

Oracle America v. Google – Expert Reply Report of Steven Shugan – October 10, 2011 – Subject to Protective Order (Contains Confidential and Highly Confidential/Attorneys’ Eyes Only Material)

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

_____)	
ORACLE AMERICA, INC.)	
)	
Plaintiff,)	
)	
v.)	Case No. 3:10-CV-03561-WHA
)	
GOOGLE, INC.)	
)	
Defendant.)	
_____)	

EXPERT REPLY REPORT OF PROFESSOR STEVEN M. SHUGAN

October 10, 2011

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I. INTRODUCTION

A) Qualifications

My name is Steven M. Shugan. I am currently the McKethan - Matherly Eminent Scholar and Professor at the University of Florida, where I teach multivariate statistics, marketing models, and advanced marketing management. I hold a Ph.D. in Managerial Economics from Northwestern University and my research includes, among others, statistics, metrics, and marketing. My fields of specialization within marketing include marketing strategy, marketing research, quantitative models, and consumer decision making. A more complete discussion of my qualifications was provided in my original Expert Report and I incorporate that report, as well as the Appendices to that report listing my curriculum vitae (Appendix A) and my testimony and reports in the past five years (Appendix B) by reference.¹

I have directed employees of Analysis Group, Inc. (“Analysis Group”), an economics research and consulting firm, to assist me in this assignment. I am being compensated at an hourly rate of \$600 for time spent on the matter. In addition, I receive compensation based on the professional fees of Analysis Group. No compensation is contingent on the nature of my findings or on the outcome of this litigation.

B) My Assignment

In my Expert Report, I was asked by Counsel for Oracle America, Inc. (“Oracle”) to evaluate consumer preferences for Smartphone features. In this Reply Report, I have been asked by Counsel to review and comment on the Expert Report of Dr. Gregory K. Leonard as it relates to my analyses.²

¹ Expert Report of Professor Steven M. Shugan, September 12, 2011 (“Expert Report”).

² Expert Report of Dr. Gregory K. Leonard, October 3, 2011 (“Leonard Report”).

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A list of the materials that I have relied upon in forming my opinions is contained in Reply Appendix A.

This Reply Report summarizes the opinions I have formed on the arguments presented in the Leonard Report as they relate to my analyses.

C) Summary of Conclusions

Dr. Leonard critiques the use of choice-based conjoint surveys by claiming that “hypothetical choice surveys are subject to various biases that can render the results unreliable,”³ but his critiques are not supported by the academic literature. In fact, the literature – including those sources that Dr. Leonard cites – is nearly unanimous in concluding that conjoint surveys are a valuable, reliable, and widely accepted method with widespread commercial and other applications. Dr. Leonard mischaracterizes and confounds findings in the environmental economics and marketing literatures that he cites; for example, one exhaustive review article finds that hypothetical bias is minimized in conjoint studies, while Dr. Leonard implies the opposite. Furthermore, Dr. Leonard does not prove the existence of any purported bias or attempt to evaluate the extent or direction of any purported bias in the results of the 2011 Smartphone Survey.

Dr. Leonard claims that there are “problematic aspects” with the design of my 2011 Smartphone Survey, including, for example, the selection of features for the choice task and the omission of features that he claims would affect consumer demand. Dr. Leonard incorrectly asserts that the design of the survey has been driven solely by the current litigation and he mischaracterizes the support I provided to validate the design of the survey (as well as my

³ Leonard Report, p. 109.

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deposition testimony explaining the design). The 2011 Smartphone Survey was designed and conducted in an unbiased and reliable manner using methods based on proven scientific research.

Dr. Leonard claims that the feature preferences of the respondents to the 2011 Smartphone Survey are inconsistent with economic preferences that he believes all consumers should have. In fact, Dr. Leonard’s analyses of the survey results are inaccurate, and he mischaracterizes the data collected from the survey. His analyses support the conservative nature of my analyses, as I did not exclude respondents who gave answers that were inconsistent with my prior beliefs or exclude respondents that would tend to increase the preference share losses associated with the copyright and patent infringements. Furthermore, I demonstrated that the results are reliable and robust and they are supported by market data.

Dr. Leonard claims that there are econometric issues in my report because I did not provide standard errors and confidence intervals on the point estimates of my preference share calculations. Dr. Leonard appears to be unaware that standard errors for the market simulations were included in the backup materials of my Expert Report, and that analysis of confidence intervals in conjoint simulations is not standard procedure.

II. OVERVIEW

As I discussed in my Expert Report, I was asked to evaluate consumer preferences for various features of Smartphones. I developed a choice-based conjoint study, the 2011 Smartphone Survey, to measure the effect of specific functionality related to the patents-in-suit and Java copyrights on consumer demand and to estimate the effect of altering particular features. The features that I used in my study are application multitasking, application startup time, availability of third-party applications, mobile operating system brand, price, screen size,

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and voice command capabilities. Each of these features was defined by three to four levels of functionality. The results of my study indicate that Android sales but-for the feature enhancements enabled by the patents-in-suit and the Java copyrights would have been at least 7.9 percent lower if availability of applications was reduced and at least 19.9 percent lower if application startup time was increased. Collectively, Android sales would have been at least 25.7 percent lower but-for these infringements.

I explained the purpose of my conjoint analysis in deposition.⁴ When asked, “[w]ouldn’t information about what phones consumers actually bought and why also help you validate results of the conjoint analysis?” I explained the following: “That’s exactly what we used there. We used the attributes that people use in their actual purchasing decisions. And *the goal here, again, is not to predict which phone they would purchase*, but of the different phones in the market, if one of them changed, how would they change their purchasing decision.”⁵ Dr. Leonard quoted only the italicized portion of my testimony in his report; fully quoted, my answer is correct.

III. DR. LEONARD MISREPRESENTS MY STUDY DESIGN AND MY TESTIMONY

Dr. Leonard repeatedly misrepresents my study design procedures, the purpose of my study, and my deposition testimony.

Dr. Leonard incorrectly suggests that my survey was designed solely based on this litigation.⁶ In fact, I testified in deposition that a variety of factors influenced my choice of

⁴ Leonard Report, p. 112, fn. 343.

⁵ Deposition of Steven M. Shugan, *Oracle America, Inc., vs. Google, Inc.*, No. CV 10-03561 WHA, United States District Court, Northern District of California San Francisco Division, September 26, 2011 (“Shugan Deposition”), p. 83.

⁶ Leonard Report, p. 111 and fn. 341.

