When Buying On-line, Does Price *Really* Matter?

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ABSTRACT
We studied how consumers make decisions about purchasing airline tickets on-line. The results suggest trends in how decisions are made to purchase products with multiple decision parameters. We found that *price matters* in that parameters ranked as more important than price are hard requirements whereas parameters ranked as less important than price are only preferences. These results have implications for the design of on-line shopping agents.

Keywords
Air travel, consumer behavior, purchase preferences.

INTRODUCTION
How do consumers make purchasing decisions when many product attributes affect that decision? An airline ticket is an example of a product with many parameters – in addition to price – that affect its purchase. One reasonable assumption about how people make decisions to buy airline tickets is that for each parameter of a flight (such as time, airline, and so forth), there are a range of acceptable values, and that certain parameters (such as price) should be minimized. Another reasonable assumption is that when investigating flights, consumers have an "ideal flight" in mind, with the best purchase being the flight closest to the ideal flight. These specific assumptions directed the development of Sardine, an agent-based interface for purchasing airline tickets on-line [1].

Sardine collects a buyer's flight preferences by asking the buyer to indicate an ideal value for each parameter and to indicated a flexibility rating ("not," "somewhat," or "very" flexible) on each value. The flexibility rating of each parameter is used to indicate a buyer's acceptable range of values for the parameter and the relative importance of the parameter. The buyer's ideal flight and the flexibility ratings are used to calculate the buyer's utility and then present potential flights for purchase.

In the work outlined here, we set out to explore Sardine's assumptions about how people conceptualize the decision parameters of complex products. We conducted a study of how consumers shop for airline tickets on-line. Specifically, we first asked consumers what kind of ticket they were looking for, then monitored what these consumers actually did when searching travel web sites (using a web proxy application constructed with the WBI development kit [2]), and finally interviewed the consumers to confirm our observations and ask specific questions about the choices made.

ON-LINE BUYING STUDY
We conducted the study at the IBM Almaden Research Center. Sixteen researchers and student interns volunteered to participate. These participants agreed to be tracked while shopping for airline tickets on the web. They first filled out a web-based form, entering a free-text description of what they were looking for. This information was used to determine the participant's acceptable ranges for the parameters of a flight.

As the participant searched for flights on a travel web site (either www.expedia.com, www.travelocity.com, www.southwest.com, or www.priceline.com), the WBI-based application collected information about the travel pages visited as well as form data sent by the participant back to the site. This information was used to confirm or dispute the preferences described in the initial free-text survey.

Follow-up interviews were conducted one-on-one, using a set list of questions. The follow-up interview asked the user to rank the relative importance of the different flight parameters, to state which parameters were flexible, and to clarify any confusion over the collected web data.

Flight Parameters	Parameter Requirements / Preferences	Rank	Stated Flexible
Date/Time	Begin: [9/1] End: [9/3, PM – 9/4, AM]	1	
Price	Minimize	2	
Airport	(Hartford, CT) TO (Any Houston, TX airport)	3	X
Airline	Any	4	X
Total Travel Time	No maximum	5	X
Connecting Cities	No preference	6	X

Table 1:Study Results for One User

In the end, we had sixteen data sets including the preferences for each parameter of a flight, ranked lists of parameters, and which parameters were considered to be flexible. The participants varied greatly in their level of travel expertise and requirements for travel. In general, the more frequent the traveler, the more specific the requirements. Table 1 shows a sample of the data.

PURCHASING MODEL

We broke the decision parameters of an airline ticket purchase into six variables: *price, date/time, airports, airlines, total travel time,* and *connection airports*. Given these parameters, we developed a method for describing the values and ranges the participants specified for each. Our analysis focuses on how participants conceptualized relationships among the six parameters.

As mentioned, during the follow-up interview, each participant was asked to rank the importance of each flight parameter for this particular purchase. Comparing each participant's actions at the travel site with the ranking, we discovered a distinctive pattern in the way participants ranked the parameters. In every case, when the participant could not find a flight that fell within his or her stated acceptable range for each parameter (including price), the participant would either search for flights outside the defined range for the parameters that were ranked *below* price, or stop searching and not purchase a ticket. From this pattern, it seems clear that when a parameter is ranked *more important than price*, its value is considered to be a *requirement* for purchase. If the parameter is ranked *less important than price*, the acceptable ranges can be seen as *preferences rather than requirements*.

Users	Behavior
Users Not Ranking Price First (6 users)	
All	Stated flexibility on every parameters ranked below price.
3	Stated not flexible on some of the parameters ranked above price.
3	Stated not flexible on any of the parameters ranked above price.
4	Specifically said they'd pay a higher price to get the parameters they wanted.
Users Ranking Price First (10 users)	
8	Stated flexibility on all parameters other than price.
1	Canceled trip because could not find ticket within parameters.
1	Planned to consider other travel means to get the price and dates he needed.

Table 2: Results Summary

From this it follows that if a consumer has requirements for a trip that are more important than price, then the consumer will purchase a ticket and if necessary will compromise on price to meet the required parameters. If the consumer ranks price as the most important parameter, then if a good price cannot be found given the preferred values of lower ranked parameters, the trip will be canceled. Of our sixteen participants, six ranked one or more parameters as more important than price. All six of these participants stated that they were flexible on every parameter ranked below price and four of these participants acknowledged they were willing to pay a high price for the ticket they wanted. The remaining ten ranked price as the most important parameter, and these participants either (a) stated a willingness to broaden their initial flight preferences, (b) canceled the trip when prices were too high, or (c) said they would find alternate ways to purchase an inexpensive ticket, for example, by using frequent flier miles. Table 2 illustrates these results.

Put simply, when a consumer ranks a flight's parameters from most important to least important, price plays a *pivotal* role. Any parameter ranked above price is a hard requirement and any parameter ranked below price is a preference that might be adjusted to gain a better price.

CONCLUSIONS AND FUTURE DIRECTIONS

Based on this study, we have a new representation of how a consumer attempts to find the right flight at the right price. These results provide an interesting twist on our original assumptions. First, no participant described an ideal flight, but instead described acceptable ranges for flight requirements. Second, the primary importance of price cannot be overlooked. Though not the sole parameter determining a purchase, price certainly plays a central role in the decision. That is, a consumer may readily state ranges for the different parameters of a flight, but some of those parameter ranges are actually considered to be *required* and others are only *preferred*, as determined by their ranking in relation to price.

Although this study provides an interesting analysis of consumer behavior on a travel site, a more extensive study might offer more reliable results. For instance, because many participants were IBM student interns, this particularly price-sensitive user base may have skewed the data. In general, students tend to have flexible dates and strict pricing requirements, which resulted in many of our participants ranking price as the most important parameter, ultimately choosing not to purchase a ticket.

The purpose of our investigation was to inform the design of an agent-based interface supporting multi-parameter on-line purchase decisions, such as Sardine [1]. Given our new understanding of the pivotal role of price in making such decisions, we can now develop an interface that supports the elicitation of parameters and acceptable ranges that makes clear each of the ranking, the requirements, and the preferences.

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