environmental stimuli, we examined how foreground and background colors were used to provide contrast. The most prevalent combination was black text on a white background (5 of 15, or 33 %). Blue text on white background was the second most common combination at two sites (11.3%). Other combinations varied widely during the entire term of the study.

White was the most common background color at 75% decreasing to 60% in 2009, more than all other colors combined, followed a distant second by blue at 13.3% increasing to 27%. Somewhat surprising, as the web page is in part a commercial message from the organization and most advertising is designed to attract a potential customer's attention and white does not seem to be a strong attractor. However, if consumers visit EC sites with a particular purpose, perhaps designers already have the user's attention and don't require strong background colors. Yet, other methods are used to gain a customer's attention.

Graphics were used in 14 of the 15 (93.3%) with 10 of the 14 (71.4%) of photo quality in 2001 and 2005. In 2009 the quality and rapidity of streaming video embedded within the sites has fostered a much wider use of very high quality HD level graphics in all of the investigated sites. However, graphics density on the page increased nearly 50% from 2001 to 2005. However, by 2009 the graphic density on the opening page had been reduced to less than 24%. Indications are that the growth between 2001 and 2005 was the result of enhanced bandwidth available to both the site designers and users. The large reduction between 2005 and 2009 may be the result of a more thorough understanding of customer needs and the value of simplicity.

Interestingly, none of the 2001 sites used animation and only one in 2005. In 2011 the number using animation had risen to two, Quantas and Air New Zealand. These two companies are merged at this point so the similarity is understandable. Page orientation was almost evenly divided in 2001 with eight sites using landscape and seven using portrait but in 2005 only two retained the landscape orientation and by 2009, none.

Information density can prove intimidating to a new user, yet airlines showed wide variations. The 2001 word count on opening pages ranged from 38 to 266 with a mean of 126. Surprisingly, this had significantly increased to 33 to 217, mean 170 in 2005. Fortunately for users mean density had significantly dropped to less than 150 by 2009.

Combined raters estimates of visual density had a minimum of 4.0 (4.4) and a maximum of 8.0 (6.6). In essence the range has narrowed with the mean staying the same. An 8.0 indicates that approximately 80% of the page is covered by text or graphics. Following the rate of decrease in graphic density, information density fell rapidly from 2005 to 2009 to approximately 3.0.

Other aspects investigated included usability on four attributes: number of screens necessary to book a flight; help facilities; information presentation clarity, and ease of data entry.

The average site required that six screens be viewed to complete an order (minimum 4 – maximum 11) and this was unchanged in 2005. By 2009 the maximum had fallen to seven and the minimum remained at 4. To quote Powell and Conca regarding general EC web-sites; ‘From a usability standpoint, four screens is probably high; in typical business information systems, the general rule is that users should have to click no more than three times before being able to begin working’ (2001:290). However, prior research suggests that web users are not quite the same as other computer users (Dennis, 1998). In the investigation of usability attributes (Ease of Data Entry, Clarity of Instructions, Speed and Help) on a scale of one (very low or poor) to ten (excellent). Data Entry Ease was rated at a mean of 4.0 in 2001.

Ease of data entry in 2001 was rated highest for Air New Zealand at 5.7 and lowest for Japan Air at 2.3. But by 2005 Lufthansa was the best at 4.9 with JAL still lowest at 2.0. Through 2009 JAL remained in last place in this category at 2.0 with Delta taking the lead at 5.7.

Clarity of instructions with a mean of 2.6 for all sites is less than adequate. Ranking highest was Air France at 5.3 and lowest at 0.0 was Continental without instructions at all for 2001. In 2005 Lufthansa had improved from 2.9 to 5.1 to rank first with Northwest now last at 2.3. In 2009, Northwest in partnership with Delta gained several positions by combining sites with that of Delta.

Speed is measured as the time required to display the requested flight quotes ranged from 2.6 / 2.5 / 1.8 to 7.3 / 5.0 / 2.9 to with the average at 4.7 / 3.4 / 2.1 where 1.0 is the fastest. So there has been some improvement. As mentioned earlier, this factor is only partially under the control of the airline. Yet, there is some control and it appears that airlines have recognized the decreasing patience of web users with slow sites. Yet, JAL has had the slowest site since this ten years study began and there has been little improvement..