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features and levels for the 2011 Smartphone Survey.⁷ The survey tested the features that were relevant for the litigation, so that it would provide results that would be useful in determining the market impact of the patents and copyrights-in-suit. I also included other features actually present in the market to deliver a reliable, realistic result; I specifically included the two most important weighted features (as they are for most products), operating system brand and price, to render the results correct. As I explained:

Now, some of the features were communicated to me through Analysis Group that they were required features and need to be there. Other features I decided should be there, and there were other features that Cockburn decided needed to be there. And then in the end, I put it all together and decided which ones to actually include in the analysis. So the – there wasn’t one source where all of the features came from.⁸

I designed and implemented the 2011 Smartphone Study by talking with customers and conducting market research to identify key product characteristics, by pre-testing the survey design to confirm that the questionnaire was comprehensible and did not reveal the sponsor or intention of the survey, and by distributing the survey using a reputable panel company with representative respondents. In addition, I spoke with Professor Cockburn to determine which features and feature levels were necessary to evaluate the effect on demand for Android resulting from the functionality enabled by the patents-in-suit and Java copyrights at issue. Professor Cockburn indicated that I should include platforms with small, medium, and large numbers of available applications; that I should include application launch times consistent with nearly

⁷ Shugan Deposition, p. 29.

⁸ Shugan Deposition, p. 29. Dr. Leonard uses my deposition testimony out of context. As my complete answer shows, I was explaining that relatively less important features need not be included in the conjoint analysis because these features are held constant and there is no need to make predictions about how changes in those attributes would influence market shares in my analysis. As I describe below, inclusion of these features would complicate the task faced by the consumer, lead to less precise estimates, and generally result in an inferior analysis.

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instant, two seconds, and four seconds;⁹ and that I should include multitasking functionality that reflects products available in the marketplace.¹⁰ As is standard in survey design, I included other relevant features, including price and operating system brand, which tend to be the most valuable for recognizable products.

The specific levels of functionality selected for all of the features (including those identified by Professor Cockburn as relevant to this litigation) were based on market research and evaluation of existing products on the market. Specifically, I selected the four leading operating systems for Smartphones, available screen sizes for Smartphones, multitasking functionality, application portfolios advertised for leading Smartphones, and voice command functions that are available on Smartphones.¹¹ I also evaluated the prices for Smartphones

⁹ Dr. Leonard also misrepresents my testimony regarding the extrapolation of these application launch times: “Dr. Shugan assumed that the market share would follow a linear path from four seconds all the way out to eight seconds ... there is no basis in the data for assuming linearity as opposed to any other shape (Leonard Report, p. 116). However, I did provide the basis for this assumption as I explained in my deposition: “a linear approximation would be conservative...” (Shugan Deposition, p. 109).

¹⁰ See Exhibit 1 of my Expert Report for the list of product features identified in the interviews and focus group.

¹¹ “ComScore Reports March 2011 U.S. Mobile Subscriber Market Share,” *ComScore*, May 6, 2011, http://www.comscore.com/Press_Events/Press_Releases/2011/5/comScore_Reports_March_2011_U.S._Mobile_Subscriber_Market_Share; “In U.S. Smartphone Market, Android is Top Operating System, Apple is Top Manufacturer,” *Nielson Wire*, July 28, 2011, http://blog.nielsen.com/nielsenwire/online_mobile/in-u-ssmartphone-market-android-is-top-operating-system-apple-is-top-manufacturer/; “The NPD Group: Larger Smartphone Screens Gain in Popularity,” *The NPD Group*, March 21, 2011; German, Kent, “Apple iOS 4 Review,” *CNET Reviews*, June 21, 2010, http://reviews.cnet.com/8301-19512_7-20008259-233.html; “Active Apps/Task Manager,” Android Market, <https://market.android.com/details?id=com.elnware.ActiveAppsWidget>, visited on September 7, 2011; “Windows Phone 7: Mango Update,” *Dotnet-Red Zone*, April 17, 2011, <http://dotnetredzone.blogspot.com/2011/04/windows-phone-7-mango-update.html>; Crum, Rex and Dan Gallagher, “Apple Unveils Latest Software Upgrade for iPhone; Update Provides Multitasking, Advertising Tools and Unified Mail Inbox,” *Market Watch*, April 8, 2010; Wauters, Robin, “There Are Now More Free Apps for Android than for the iPhone: Distimo,” *TechCrunch*, April 27, 2011, <http://techcrunch.com/2011/04/27/there-are-now-more-free-apps-for-android-than-for-the-iosplatform-distimo/>; Albanesius, Chloe, “Android Market Hits 100,000 Apps,” *PCMag*, October 25, 2010, <http://www.pcmag.com/article2/0,2817,2371436,00.asp>; “App Catalog Gallery,” *PreCentral.net*, http://www.precentral.net/app_gallery-app_catalog, visited on September 7, 2011; Bradley, Tony, “Getting Things Done with Froyo Voice Actions,” *PCWorld*, August 13, 2010,

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available through three different major carriers, two of whom carry all of the operating systems included in the study.¹² Each of these features was mentioned in both the qualitative interviews and in the market research as relevant to consumer decision making.

In addition, Dr. Leonard further misrepresents my explanation of the purpose of my conjoint analysis by citing only portions of the description I provided at my deposition (again the portion cited by Dr. Leonard is in italics):

*[A] conjoint analysis is asking them the profile questions and not the question of whether or not they could – they could still buy the phone in a physical form after seeing it. The question is if a feature changed on a phone that you’re familiar with, which you may or may not have seen physically, would you be more likely or prefer it. And this is sort of a very standard thing that people do all the time.*¹³

http://www.pcworld.com/businesscenter/article/203233/getting_things_done_with_froyo_voice_actions.html; Devereux, William, “Windows Phone Mango to Support Hands-Free Communication,” *AnythingButiPhone*, May 24, 2011, <http://anythingbutiphone.com/3191>; and “Available Voice Commands,” *BlackBerry*, http://docs.blackberry.com/en/smartphone_users/deliverables/18335/Available_voice_commands_825913_11.jsp, visited on September 6, 2011.

