UNDERSTANDING THE EFFECT OF THE GROWTH OF INTERNET ACCESS ON

LUXURY PURCHASING DECISIONS

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Economics

Abstract

In the span of just over 20 years, once small companies like Amazon have grown into major retailers that have taken substantial market-share from retail behemoths like Nordstrom and JC Penny. One of the driving factors of this shift is the adoption of online access in the vast majority of American homes. This study aims to understand how the increase in online adoption has changed consumer behavior, and whether or not the increase in internet access has pushed consumers to spend more on luxury purchases. A Random Effects Poisson regression was used to observe the effects of internet access on consumer luxury spending behavior from 2000-2016. The findings were inconsistent with the initial hypothesis, that luxury good expenditures would increase with internet access. Instead, luxury good expenditures decreased as the percentage of Americans with internet increased.

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED UNAUTHORIZED AID ON

THIS THESIS

_____Stefan Jandreau-Smith_____

Signature

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1. Introduction

It is by no means a secret that online sales have increased dramatically in the past 16 years. Consumers have drastically changed their shopping habits throughout those years, with 2016 being the first year where more goods were purchased online than in-store (UPS, 2016). With consumers shifting more towards online retailers for day-to-day purchases, the sudden surge in demand for online goods has pushed companies that traditionally only dealt with customers in-person to move into the online realm such as Wal-Mart and Gap Inc. This sudden, yet massive, shift has prompted the question of whether consumer purchasing behavior has been shaped by access to online purchasing.

Consumer purchasing behavior can be most easily defined as, the study of how individual customers, groups or organizations select, buy, use, and dispose ideas, goods, and services to satisfy their needs and wants (Kardes et. al, 2011, p. 7). With this information, a retailer, whether it be online or in-person, can better engage potential customers and provide a more fluid customer experience. Understanding how a consumer-base shops, can also drive sales through different promotional channels such as personalized (or targeted) recommendations, online behavior tracking used to create a comfortable user experience, and a general understanding of consumer demands based on positively correlated demographic characteristics (socioeconomic status, gender, etc.). Understanding consumer purchasing behavior is essential to correctly market and sell products.

The rapid growth in internet use is also a major driving factor in the increase in online spending. A recent study conducted by the Pew Research Center noted that 84% of Americans 18 years and older actively use the internet, and 99% of Americans between 18-29 use the internet (Perrin & Duggan, 2015). Of the 84% of Americans 18 years and older who actively use

the internet, 94% of them have made at least one online purchase (79% of the total United States 18 years and older population) (Smith & Anderson, 2016). Since there is a clear upwards trend in internet users and online shoppers, understanding consumer purchasing behavior online is becoming increasingly important.

Also, luxury goods have always carried prestige within American society. Looking at how the consumption of luxury goods has changed over the last 16 years gives insight into how the American consumer base has shifted its desires. In this study, luxury goods that have an income elasticity greater than one are considered luxury goods. In other words, if an individual's income increases their spending on the luxury good increases; with the opposite also being true (the underlying math is further discussed in the "methodology" section). This definition is important since it allows for a clear distinction between luxury and non-luxury goods.

Thus, this study aims to answer the question: What is the relationship between access to online purchasing and trends in consumer purchasing of luxury goods? Through research the initial hypothesis, to be further supported in the 'Literature Review' section, is that there is a positive correlation between internet access and luxury spending.

The paper is therefore organized as follows: First, the literature review provides a brief overview of past research surrounding consumer purchasing behavior and the decision to make purchases online. Second, the methodology used in this study is covered and the usage of the dataset, the Consumer Expenditure Survey, is explained. Third, the results are presented. Fourth, the results are discussed and interpreted. Finally, this study ends with a conclusion, the discussion of limitations, and future possible research ideas.

2. Literature Review

The main goal of this paper is to analyze the relationship between internet purchasing access and online shopping on individuals' number of luxury purchases. This literature review is therefore divided into five sections: the rise of the internet and its use, the relationship between in-store and online shopping, motivations for making or not making a purchase online, the effect of targeted advertising, and consumer purchasing behavior of luxury goods.