Help facilities were evaluated on availability, ease of use and usefulness as well as an overall assessment. All airlines had some Help facilities; however the variations in quality were substantial. Ease of use ratings ranged from 4.0 / 4.1 / 3.5 to 6.2 / 6.5 / 6.3 with means of 5.0 / 5.3 / 5.5, indicating insignificant advances.

Usefulness ranged from 2.1 / 3.7 / 3.5 to 5.2 / 5.8 / 5.6 with means of 3.8 / 4.6 / 4.8 Overall, ratings of the help features were generally poor with a mean of 3.9 (4.4) and a range of 2.3 (2.9) to 5.5 (6.5). Obviously some airlines, notably United (6.6) and Southwest (6.5) are paying some attention to the Help feature.

After completing the above evaluations, each rater was then asked to rank each airline from best to worst, one to fifteen. Delta ranked first with an average rank of 3.0/ 2.3 / 2.8 in 2001 and 2005 then to second in 2009. American fell from second at average rank 3.8 to fifth with a 7.0 then attained first with an average of 2.6. Northwest made the most remarkable improvement jumping from fourteenth into seventh place, then into fourth in 2009. In 2001 the four lowest ranked airlines were KLM (11.7); Lufthansa (11.4) with Japan Air and Qantas tied at 11.3. In 2005 the four worst were Southwest at 12th falling from fourth, KLM falling from

thirteenth to fourteenth, and JAL falling from eighth to fifteenth and Lufthansa remaining at 11.4.

The final four in 2009 were JAL at 13.8, Lufthansa at 12.2, KLM at 10.5 with Quantas and Air France tied at 9.4. Only Air France and JAL fell in each of the wave rankings.

CONCLUSIONS AND RECOMMENDATIONS

From the consistently low rating on every selected criterion, it is apparent that airlines continually need to reevaluate their EC sites. Since humans are such visually intensive beings, it is obvious that this aspect of web page design requires considerable attention. As evaluated, the visual aspects of the majority of these pages are cluttered, confusing and not particularly aesthetically pleasing. In the area of information density and graphics density the airlines do seem to have improved from the point of view of the users. However, it appears that although some companies have investigated the effects of color, most are constricted by the need to use corporate color schemes in their sites. This may not be the most productive avenue. Certainly there are other methods to support the integrated marketing communications mantra and yet allow the most effective colors to be utilized in the site itself.

More importantly, they do not create a feeling of confidence in the use because of poor instructions and difficult, less than useful help features. Some attempts at simplification and improvements in Ease of Use have occurred, but not enough. Although most reading this paper certainly have the ability to use airline web-sites with little or no difficulty, this may not hold true for the general population. With costs of airline travel within the reach of most consumers, many new potential flyers are entering the market with limited computer experience. Unlike the expert web surfer, this segment of the market requires simple, straightforward, and easy to use and understand EC sites. In particular, they need excellent help facilities.

Along those lines, commercial software providers have long understood the importance of help facilities. Consider the Help available in Word, Excel, PowerPoint and many other applications. None of the airline sites visited had Help facilities that would have passed the scrutiny of any competent applications programmer. Perhaps adaptive web designs could be used to continuously upgrade each site as usage patterns emerge.

Major improvements made by Airtran and to some extent Northwest appear to be in the increased information return speed, clarity of instructions and ease of use. Evidently these aspects are of particular importance to the user when their overall ratings significantly improved. Airtran's ranking rose from 9.4 in 2001 to 5.2 in 2009 and those of Northwest from 12.8 in 2001 to 4.3 in 2009.

These findings explicitly point to a need for airlines to pay increased attention to web-site design. Specifically, pages should be simplified, advertising limited and usability and ease of use need to be significantly improved. Most importantly, web page design must be controlled by the marketing department, not the IT department. Consumer behavior is the venue of marketers, not programmers. As airlines increase their dependence on web-sites for bookings, the use of travel agents decreases and the market expands, web-site design will play an increasingly critical role in airline profitability.