¹² “How Much Does a Smartphone Cost?” *CostHelper.com*, July 2011, <http://www.costhelper.com/cost/electronics/smartphone.html>; “Smartphones,” *FindTheBest.com*, <http://smartphones.findthebest.com/>; “BlackBerry Bold 9900 4G-Black: Overview,” *T-Mobile*, <http://www.t-mobile.com/shop/Phones/cell-phone-detail.aspx?cell-phone=BlackBerry-Bold-9900-4G-Black>, visited on September 7, 2011; “Apple iPhone 4 32GB,” *AT&T*, http://www.wireless.att.com/cell-phoneservice/packages/packages-details.jsp?q_package=sku4710253, visited on September 7, 2011; “Droid Charge by Samsung,” *Verizon Wireless*, <http://www.verizonwireless.com/b2c/store/controller?item=phoneFirst&action=viewPhoneDetail&selectedPhoneId=5642&deviceCategoryId=1>, visited on September 7, 2011; “HTC Sensation 4G,” *T-Mobile*, <http://htc.t-mobile.com/sensation>, visited on September 9, 2011; “Apple iPhone 4-16GB in White,” *Verizon Wireless*, <http://www.verizonwireless.com/b2c/store/controller?item=phoneFirst&action=viewPhoneDetail&selectedPhoneId=5654&deviceCategoryId=1>, visited on September 7, 2011; “HTC HD7S,” *AT&T*, http://www.wireless.att.com/cell-phone-service/cell-phonedetails/?device=HTC+HD7S&q_sku=sku5200276#fbid=Shs5jLifkBV, visited on September 7, 2011; “BlackBerry Bold 9780-Black-No Camera,” *T-Mobile*, <http://www.t-mobile.com/shop/Phones/cell-phonedetail.aspx?cell-phone=BlackBerry-9780-Black-No-Camera>, visited on September 7, 2011; and “HTC Trophy,” *Verizon Wireless*, <http://www.verizonwireless.com/b2c/store/controller?item=phoneFirst&action=viewPhoneDetail&selectedPhoneId=5635>, visited on September 7, 2011.

¹³ Leonard Report, p. 111, fn. 340; and Shugan Deposition, pp. 66-67.

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IV. CONJOINT ANALYSIS IS A RELIABLE PREFERENCE MEASUREMENT TOOL

Dr. Leonard’s critiques of the 2011 Smartphone Survey and the use of choice-based conjoint surveys are not supported by the academic literature and are contradicted by the widespread application of conjoint analysis in commercial and other fields. Dr. Leonard claims that “it is recognized in the economics, marketing, and survey literature that stated preference surveys, such as the Shugan survey, are susceptible to serious biases as a result of the hypothetical and artificial nature of the exercise that survey respondents are asked to complete.”¹⁴ Dr. Leonard further claims that “[c]onjoint stated preference surveys are as susceptible to hypothetical bias as other types of stated preference surveys” and supports his claims by citing academic articles.^{15, 16} Neither of these statements is true.

Dr. Leonard both misrepresents my survey design and the literature he cites. Dr. Leonard first inaccurately characterizes my survey as eliciting “stated preferences.” In fact, it is well-recognized that conjoint studies are more accurate than direct questioning of preferences because the choice-based exercises require respondents to trade off features and to reveal their preferences from their choices. Dr. Leonard misrepresents the literature he cites by either taking excerpts out of context or by misinterpreting the findings reported by the authors. For example, the Diamond and Hausman (1994) article cited by Dr. Leonard does not criticize preferences

¹⁴ Leonard Report, p. 108.

¹⁵ Leonard Report, p. 109.

¹⁶ NERA Economic Consulting published a white paper that “examine[s] small/medium commercial and industrial customers’ choices among energy suppliers in conjoint-type experiments.” The article was also published in *The Energy Journal*. (Goett, Andrew A., Kathleen Hudson, and Kenneth Train, “Customers’ Choice Among Retail Energy Suppliers: The Willingness-to-Pay for Service Attributes,” *The Energy Journal*, Vol. 21, No. 4, 2000, pp. 1-28.)

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revealed by conjoint analysis, as he claims. The article is specifically evaluating the measurement of preferences for environmental protections, an abstract public good, rather than a tangible consumer product. The article concludes that the primary problem with environmental survey analysis is that people’s preferences are ill-formed. Diamond and Hausman do not conclude that there is a problem with a survey instrument such as conjoint analysis, rather the authors conclude as follows:

[Our] skepticism comes from the belief that the internal consistency problems come from an absence of preferences, not a flaw in survey methodology. That is, we do not think that people generally hold views about individual environmental sites (many of which they have never heard of); or that, within the confines of the time available for survey instruments, people will focus successfully on the identification of preferences, to the exclusion of other bases for answering survey questions. This absence of preferences shows up as inconsistency in responses across surveys and implies that the survey responses are not satisfactory bases for policy.¹⁷

Notably, as this excerpt illustrates, Dr. Leonard is generally citing articles from the environmental economics field, not marketing literature; such studies are irrelevant to assessing the reliability of a conjoint study in this matter. Problems with evaluating consumer preferences for public goods, particularly those with indirect value, can lead to difficulties in measuring consumer preferences through surveys. However, even within the environmental economics literature, choice-based conjoint analysis – the method that I use in my Expert Report – is a good way to minimize so-called hypothetical bias¹⁸ that Dr. Leonard discusses. In fact, an article that

¹⁷ Diamond, Peter A., and Jerry A. Hausman, “Contingent Valuation: Is Some Number Better than No Number?” *The Journal of Economic Perspectives*, Vol. 8, No. 4, 1994, pp. 45-64 at p. 63.

¹⁸ Dr. Leonard states that “[a]t his deposition, Dr. Shugan did not seem to understand the nature of hypothetical bias” (Leonard Report, p. 109, fn. 336). However, in my deposition, I explicitly stated that there are different types of bias and that the questions posed to me were not sufficiently specific. I testified: “Well, I think you’re using the word ‘bias’ very casually. Conjoint analysis is used to estimate accurately what would be the change

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does an exhaustive review of the relevant literature in economics summarizes 28 published articles as follows:

The positive and significant coefficient for Choice indicates that the choice-based elicitation mechanisms are associated with **less hypothetical bias**. There may be several reasons for this finding.... From a psychological perspective, the process of making choices is quite different from that of pricing ... some choice formats, **like conjoint**, allow respondents to directly express ambivalence, indifference or uncertainty. Since a high level of uncertainty is often associated with significant hypothetical bias, choice formats may produce less bias.¹⁹