Online sales, as a percent of total sales, have risen significantly since the early 2000s. In the first quarter of 2002 online sales made up just 1.3% of total sales (Piesto & King, 2002). Since then, ecommerce sales have increased to 8.5% of total sales in the first quarter of 2017 (Quarterly Retail E-commerce Sales, 2017). The implications from this shift have been clear in the retail sector – once major retail chains like Nordstrom are either going bankrupt, or, in Nordstrom's case, considering shifting back to private ownership to try to salvage their core retail business (Corkery & Merced, 2017). However, Nordstrom was not the only company to suffer from the increase in online sales. Major retailers such as JC Penny and Sears have been forced to close locations nationally, and once prominent retail clothing store Aéropostale was forced to file for bankruptcy in May 2016 (Close, 2016). With the rapid growth of online sales, the future for major in-person retails stores remains uncertain.

With the advent of online shopping, numerous studies have focused on the relationship between online and in-store shopping. In 2006, while e-commerce was still relatively new, Sendy Farag, a researcher interested specifically in the development of the relationship between online and in-store shopping found that "although there might be individual instances of substitution, these findings render it unlikely that e-shopping will substitute in-store shopping trips on a large scale" and that online shopping complements in-store shopping (Farag, 2006, p. 59).

Additionally, as a result of the complementary nature of the two forms of shopping that, "a modification of in-store shopping could occur" (Farag, 2006, p. 60). Farag's speculative guess about the future relationship of these two forms of shopping was not far off from reality. Numerous retail companies, from Best Buy to Target, have since launched buy online and pick up in-person (BOIP) or click and collect programs. These programs are a hybrid of online and in-store purchases that allow users to obtain the best of both forms of shopping: the convenience of shopping online from home, and the satisfaction of pleasant customer service when going into the store to pick up the item.

In another study conducted by Xinyu Jason Cao, Zhiyi Xu and Frank Douma (2011), they found similar results as Sendy Farag (2006). However, what differentiated their results from Farag's was their emphasis on the significance of online searching (product information searching) and its effect on in-store purchases (Cao, Xu & Douma, 2011). They noticed that, "in terms of total effect, it seems that online information searching has a larger complimentary effect on traditional shopping than does online buying" (Cao, Xu & Douma, 2011, p. 972). The researchers found that although online searching has a complementary effect on online purchases, its complementary effect is more significant to in-store purchases. This finding could explain changes in consumer behavior as a direct result of internet purchasing access.

Understanding a consumer's motivation to shop online rather than in-person, is imperative to understanding consumer purchasing behavior. In a study conducted by Manju Ahuja, Babita Gupta, and Pushkala Raman (2003), they found that 28% of students shopping online in 2003 (during the initial growth period of e-commerce) shop online due to the convenience, and 23% of students shop online due to the amount of time saved. More notably, 25% of students said they shop online due to better prices, and 19% of students said they shop

online because of a wider variety of products and more availability of products (Ahuja et. al, 2003). The logic the students displayed, behind the variety and product availability, is one of the many reasons large marketplaces like Amazon and Alibaba have been so successful.

While understanding a consumer's motivation to shop online rather than in-person is important, understanding a consumer's motivation not to shop online is equally as essential. In a study conducted by Lina Zhou, Liwei Dai, and Dongsong Zhang (2007) on consumer factors in online shopping, they found that, "consumers were more concerned about attributes of Web sites associated with perceived risks (e.g., security of information and vendor reliability) than those associated with perceived gains (e.g., convenience)" (Zhou et. al, 2007, p. 54). Perhaps this results from the concept of loss aversion; that a loss is more emotionally taxing than a gain. As a result, another important factor to acknowledge is trust between a consumer and a retailer with online purchases. In an article written by Paul A. Pavlou (2003) he stresses the importance of trust of the internet retailer in a consumer's decision to make a purchase online. "Trust creates positive attitudes and perceived behavioral control toward transactions with Web retailers, reducing uncertainty and providing expectations for a satisfactory transaction, thus positively influencing consumer behavioral intentions to transact" (Pavlou, 2003, p. 107). Without trust, large ticket (potentially luxury) items will be left to in-store transactions.