Ultimately the success or failure of any commercial web site depends on the consumer. This research suggests that ease of use, usefulness and certain aesthetic characteristics of airlines

sites are critically important to the user and therefore to the success or failure of the site and perhaps the company.

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APPENDIX

Table One

Variable	Rank			Rank Change		
	2001	2005	2009	2001	2005	2009
Delta	3.0	2.3	2.8		0.7	-0.5
American	3.8	3.7	2.6		0.1	1.1
Continental	5.2	7.0	6.8		-1.8	0.2
United	5.7	5.5	5.9		0.2	-0.4
Southwest	7.4	7.5	4.2		-0.1	3.3
Frontier	7.9	7.3	8.4		0.6	-1.1
British Air	8.2	7.6	6.9		0.6	0.7
Air France	8.6	8.8	9.4		-0.2	-0.6
Japan Air	8.7	11.3	13.8		-2.6	-2.5
Air New Zealand	9.1	9.5	7.6		-0.4	1.9
Qantas	9.4	11.3	9.4		-1.9	1.9
Airtran	9.4	6.8	5.2		2.6	1.6
KLM	10.3	11.7	10.5		-1.4	1.2
Lufthansa	11.6	11.4	12.2		0.2	-0.8
Northwest	12.8	7.0	4.3		5.8	2.7
Mean	8.3	7.9	7.3		0.58	-0.6
Std. Deviation	3.1	2.8	3.3		1.6	1.6
Median	7.8	7.5	6.9		0.70	-0.9
Std. Error	0.79	0.73	0.86		0.41	0.56

Table Two

Variable	Ease of Use			Usefulness			Aesthetics			Overall I		
	2001	2005	2009	2001	2005	2009	2001	2005	2009	2001	2005	2009
Delta	5.0	5.7	6.3	3.6	4.0	4.6	3.4	3.3	3.1	2.2	2.3	3.6
American	4.6	5.3	5.7	3.8	4.2	4.4	4	4.2	4	2.4	2.5	3.2
Continental	5.4	6.3	6.3	3.7	4.5	4.3	3.6	3.7	3.6	3.5	4.0	3.8
United	4.8	5.2	5.4	3.5	4.2	4.5	3.5	3.5	3.4	3	3.5	3.6
Southwest	4.9	5.2	6.0	3.4	4.3	4.4	3.6	3.5	3.6	3	2.7	3.4
Frontier	4.7	4.7	5.2	4.1	5.0	5.4	4.3	4.2	4.5	4.1	4.2	4.2
British Air	5.0	4.9	5.3	4.0	4.8	5	4	3.8	4.2	4.1	4.1	4.6
Air France	6.0	6.5	5.8	5.2	5.8	5.6	4.7	5.0	5.1	4.6	5.5	5.6
Japan Air	3.5	4.1	3.5	2.1	4.4	3.5	3.8	3.7	3.8	3.5	4.4	3.5
Air New Zealand	5.1	5.2	5.9	4.6	5.0	5.2	4.5	4.3	4.3	4	4.5	4.8
Qantas	6.2	6.3	5.9	4.2	5.5	5.2	5.4	5.3	5.4	4.6	5.2	5.4
Airtran	5.4	5.3	6.2	3.4	3.7	4	3.2	2.7	3.4	2.7	3.0	3.6
KLM	4.7	4.8	4.5	3.9	5.0	5.3	4.5	5.0	4.8	4.1	4.5	4.8
Lufthansa	4.0	4.1	4.0	4.1	5.0	5.1	5.8	5.4	5.5	4.5	4.6	4.9
Northwest	5.2	5.6	5.9	3.1	4.1	4.8	4.1	4.0	4.1	2.9	3.3	4.1
Mean	5.0	5.3	5.5	3.8	4.6	4.8	4.2	4.1	4.2	3.5	3.9	4.2
Std. Deviation	0.67	0.74	0.85	0.70	0.60	0.58	0.73	0.79	0.75	0.81	0.97	0.76
Median	5.0	5.2	5.8	3.8	4.5	4.8	4.0	4.0	4.1	3.5	4.1	4.1
Std. Error	0.18	0.20	0.22	0.18	0.20	0.15	0.19	0.20	0.19	0.21	0.25	0.20