Dr. Leonard also selects articles from the consumer behavior and psychological literature to support his skepticism of conjoint analysis. However, most of the consumer behavior articles cited by Dr. Leonard never mention conjoint analysis. For example, the Bettman, Luce, and Payne (1998) article does not consider conjoint analysis or hypothetical bias, nor does the article even discuss surveys. The article rejects the basic premise underlying nearly all economic analysis (of survey or real-world behavior) called “rational choice theory” in favor of “bounded rationality,” and makes no specific mention of conjoint analysis.²⁰

In fact, Dr. Leonard cites articles that often specifically conclude the opposite of what he claims in his report. For example, Dr. Leonard uses the Miller et al. article to support his claim that “[c]onjoint stated preference surveys are as susceptible to hypothetical bias as other types of stated preference surveys.”²¹ However, the Miller et al. articles states “Our mean bias analysis

in market share of products given changes in market conditions. It’s been around for 30 years and shown to be very accurate in doing that.” (Shugan Deposition, p. 72)

¹⁹ Murphy, James J., P. Geoffrey Allen, Thomas H. Stevens, and Darryl Weatherhead, “A Meta-Analysis of Hypothetical Bias in Stated Preference Valuation,” *Environmental and Resource Economics*, Vol. 30, No. 3, 2005, pp. 313-325 at p. 320 (emphasis added).

²⁰ Bettman, James R., Mary Frances Luce, and John W. Payne, “Constructive Consumer Choice Processes,” *Journal of Consumer Research*, Vol. 25, No. 3, 1998, pp. 187-217 at p. 187.

²¹ Leonard Report, p. 109.

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uses the criterion of overlapping confidence intervals and cannot confirm the existence of a hypothetical bias. This result suggests that in our data set, all methods have a high convergent validity in measuring consumers’ mean WTP [willingness to pay].”²² Moreover, this article concludes that hypothetical methods “may still lead to the right demand curves and right pricing decisions.”²³

Dr. Leonard’s report suggests that there is a critical flaw with any conjoint analysis that leads to “hypothetical bias.”²⁴ Despite hundreds of published articles on conjoint analysis in the top marketing journals, only a very small number even mention so-called hypothetical bias. Even the Ding (2007) article cited as an example of the existence hypothetical bias by Dr. Leonard states that “[c]onjoint analysis is a centerpiece of marketing research. Since the methodology was introduced to marketing approximately 30 years ago in a seminal article by Green and Rao (1971), researchers have been continuously realizing new and major advances in the field, including hierarchical Bayesian estimation.”²⁵

Despite very wide-spread recognition of the validity of conjoint analysis, a few recently published articles (most by Professor Ding) advocate a more complex form of conjoint analysis to eliminate so-called hypothetical bias. Whether promising or not, the approach advocated by Professor Ding would not have been appropriate to use in this case. It is not used by reputable

²² Miller, Klaus M., Reto Hofstetter, Harley Krohmer, and Z. John Zhang, “How Should Consumers’ Willingness to Pay Be Measured? An Empirical Comparison of State-of-the-Art Approaches,” *Journal of Marketing Research*, Vol. 48, No. 1, 2011, pp. 172-184 at p. 177.

²³ Miller, Klaus M., Reto Hofstetter, Harley Krohmer, and Z. John Zhang, “How Should Consumers’ Willingness to Pay Be Measured? An Empirical Comparison of State-of-the-Art Approaches,” *Journal of Marketing Research*, Vol. 48, No. 1, 2011, pp. 172-184 at p. 182.

²⁴ Leonard Report, p. 109.

²⁵ Ding, Min, “An Incentive-Aligned Mechanism for Conjoint Analysis,” *Journal of Marketing Research*, Vol. 44, No. 2, 2007, pp. 214-223 at p. 214.

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survey firms and it has not been used in the field as a national survey. It has not been widely adopted; it remains untested in the literature; and it is, at present, controversial. In fact, Ding, Grewal, and Liechty (2005) state that, for Ding’s approach, a potentially “serious implementation challenge remains for expensive or complex products (e.g., automobiles) and for novel products for which a prototype may not exist. In the case of expensive products, it may not be cost effective to offer a real product to each study participant.”²⁶ The 2011 Smartphone Survey, by contrast, used a main-stream approach employing well-tested survey methods.

Finally, even if there *were* such a thing as hypothetical bias with respect to consumer good decision-making, the hypothetical bias discussed by Dr. Leonard would lead my results to understate the value of the functionality enabled by the patents-in-suit and Java copyrights. As the article by Ding concludes, any so-called hypothetical bias would lead to an undervaluation of recognizable physical features. Ding (2007) hypothesizes that “[i]t is conjectured that under hypothetical conditions, on average, participants tend to understate their valuation for physical features they are likely to use (e.g., speakers, the power adapter) and to overstate their valuation for physical features they are unlikely to use (cassette adapter).”²⁷ Hence, even accepting Dr. Leonard’s criticism as valid (which it is not), it would have meant that respondents in the 2011 Smartphone Survey likely underestimated the importance of application startup time because some applications are likely used on their existing devices and startup time is obviously observed, and it would render my results overly conservative.

²⁶ Ding, Min, Rajdeep Grewal, and John Liechty, “Incentive-Aligned Conjoint Analysis,” *Journal of Marketing Research*, Vol. 42, No. 1, 2005, pp. 67-82 at p. 78.

²⁷ Ding, Min, “An Incentive-Aligned Mechanism for Conjoint Analysis,” *Journal of Marketing Research*, Vol. 44, No. 2, 2007, pp. 214-223 at p. 221.

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The few articles cited by the Leonard Report that mention conjoint analysis also recognize that conjoint analysis methods and related survey methods are routine and that their application is based on years of research.²⁸ Applications of conjoint analysis occur in economics, marketing, psychology, statistics, market research, political science, the survey literature, and many other areas (all areas that I have studied). In fact, surveys involving hypothetical choices are commonly employed in nearly every sector of our economy by managers, executives, public policy makers, politicians, regulators, the courts, and many others. The number of applications of surveys and conjoint analyses involving hypothetical choices is too long to list in a single document. Applications also permeate numerous areas, including political polls, public policy, new product design, employee evaluations, and deceptive advertising claims. A simple Internet search reveals the overwhelming number of published refereed articles in scholarly journals that employ conjoint analysis. Examples of applications of conjoint analysis include the following:²⁹

- Design of AT&T’s first cellular telephone
- Design and implementation of the EZ-Pass toll collection system
- Development of new varieties of Mama Celeste pizzas
- New logo design for the Baltimore Ravens football team
- U.S. Navy reenlistment benefits
- New services for the Ritz Carlton and Marriott hotel chains

²⁸ Miller, Klaus M., Reto Hofstetter, Harley Krohmer, and Z. John Zhang, “How Should Consumers’ Willingness to Pay Be Measured? An Empirical Comparison of State-of-the-Art Approaches,” *Journal of Marketing Research*, Vol. 48, No. 1, 2011, pp. 172-184.