Targeted advertising also places a major role in a consumer's online purchase decision-making process. Even in 2006, when banner advertising was in its relative infancy, Puneet Manchanda, Jean Pierre Dubé, Kim Yong Goh and Pradeep K. Chintagunta found that, "[their] main finding is contrary to popular belief, banner advertising does affect purchase probabilities" (Manchanda et. al, 2006, p. 99). However, since then advertisements have become more specific and can target individuals based on their online behavior, sociodemographic information,

hardware/software status and a multitude of other factors. In a study conducted by Ayman Farahat and Michael Bailey (2012), they observed a 79% increase in likelihood to search a brand after being exposed to a targeted advertisement from the brand. Not only does this change the way that marketers can reach their consumer-base, but it also changes how consumers interact with online retailers. Instead of traditional marketing methods, consumers are given specific advertisements that can target their interests and needs, which may push them to make consumption decisions they otherwise would not have made.

However, this new wave of advertising has also made consumers more skeptical of advertisements. In a study conducted by Avi Goldfarb and Catherine Tucker (2011), they observed that although consumers are "willing to tolerate contextually targeted ads more than other ads because they potentially provide information; however, making such ads obtrusive in nature may increase perceptions of manipulation" (Goldfarb & Tucker, 2011, p. 400). With a more internet-savvy generation on the rise, perhaps targeted advertisements do not have as much influence as they may have in past years.

Finally, understanding consumer behavior in regard to luxury goods is a key aspect in understanding how consumer behavior has changed with internet purchasing access. Xia Liu, Alvin Burns and Yingjian Hou (2013) looked into the difference between consumers spending online on luxury goods and in-store on luxury goods. They found that there were key differences that influenced individuals to either choose to shop online or in-store. "The major themes of online luxury buying are convenience, price, product availability, online shopping attitude and online trust. For the in-store luxury buyers, the crucial factors are aesthetic appeal, store trust, shopping experience, customer service, and sense of power" (Liu, Burns & Hou, 2013, p. 895). Since online and in-store luxury good shoppers are actually making decisions off of two different

sets of criteria, one can posit that their decisions may be different. Liu, Burns and Ying (2013) also note that both sets of shoppers display different types of trust. Online shoppers show trust in the retailer and customer reviews, while in-store shoppers display trust in the physical shopping environment (Liu, Burns & Hou, 2013). While this may not be particularly surprising, due to the fact that the two different types of shoppers exist in two separate shopping environments, there are implications that stem from this that could explain potential differences in consumer purchasing behavior.

Building the narrative around consumer purchasing behavior allows for an understanding for the need to conduct this study. Although there has been a lot of research around how consumer spending changes based on environments, there has not been any explicit longitudinal study observing how spending has changed with the rise in internet usage. This study will aim to fill the gap in the existing literature and provide understanding of how this change has occurred.

3. Model

3.1 Empirical Model

The goal of this study is to observe the relationship between internet access and the number of luxury expenditures a family unit would make. To best observe this relationship an empirical model was created:

$$LuxSpending = A + \beta_1 InternetAccess + \beta_2 Income + \beta_3 Education + \beta_4 Sex +$$
$$\beta_5 Urban + \beta_6 Race + \beta_7 Age + \varepsilon$$

where

- *LuxSpending* was determined by combining luxury good (goods where the elasticity of expenditure was greater than one) purchases from the quarterly data. The five luxury good categories determined were new cars, used cars, major appliances, furniture, and air travel. If a family made a purchase in any of these categories, the *Luxspending* variable increased by one (for example if an individual spent $30,000 on a new car, and bought $2,000 in airfare, their *Luxspending* variable for that period would be equal to 2).

- *InternetAccess* is numerical variable that is equal to the American internet usage rate for the year the data was collected in. The data came from a separate source, the Pew Research Center.

- *Income* is used to track interviewed families' total income (numerical variable).

- *Education* was tracked through the head adult of the family (a term that is self-defined by the family during the interview process). From 1996 to 2013 the education variable was

broken down into 9 separate categories with the assumption that each category is a higher

level of education than the previous.

- o 9 Never attended

- o 10 1st – 8th grade

- o 11 9th – 12th grade (no high school diploma)

- o 12 High school graduate

- o 13 Some college, no degree

- o 14 AA degree

- o 15 Bachelors degree

- o 16 Masters degree

- o 17 Professional / Doctorate degree

From 2013-2016 the final two categories (Masters degree and Professional / Doctorate

degree) were combined into one variable.

- *Sex* is a binary variable used to track the declared sex of the head member of the

  household

  - o 0 is male

  - o 1 is female

- *Urban* is a binary variable used to track if a family is located in an urban or nonurban

  center.

  - o 0 Urban

  - o 1 Rural/Nonurban

- *Race* is a binary variable used to track how the head adult of the household defines their

  race. This was originally a categorical variable however, due to the nature of regression,

it was necessary to transform it into a binary variable that classifies the interviewees as white or non-white. Therefore, the variable was as follows:

- o 0 Non-white

- o 1 White

- *Age* is used to track the age of the participant (numerical variable).

The variables listed above fall into one of two categories: spending-related variable, or sociodemographic variables.

3.2 Spending-Related Variables

The spending-related variables consist of the dependent variable *LuxSpending*, and an independent variable, and internet access. As mentioned above, *Luxspending* consists of five different classes of luxury goods: new cars, used cars, airfare, major appliances, and furniture. Internet access is considered a spending-related variable since its relationship with spending is what is trying to be understood.

3.3 Sociodemographic Variables

The sociodemographic variables are used in this study to control for sociodemographic factors. They are also used to look at how different segments of American society have reacted to the growth in internet access and usage. The independent variables in this group are: total family income, education level, sex, age, location and race. These variables are mainly used as controls; however, they are also included in this study due to potential effects that they may have on the dependent variable.

Total family income could be theorized to have a positive effect on the dependent variable. From the definition of a luxury good used in this survey, families who have increasing income can be theorized to spend more on luxury goods. This is consistent with the idea that families who have high socioeconomic standing purchase more luxury goods, due to their position in society and their desire for prestige.

Years of completed education have been found to have a positive correlation with internet usage and therefore could be a necessary variable to include due to its potential effect on luxury good spending (Internet/Broadband Factsheet, 2018).

Sex is an important variable to include due to the differences in the ways that females and males utilize the internet. Deborah Fallows, through the Pew Research Center (2005), found that "men are slightly more intense internet users than women." The definition for intensity used in this study refers to the frequency of internet usage and the likelihood of having a high-speed internet connection. This difference in internet usage could lead to a difference in purchasing behaviors.

Age is an important sociodemographic variable to include in this study due to the reasons discussed earlier in this paper. With 98% of Americans between the ages of 18-29 using the internet, and just 64% of individuals 65 and older using the internet, the rapid growth in ecommerce could have profoundly different effects (Internet/Broadband Factsheet, 2018).

Location could have an impact on a family's choice to spend more on luxury goods. Since item availability is one of the reasons that individuals use the internet for purchasing, being close to an urban center would provide the same accessibility, and therefore internet purchasing access would not change a family's purchasing behavior.

Race is a necessary variable to include in this study due to the historical disparity in internet usage between different racial groups. Although white and black individuals have similar rates of internet usage in 2018, in 2001 the difference in white and black internet usage was 17% (57% of white individuals used the internet, while only 40% of black individuals did) (Internet/Broadband Factsheet, 2018).

All variables chosen in this study have specific usage and importance in this study. Instead of narrowing the focus to just look on luxury spending as a percent of total spending over time against internet usage, the inclusion of these variables allows for speculation around the causation of the results.

4. Methodology

4.1 Dataset

The main portion of the data used for this study comes from the Bureau of Labor

Statistics' (BLS) annual survey, the Consumer Expenditure Survey (CE). All data collected by

the BLS and used in this survey, comes from their public releases of the interview format of the

CE. For the interview format of the BLS survey, they use a computer assisted personal

interviewing (CAPI) instrument to interview families four times on their daily and quarterly

expenditures (BLS.gov, 2016). The first interview also incorporates sociodemographic

information questions. Each interview takes around 60 minutes to complete and is conducted a

maximum of four times per family (BLS.gov, 2016). After a family is interviewed four times,

they drop the sample family and replace it with a new one (BLS.gov, 2016). The data is

considered panel data since the families are individually identifiable through their family

identification variable.

Although CE data exists before 2000, this study uses the annual reports starting in 2000

and going until 2016. This date range was chosen because within the BLS dataset there was no

specific proxy that could be used to assume internet access, so an outside source, The Pew

Research Center, was used with the earliest available data being from 2000 (Internet/Broadband

Factsheet, 2018).