²⁹ Orme, B., *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research*, Second Edition, Madison Wis.: Research Publishers LLC, 2010.

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Furthermore, the results of the 2011 Smartphone Survey are consistent with analyses of pricing data. It is my understanding that Professor Cockburn conducted a hedonic analysis of consumer willingness-to-pay for specific Smartphone attributes using data on Smartphone purchases from eBay that yields results that are consistent with the 2011 Smartphone Survey. In addition, the base case preference shares predictions from the 2011 Smartphone Survey are consistent with actual market shares at the time when the survey was conducted.³⁰

V. DR. LEONARD DOES NOT PROVIDE EVIDENCE THAT THE 2011 SMARTPHONE SURVEY IS BIASED

Dr. Leonard claims that aspects of the design of the 2011 Smartphone Survey contribute to hypothetical bias.³¹ As I discussed above, the evidence cited by Dr. Leonard does not demonstrate that hypothetical bias would be present in my study.³² In fact, if hypothetical bias were present, it would only serve to understate the value of the functionality enabled by the patents-in-suit and the Java copyrights.

In addition to making general assertions about hypothetical biases, Dr. Leonard mentions the potential for other biases in my study. Despite discussing such “biases” for four pages, Dr.

³⁰ Kellogg, Don, “In U.S. Market, New Smartphone Buyers Increasingly Embracing Android,” *NielsenWire*, September 26, 2011, http://blog.nielsen.com/nielsenwire/online_mobile/in-u-s-market-new-smartphone-buyers-increasingly-embracing-android/ and Exhibit 3a of my Expert Report. Note that Dr. Leonard tries to misrepresent the validation procedures that I conducted: “At his deposition, Dr. Shugan acknowledged that ‘we didn’t go through the additional task of validating the conjoint analysis on the real-world purchases’ (Shugan Dep., p. 84)” (Leonard Report, p. 114, fn. 347). I was referring to an assessment of respondents’ phones that were purchased prior to the survey in that quote. With regards to a validity check using aggregated market data, I stated in deposition: “One, I forecasted or predicted what the actual market shares could be from the conjoint analysis and found that the observed shares in the market were very close to what the conjoint analysis predicts they should be.” (Shugan Deposition, p. 115).

³¹ Leonard Report, p. 111.

³² For example, Smith and Mansfield find “no significant differences between people’s choices with real and hypothetical offers.” (Smith, V. Kerry and Carol Mansfield, “Buying Time: Real and Hypothetical Offers,” *Journal of Environmental Economics and Management*, Vol. 36, 1998, pp. 209-224.)

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Leonard has not established the existence, the direction, or the extent of any bias in my 2011 Smartphone Survey. Dr. Leonard simply asserts, without support, that the survey design is biased, yet he fails to demonstrate that any one of the purported flaws in the study would increase the value of the features and functionality enabled by the patents-in-suit or the Java copyrights.

The 2011 Smartphone survey was carefully designed to optimize the accuracy of the results and to minimize any potential bias. I followed key design and implementation procedures to ensure that the study did not reveal the sponsor or the purpose of the study, the words and phrases were appropriate for the target customer group, and the product attributes were relevant to consumers.³³ In addition, I conducted the 2011 Smartphone Survey using a highly reliable Internet panel maintained by Knowledge Networks, which maintains a standing panel of recruited respondents designed to reflect the overall U.S. population.

As I discussed in my Expert Report, I relied on market research, interviews, and a focus group to identify the relevant features and their levels. The focus group was moderated to facilitate information exchange among the participants such that all features relevant to purchasing decisions were identified.³⁴ All of the features contained in my 2011 Smartphone Survey, including those required to evaluate the effect of the patents-in-suit and Java copyrights, were mentioned by consumers in qualitative interviews and were noted in market research. For example, in the interviews and the focus group, I learned that the number of applications

³³ See Section II and Appendix D of my Expert Report for a detailed discussion of how my 2011 Smartphone Survey was designed and conducted.

³⁴ Dr. Leonard notes that the focus group was not conducted personally by me (Leonard Report, p. 111). As I testified in my deposition, Dr. Rene Befurt conducted the focus group and interviews based on my direction. Dr. Befurt has been conducting market research in academia and the private sector for approximately 15 years.

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available for a phone was a key factor in even considering the purchase of a particular phone.

Furthermore, research showed that operating system brands advertise the number of applications available for their operating systems.

Dr. Leonard argues that the omission of some “attributes of a handset that are thought to affect consumer demand”³⁵ biases my results. In conducting surveys, it is necessary to balance the number of choice tasks required with increasing respondent fatigue and the tendency to err in choice selection. The pre-test of the 2011 Smartphone Survey confirmed, among other things, that the length of the survey did not lead to noticeable fatigue, indicating that I had included the correct number of attributes and levels.

As Dr. Leonard reports, phone design was not included in the choice options of the survey.³⁶ However, many of the specific design characteristics that Dr. Leonard argued were missing from the 2011 Smartphone Survey are correlated with screen size – which I did include in the study – and are thus incorporated into the survey. Furthermore, market research indicates that the physical design of Smartphones is similar and “many of them look the same,”³⁷ which suggests that such a feature would be unnecessary to include in the study.

Despite Dr. Leonard’s attempt to imply that the omission of some variables biases my results in favor of Oracle, as I explained in my deposition, the design of the study and the omission of explicit mention of select attributes lead my results to be conservative.³⁸ For

³⁵ Leonard Report, p. 112.

³⁶ Leonard Report, p. 112.

³⁷ Akhtar, Iyaz, “Verizon iPhone Look-A-Likes,” *PCMag*, January 30, 2011, <http://www.pcmag.com/article2/0,2817,2376828,00.asp#fbid=ivv3REkvSA3>; see also Henderson, Rik, “Superslim LG Optimus 3D 2 Set for World Domination in 2012. Exclusive: Pocket-lint Chats to Dr Noh,” *Pocket-Lint*, September 5, 2011, <http://www.pocket-lint.com/news/41933/superslim-lg-optimus-3d-2>.

³⁸ Shugan Deposition, p. 73.