One of the more difficult parts of this study was correctly identifying and categorizing

luxury goods within the CE. Since goods with a expenditure of elasticity greater than one were

defined as luxury goods, the following formula could be utilized to calculate the elasticity of

expenditure for each class of good:

$$\frac{(\bar{L}_2 - \bar{L}_1)/\bar{L}_1}{(\bar{I}_2 - \bar{I}_1)/\bar{I}_1} = Elasticity\ of\ Expenditures$$

In this equation, $\bar{L}_1$ represents an average expenditure on a good in the first quarter. $\bar{L}_2$ represents the average expenditure on a good in the second quarter. $\bar{I}_1$ represents the average income in the first quarter. $\bar{I}_2$ represents the average income in the second quarter. By taking these averages and inputting them in this equation, the goods in this study were found to have the following elasticities: furniture 8.00, new cars 22.84, major appliances 2.72, used cars 6.80 and air travel 10.02. Other variables were initially used but fell below the threshold of having an elasticity greater than 1.

Although the dataset had a more than substantial number of observations, it is important to acknowledge its limitations. First, the CE does not track internet access in its demographic variables. This was problematic because it required using an outside data source, with a separate methodology, to estimate the portion of the data set that had internet access. Second, the CE tracks the amount spent on each good, but does not track the quantity of each good purchased. This became problematic in regard to understanding exactly how many luxury goods were purchased, something that ended up being solved by instead classifying groups of goods as luxury or not.

4.2 Statistical Methodology

This study uses the Random Effects Poisson Regression to observe the relationship between the dependent and independent variables. This method was selected due to the characteristics of the dependent variable. Since *luxspending* is a count variable in which the variables that comprise it (the aforementioned luxury good classes) have a maximum of 1 and a minimum of 0, but have no ability to be any value in between, the Random Effects Poisson Regression is an effective model to use to understand relationships between the variables. Also,

since the data used was in a panel format it was treated as panel data. The panel variable was the family identification variable and the time variable was quarters.

5. Results and Analysis

Utilizing the Poisson regression, the relationship between internet access and luxury spending was determined, and the results were analyzed. In order to best present the data and discuss its implications, this section is broken up into two distinct sections. In the first section, the results will be displayed and described. In the second section, the results will be discussed and further analyzed to unpack their implications.

5.1 Results

First, with a Wald chi^2 statistic of 6230.14 and P > chi^2 equal 0.0000 the null hypothesis can be rejected.

The results were mostly inconsistent with the initial hypothesis that there is a positive correlation between internet access and luxury spending.

Table 1. Random Effects Poisson Regression of the available data

y = Luxury Spending	Coef.	Std. Error	Z	P > |z|	95% Conf. Interval	
Internet	-.0072352	.0003861	-18.74	0.000	-.0079918	-.0064785
Race	.1747244	.012192	14.33	0.000	.1508286	.1986203
Age	-.0060436	.0002671	-22.63	0.000	-.0065672	-.0055201
Sex	.0051341	.0088194	0.58	0.560	-.0121517	.0224199
Edu	.1015254	.0026353	38.52	0.000	.0963602	.1066906
Income	3.28e-06	5.75e-08	57.07	0.000	3.17e-06	3.39e-06
Urban	-.0355552	.0186881	-1.90	0.057	-.0721832	.0010729

As illustrated in Table 1 above, internet access is shown to have a negative effect on luxury spending. For each 1% increase in the US population with internet access, each family unit purchases .00724 less luxury goods. With a z value less than -2.00 (statistical significance is assumed if z < -2 or z > 2) this result is also statistically significant.

However, for the urban variable, the results were not statistically significant and therefore not consistent with the initial hypothesis. Since the 95% confidence interval crosses over "0" it cannot be said with confidence that the urban variable has any specific effect on luxury spending.

For the income variable, the results were consistent with the hypothesis. However, the magnitude of the results was unexpected. Since income in the BLS dataset was measured to the single dollar, the coefficient is remarkably small compared to the other variables. For each dollar increase in family income, their luxury purchases increase by .00000328. In other words, it can be assumed that it would take an income increase of roughly $305,000 to increase their luxury purchases by 1. This result was also statistically significant with a z value of over 57.

An increase in education level had a significant effect on the number of luxury purchases a family makes and is consistent with the initial hypothesis. Although this is not too surprising after discussing the income variable, due to the correlation between education and income (coefficient = .3146), the effect was still dramatic. For each tier increase in education, a family makes .102 more luxury purchases. Education also had a high z value, and therefore can be considered significant.

Race had a significant effect on luxury spending. It can be determined from the results that white individuals purchase more luxury goods. They purchase .175 more luxury goods than non-white individuals. The z value was also high, showing that this is a statistically significant result.