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example, respondents will tend to implicitly attribute to the brand name any excluded attributes.³⁹ Such an effect would increase the value of the Android brand name, and so such biases would reduce the value of the relevant features. In addition, because there are links between the feature set and the other marketing mix variables in the real world, there are factors that are indirectly related to product features. For example, standard marketing variables, such as carrier, OEMs adopting the product, channels of distribution, availability, awareness, availability of the product, the ability to advertise effectively, Internet reviews for the product, and word of mouth are positively affected by having better features. Thus, Android achieves indirect benefits that increase sales and that cannot be captured through an analysis of feature preferences. Dr. Leonard’s implicit conclusion is that feature omission would increase loss of preference shares but-for the infringed copyrights and patents; however, such omissions would only tend to increase the value of the Android brand. Thus, my analysis of preferences relative to the outcome that would occur in the real world absent the functionality enabled by the patents-in-suit and Java copyrights is conservative.

VI. THE RESULTS OF THE 2011 SMARTPHONE SURVEY ARE CONSISTENT WITH ECONOMIC PREFERENCES

Dr. Leonard claims that the survey respondents’ stated preferences are susceptible to hypothetical bias and therefore are inconsistent with so-called economic preferences, which he seeks to impose on all buyers of Smartphones.⁴⁰ In Dr. Leonard’s theoretical framework, each respondent should prefer a price of \$100 to a price of \$200 and not vice versa. By imposing this restriction on consumers’ preferences, Dr. Leonard does not account for consumers whose real-

³⁹ Shugan Deposition, pp. 55 and 115.

⁴⁰ Leonard Report, pp. 109 and 113-114.

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world behavior reflects a very low sensitivity to price changes (within a reasonable range) and real-world consumers who may not consider cheap smart-phones for a variety of legitimate reasons. Hence, the preferences estimated using my 2011 Smartphone Survey are consistent with real-world behavior where some percentage of the population does prefer higher prices within some reasonable range.

The purpose of market research tools, such as conjoint analysis, is to determine actual buyer preferences and not to assume what those preferences might be. A few consumers who prefer Smartphones with higher prices does not necessarily imply that the market is insensitive to price or that market price elasticities do not reflect a downward sloping demand function. Some consumers, for example, prefer to purchase premium goods and are willing to pay a price premium. They prefer a more prestigious Smartphone, often implied by the phone having a higher price.⁴¹ Smartphones are conspicuously consumed in public and consequently are subject to all of the factors associated with prestige, the desire for self-esteem, and recognition. Of course, only a minority of consumers might display such preferences.

Furthermore, some consumers may use price as a surrogate measure of unobserved qualities (e.g., durability) and focus only on Smartphones in a particular price range and not consider cheap Smartphones. This consumer behavior has been documented and discussed in the marketing literature.⁴²

⁴¹ See, for example, Mohr, Jakki, J., Sanjit Sengupta, and Stanley F. Slater, *Marketing of High-Technology Products and Innovations*, Third Edition, New Jersey: Pearson Prentice Hall, 2010; and “Smartphones: Building Profitability and Loyalty in the Mass-market,” *WDSGlobal*, 2010, http://www.wds.co/enlightened/smartphone_profitability/smartphone_profitability_and_loyalty_wdsglobal.pdf.

⁴² See for example, Shugan, Steven M., “Price-Quality Relationships,” *Advances in Consumer Research*, Volume 11, Thomas C. Kinnear (ed.), Provo, UT: Association for Consumer Research, 1984, pp. 627-632.

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In Exhibit 7 of his report, Dr. Leonard counts the number of respondents who “prefer” higher prices to lower prices and asserts that such preferences are inconsistent with economic rationality. As noted, such preferences are likely to be exhibited in real world purchases. Furthermore, Dr. Leonard does not account for the minimal amount of noise around the estimated utilities that is to be expected from any estimation technique. If a respondent (for example, ID 146) has 0.208 utility points associated with a price level of \$100 and 0.209 utility points associated with a price level of \$200, then Dr. Leonard claims that the stated preference is inconsistent with what he considers economic preferences.

As a simple exercise, I excluded respondents with utilities associated with \$100 and \$200 that are within one standard deviation of the difference in utilities between levels. When these respondents with such utility comparisons are excluded from Dr. Leonard’s analysis, only 8.8 percent of respondents, not 24 percent as claimed by Dr. Leonard, prefer a price of \$200 over a price of \$100.⁴³ This finding is consistent with real-world behavior where some percentage of the population is price-insensitive within a reasonable range of prices. Moreover, statistical theory suggests that small estimation errors will tend to cancel out across consumers when estimating preference shares and it is unwise to exclude observations merely because they deviate from values expected by the researcher.

As a further consideration of Dr. Leonard’s Exhibit 7, I re-estimated the choice model described in my Expert Report excluding respondents with so-called non-economic preferences for price and application startup time. I then re-conducted the same market simulations using the same settings underlying Exhibit 3a of my Expert Report.⁴⁴ Excluding respondents that Dr.

⁴³ Leonard Report, p. 114.

⁴⁴ See Exhibit 3a in my original Expert Report and reproduced in this report as Reply Exhibit 1a.

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Leonard claims have inconsistent economic preferences leads to a higher loss of preference share for Android Smartphones. As a result, Android sales but-for the feature enhancements enabled by the patents-in-suit and the Java copyrights would have been at least 9.6 (instead of 7.9) percent lower if availability of applications was reduced and at least 22.7 (instead of 19.9) percent lower if application startup time was increased. Collectively, Android sales would have been at least 29.9 (instead of 25.7) percent lower but-for these infringements.⁴⁵ In other words, even accepting Dr. Leonard’s critique (which I do not), “correcting” for it leads to results that are, in fact, better for Oracle – demonstrating, yet again, that my opinion is conservative.

As another evaluation of Dr. Leonard’s Exhibit 7, I imposed monotonic preferences on price, such that a price of \$200 is always preferred to a price of \$300, a price of \$100 is always preferred to a price of \$300, and a price of \$100 is always preferred to a price of \$200. I re-estimated the choice model with these price constraints and re-conducted all market simulations, using the same settings underlying Exhibit 3a of my Expert Report. According to these results, Android sales but-for the feature enhancements enabled by the patents-in-suit and the Java copyrights would have been at least 7.6 (instead of 7.9) percent lower if availability of applications was reduced and at least 20.0 (instead of 19.9) percent lower if application startup time was increased. Collectively, Android sales would have been at least 25.7 (compared to 25.7) percent lower but-for these infringements.⁴⁶ Once again, I emphasize that the issues that Dr. Leonard raises in his report are irrelevant to my analyses and entirely consistent with consumer behavior. Even if the issues he raises were relevant, an experiment that adopts his

⁴⁵ See Reply Exhibit 1b. See also Reply Exhibit 1c for the results excluding respondents preferring a slower application startup time and Reply Exhibit 1d for the results excluding respondents preferring a higher price or a slower application startup time.

⁴⁶ See Reply Exhibit 1e.

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critique further underscores the conservativeness of my analyses, and shows that those results may have actually understated the value of the functionality enabled by the patents-in-suit and Java copyrights.

Dr. Leonard also claims that his estimate of a price elasticity of demand for Android Smartphones based on the data from the 2011 Smartphone Survey is “implausibly low,” thus providing further evidence of hypothetical bias and inconsistent economic preferences.⁴⁷ Dr. Leonard’s elasticity calculation reported in Exhibit 8 of his report is not applicable to my analysis of the 2011 Smartphone Survey. Dr. Leonard’s estimation of preference shares is inconsistent with those estimated using Sawtooth Software, the leading application for evaluating data produced in choice-based conjoint surveys. Specifically, Dr. Leonard reports a value of 47.2 percent for the “base case,” which should be equivalent to my measure of 44.3 percent (as reported in Exhibit 3a of my Expert Report) if Dr. Leonard used the feature and product set presented in his Exhibit 8. Accepting Dr. Leonard’s approach for purposes of argument, I re-estimated the price elasticity of demand using the base case from my Expert Report and varying the price of the Android phone from \$200 to \$100 to get a value of -0.59, approximately twice the value reported by Dr. Leonard.⁴⁸ One study of LCD televisions, a similar consumer technology, found elasticity measures of -0.61 to -0.94, similar to this measure.⁴⁹

⁴⁷ Leonard Report, p. 115.

⁴⁸ See Reply Exhibit 2.

⁴⁹ Conlon, Christopher T., “A Dynamic Model of Costs and Margins in the LCD TV Industry,” Unpublished Paper, Yale University, January 5, 2010.

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VII. DR. LEONARD IGNORES MY ROBUSTNESS CALCULATIONS

Dr. Leonard claims that I did not provide standard errors and confidence intervals for the preference share calculations in my Expert Report.⁵⁰ It appears that Dr. Leonard is unaware that standard errors for the market simulations were included in the backup materials of my Expert Report.⁵¹ An example of the standard errors provided by Sawtooth Software output, included in the backup materials to my Expert Report provided to Dr. Leonard, is shown in Reply Exhibit 3.

Furthermore, Dr. Leonard appears not to understand the meaning of the robustness measures that I included in my Expert Report. Dr. Leonard incorrectly refers to robustness measures such as U^2 and hit rate as “tests” for “hypothetical bias.”⁵² Dr. Leonard appears not to understand that the U^2 and hit rate values that I presented in my Expert Report indicate a very good model fit and indicate that the data provide strong predictions of consumer behavior. Both indicate strong validity of the results. For example, as shown in Table 2 of my Expert Report,

⁵⁰ Leonard Report, p. 116.

⁵¹ Based on the standard errors reported in the backup to my Expert Report, one can determine confidence intervals associated with the results of the preference share predictions. My deposition testimony states that Bayesian analyses do not have traditional confidence intervals as interpreted in classical frequentist-based statistics but instead have posterior distributions and corresponding Bayesian credibility intervals. Although that is correct, my testimony should not imply that if the estimators in Exhibit 3a of my Expert Report are taken as point estimators that one cannot compute confidence intervals using standard errors. Doing so does reveal confidence intervals for these predictions, but confidence intervals cannot be calculated for the Bayesian utility point estimates used to derive the relative importance of features presented in Table 1 of my Expert Report.

⁵² Dr. Leonard claims that “[t]his is a weak test because it has relatively low power to detect hypothetical bias. The reason is that it is a ‘within-respondent’ test, depending on inconsistencies within a respondent’s own answers to detect a problem, and thus it will be confounded by a respondent’s desire to be internally consistent” (Leonard Report, p. 113). However, many published articles (including Ding, Grewal, and Liechty (2005) cited by Dr. Leonard) as well as my 2011 Smartphone Survey, use a hierarchical shrinkage specification for the individual partworths. This method uses information from all respondents to predict individual choices. Hence, the so-called “within-respondent” test considers both individual information as well as information across respondents. Moreover, it is a strong test because choices were predicted for four Smartphone options, which makes it more difficult to generate predictions compared to smaller choice sets, thereby greatly improving the statistical power of the test.

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the average hit rate is 72.8 percent, indicating that the model has good predictive abilities. My robustness measures indicate that the results of the 2011 Smartphone Survey and market simulations with and without the functionality enabled by the patents-in-suit and Java copyrights are highly reliable.

A handwritten signature in cursive script that reads "Steven M. Shugan". The signature is written in black ink and is positioned above a horizontal line.

Steven M. Shugan
October 10, 2011

Reply Exhibit 1a
Formerly Exhibit 3a from my Expert Report
Android Preference Shares With and Without Select Feature Infringement
All Respondents (N = 784)

Features				Android			
	Apple	BlackBerry	Windows	Base case:	Scenario 1:	Scenario 2:	Scenario 3:
	All Scenarios			Android infringement	Infringing but for application startup time	Infringing but for availability of applications	Not infringing both select features
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$200	\$200	\$200
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	4	2	4
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	40,000	40,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares							
Base case:	28.4%	15.0%	12.4%	44.3%			
Scenario 1:	31.2%	17.2%	16.1%		35.5%		
Scenario 2:	30.2%	16.1%	12.9%			40.8%	
Scenario 3:	32.5%	18.1%	16.5%				32.9%
Loss of preference share for Android between base case and infringing/non-infringing scenarios:					19.9%	7.9%	25.7%

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Source: Fonkn_A Simulation1_RFC.xls

Reply Exhibit 1b

Android Preference Shares With and Without Select Feature Infringement
Sensitivity Excluding Respondents Preferring a Higher Price (N = 576)