Surprisingly, age had the opposite effect than predicted initially. Instead of luxury spending increasing with age, luxury purchases decreased by .00604. Age also had a large z value, showing that it was a statistically significant.

For the remaining variable, sex, the z value was far too low to determine a relationship, and therefore no specific effect on luxury spending can be deduced.

5.2 Analysis

This study aimed to answer the question: What is the relationship between access to online purchasing and trends in consumer purchasing of luxury goods? Throughout the 'Results' section the initial hypothesis, that online access would increase luxury good purchasing, was disproved. Instead, although much of the surrounding literature prior to this study would suggest otherwise, luxury spending decreases as internet access increases. These results, although not expected, contain implications into the nature of internet users and possible explanations as to why these results are representative of the US consumer base.

First, the negative effect internet access has on luxury spending suggests that online shoppers make more informed decisions. Since product information is far more available online, online shoppers are more likely to research products before purchasing. This mass quantity of product information could potentially dissuade a shopper from making a purchase, especially one that is at a high cost (e.g. a luxury good), causing the effect seen in the regression. Also, online shoppers have access to product reviews, which could have a similar effect as a mass amount of product information.

The assumption that internet users incorporate the vast amount of product information into their purchasing decisions suggests how professionals in marketing should position their

product online to be more successful. Although product descriptions are carefully tailored to provide the most amount of flattering product information, marketers will continue to struggle to position lower-quality 'luxury-goods' as high-quality goods with the public response being heavily weighed in purchasing decisions. One of the most blatant examples of this trend is Apple's release of the iPhone X, their new, flagship phone. With the tagline, "Say hello to the future," Apple's release of a luxury phone was supposed to set the bar for future smartphones (Apple.com, 2017). However, the product functionality did not live up to consumer expectations as seen by the mixed responses from major media outlets (Kelion, 2017). The iPhone X only captured 20% of the total iPhone sales in the holiday season, 2017 (Levin & Lowitz, 2018). Understanding how to correctly position products to meet consumer expectations will continue to be more important as more product information becomes available in the coming years.

The regression also highlighted the sheer amount of income increase it takes for individuals to purchase another luxury good. This was initially surprising since due to the expectation was that a small increase in income would increase luxury good spending significantly, but a logical result considering that this study only covered five of a vast amount of luxury goods. If this study was conducted with more specific product data, income would need to increase less substantially to increase the number of luxury purchases.

Education, as mentioned in the results section, also had a significant effect on luxury purchases. Although this could be due to the correlation between education and income, it also gives insight into what kind of online shopper would purchase more luxury goods. Since highly educated people are often members of the upper class, and luxury goods are a sign of prestige, luxury purchases should be tailored more towards educated individuals, rather than just wealthy ones.

For the remaining variables, although some were significant, further research using the BLS data would be necessary to determine the root of their effects. While speculation is possible (e.g. as to reasons why white individuals purchase more luxury goods than non-white individuals) the data does not provide enough evidence to support any claim.

6. Conclusion

In the effort to understand the effect of internet access on luxury spending, a significant relationship was discovered. The growth in internet access was found to have a negative effect on luxury goods purchasing from five distinct categories: new cars, used cars, major appliances, furniture, and air travel. For every 1% increase in the American population that has internet access, it was found that luxury goods in these categories decreased by .00724 luxury purchases. By running a Poisson regression, this result was found to be statistically significant, and have a multitude of implications as discussed in the previous 'Analysis' section.

This study contributed to the surrounding academic literature in an unexpected way. Instead of its initial goal of modeling how the increase in internet users has allowed companies to sell more luxury goods, it showed that there needs to be more effort put into understanding how the internet's development is actually changing the way consumers are interacting with luxury products.

The intention of this study was to build on consumer purchasing behavior studies that were previously published, however it covered an area of purchasing that has been under-studied. Many of the studies discussed previously in this paper, such as the study conducted by Cao, Zhu and Douma (2011) or Ahuja, Gupta and Raman (2003), focused specifically on consumer behavior, rather than understanding how the development of the ecommerce industry directly effects purchases. Many methods of appealing to this shifting consumer behavior has been developed, such as targeted advertising (Manchanda et. al, 2006), however, it begs the question: is it focusing on the right part of this changing industry – the individual consumer behavior?