Features				Android			
	Apple	BlackBerry	Windows	Base case: Android infringement	Scenario 1: Infringing but for application startup time	Scenario 2: Infringing but for availability of applications	Scenario 3: Not infringing both select features
	All Scenarios						
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$200	\$200	\$200
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	4	2	4
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	40,000	40,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares							
Base case:	27.6%	19.9%	11.6%	40.8%			
Scenario 1:	30.2%	22.8%	15.4%		31.6%		
Scenario 2:	29.4%	21.4%	12.3%			36.9%	
Scenario 3:	31.5%	23.9%	16.0%				28.6%
Loss of preference share for Android between base case and infringing/non-infringing scenarios:					22.7%	9.6%	29.9%

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Source: Fonkn_PRP Simulation1.xls

Reply Exhibit 1c
Android Preference Shares With and Without Select Feature Infringement
Sensitivity Excluding Respondents Preferring a Slower Application Startup Time (N = 526)

				Android			
	Apple	BlackBerry	Windows	Base case: Android infringement	Scenario 1: Infringing but for application startup time	Scenario 2: Infringing but for availability of applications	Scenario 3: Not infringing both select features
	All Scenarios						
Features							
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$200	\$200	\$200
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	4	2	4
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	40,000	40,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares							
Base case:	35.1%	9.5%	17.4%	38.1%			
Scenario 1:	39.1%	11.2%	23.7%		26.0%		
Scenario 2:	37.1%	10.1%	18.2%			34.6%	
Scenario 3:	40.3%	11.6%	24.5%				23.6%
Loss of preference share for Android between base case and infringing/non-infringing scenarios:					31.7%	9.1%	38.0%

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Source: Fonkn_PRAST Simulation1.xls

Reply Exhibit 1d
Android Preference Shares With and Without Select Feature Infringement
Sensitivity Excluding Respondents Preferring a Higher Price or a Slower Application Startup Time (N = 403)

				Android			
	Apple	BlackBerry	Windows	Base case: Android infringement	Scenario 1: Infringing but for application startup time	Scenario 2: Infringing but for availability of applications	Scenario 3: Not infringing both select features
	All Scenarios						
Features							
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$200	\$200	\$200
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	4	2	4
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	40,000	40,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares							
Base case:	33.9%	12.5%	15.9%	37.8%			
Scenario 1:	37.7%	14.9%	22.5%		25.0%		
Scenario 2:	35.8%	13.3%	17.0%			33.9%	
Scenario 3:	39.0%	15.4%	23.5%				22.2%
Loss of preference share for Android between base case and infringing/non-infringing scenarios:					33.9%	10.3%	41.3%

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Source: Fonkn_PRB Simulation1.xls

Reply Exhibit 1e
Android Preference Shares With and Without Select Feature Infringement
Sensitivity Modeling Price Constrained Preferences (N = 784)

				Android			
	Apple	BlackBerry	Windows	Base case: Android infringement	Scenario 1: Infringing but for application startup time	Scenario 2: Infringing but for availability of applications	Scenario 3: Not infringing both select features
	All Scenarios						
Features							
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$200	\$200	\$200
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	4	2	4
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	40,000	40,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares							
Base case:	28.4%	15.5%	12.4%	43.7%			
Scenario 1:	31.3%	17.6%	16.2%		35.0%		
Scenario 2:	30.2%	16.4%	12.9%			40.4%	
Scenario 3:	32.5%	18.2%	16.7%				32.5%
Loss of preference share for Android between base case and infringing/non-infringing scenarios:					20.0%	7.6%	25.7%

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Source: Fonkn_P Simulation1.xls

Reply Exhibit 2
Android Preference Shares Under Different Price Scenarios
All Respondents (N = 784)

	Apple	BlackBerry	Windows	Android		
				Base case: \$200	Scenario 1: \$100	Scenario 2: \$300
Features						
Screen size (<i>inch</i>)	3.5	3.5	4.5	4.0	4.0	4.0
Price	\$200	\$100	\$200	\$200	\$100	\$300
Voice commands ²	Voice dialing	Voice dialing	Voice dialing	Voice dialing & texting	Voice dialing & texting	Voice dialing & texting
App startup time (<i>seconds</i>)	0.2	2	0.2	2	2	2
Availability of applications ³ (<i>number of applications</i>)	300,000	40,000	40,000	100,000	100,000	100,000
Multitasking (<i>number of applications</i>) ⁴	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5	Up to 5
Preference shares						
Base case:	28.4%	15.0%	12.4%	44.3%		
Scenario 1:	25.9%	6.7%	10.0%		57.4%	
Scenario 2:	32.9%	19.1%	18.3%			29.8%
Change in preference share for Android between base case and infringing/non-infringing scenarios:					29.7%	-32.8%
Elasticity of demand					-0.594	-0.657

Note:

[1] For notes and sources on base case feature levels, see Exhibit 3a from my Expert Report

Sources:

[A] Leonard Exhibit 8

[B] Fonkn_A_EI Simulation1.xls

Reply Exhibit 3
FonKN_A Sawtooth Simulation Output
Including Standard Errors

The screenshot shows an Excel spreadsheet with the following data:

Scenario: Basecase
 Utility Run: FonKN_A.hbu Import

Total Respondents

Total Respondents	Total	784
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Product Simulation Settings
 Simulation Mode: Simulation
 Simulation Method: Randomized First Choice
 Total Sampling Iterations: 200000
 Attribute Variability Multiplier: Autocalibrated Value (0.425966)
 Product Variability Multiplier:
 Exponent: 1.00

Product Specifications

	OS	Screen size	Price	Voice commands	Multitasking	Availability of apps	App startup time
Android_1	1	2	2	3	2	3	2
I-Phone_1	2	1	2	2	2	4	3
Blackberry_1	3	1	3	2	2	2	2
Windows_1	4	3	2	2	2	2	3

Product Shares of Preference

	Share	Std Err
Android_1	44.29	1.46
I-Phone_1	28.36	1.41
Blackberry_1	14.99	1.06
Windows_1	12.36	0.86

Scenario: Sens#2-AST
 Utility Run: FonKN_A.hbu Import

Total Respondents

Total		
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Source: Fonkn_A Simulation1_RFC.xls

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REPLY APPENDIX A

DOCUMENTS RELIED UPON

Expert Reports

Expert Report of Dr. Gregory K. Leonard, October 3, 2011

Expert Report of Steven M. Shugan, September 12, 2011.

Court Documents

Deposition of Steven M. Shugan, *Oracle America, Inc., vs. Google, Inc.*, No. CV 10-03561 WHA, United States District Court, Northern District of California San Francisco Division, September 26, 2011.

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