Future studies, therefore, could explore the connection between the development of internet infrastructure and its effect on consumers' perception of luxury goods. Studies similar to the one conducted by Goldfarb and Tucker (2011), that focus on how consumers interact with the constant bombardment of product information, could help the ecommerce space move forward and develop new techniques to generates leads. Similarly, studies such as the one conducted by Cao, Xu and Douma (2011), which discovered that online product information contributes more to in-person shopping decisions than online decisions, could help companies understand how to better use product information to drive more product purchases. There is much potential within this field of study to develop new sales and marketing strategies to appeal to now unknown customer behavior, and future studies could contribute to the development of these strategies.

It is important to also acknowledge the limitations of this study to hopefully improve future studies of the same nature. Although the number of observations and available data were substantial (over 491,000 observations were used in this study) the data was not as comprehensive as necessary to get perfect results. As mentioned previously in this paper, the BLS survey did not specifically track internet access and had no available variables that could be used as a proxy. This is specifically important since although a relationship was determined through the use of aggregate statistics (the percentage of the American population who had internet access), it is impossible to understand whether or not the specific individual making a luxury purchase has internet access. A second limitation was the timeframe in which this study was conducted. If given more time, this study could include more demographic descriptors (e.g. family composition) to improve on how well the data fit the model. Also, a survey could have been conducted to look at the dollar amount spent over time in a wider range of luxury goods, and looked at the number of luxury goods made within each luxury good class.

In sum, this study observed a statistically significant relationship between luxury good spending and internet access. The specific question it reached out to answer was: What is the relationship between access to online purchasing and trends in consumer purchasing of luxury goods? This question was answered, and the result provided insight into the inner-workings of modern consumers.

References

Ahuja, M., Gupta, B., & Raman, P. (2003). An Empirical Investigation of Online Consumer Purchasing Behavior. *Communications of the ACM - Mobile computing opportunities and challenges*, *46*(12), 141-151. doi:10.1145/953460.953494

U.S. Bureau of Labor Statistics - Consumer Expenditure Survey and Methodology. (2016). Retrieved March 12, 2018, from https://www.bls.gov/opub/hom/cex/pdf/cex.pdf

Cao, X. J., Xu, Z., & Douma, F. (2011). The Interactions between E-shopping and Traditional In-store Shopping: An application of structural equations model. *Transportation, 39*(5), 957-974. doi:10.1007/s11116-011-9376-3

Close, K. (2016, June 30). What Retail Stores Are Closing Most Locations Due to Amazon? Retrieved March 04, 2018, from http://time.com/money/4386499/retail-stores-closing-locations/

Corkery, M., & Merced, M. J. (2017, June 08). Nordstrom to Explore Deal to Go Private as Retail Sector Reels. Retrieved March 04, 2018, from https://www.nytimes.com/2017/06/08/business/dealbook/nordstrom.html

Fallows, D. (2005, December 28). How Women and Men Use the Internet. Retrieved March 4, 2018, from http://www.pewinternet.org/2005/12/28/how-women-and-men-use-the-internet/

Farag, S., Krizek, K. J., & Dijst, M. (2006). E-Shopping and its Relationship with In-store Shopping: Empirical Evidence from the Netherlands and the USA. *Transport Reviews,26*(1), 43-61. doi:10.1080/01441640500158496

Farahat, A., & Bailey, M. C. (2012). How Effective is Targeted Advertising? *Proceedings of the 21st International Conference on World Wide Web,*111-120. doi: 10.1145/2187836.2187852

Kardes, R. F., & Cronley, L. M., & Cline, W. T., (author.) (2011). *Consumer Behavior*. Mason, OH South-Western, Cengage Learning.

Kelion, L. (2017, September 13). Apple iPhone X: The internet reacts. Retrieved March 12, 2018, from http://www.bbc.com/news/technology-41249367

Goldfarb, A., & Tucker, C. (2011). Implications of Online Display Advertising: Targeting and obtrusiveness. *Marketing Science,30*(3), 413-415. doi:10.1287/mksc.1100.0634

IPhone X. (2017). Retrieved March 12, 2018, from https://www.apple.com/iphone-x/

Internet/Broadband Fact Sheet. (2018, February 05). Retrieved March 04, 2018, from http://www.pewinternet.org/fact-sheet/internet-broadband/

Liu, X., Burns, A. C., & Hou, Y. (n.d.). Comparing Online and In-store Shopping Behavior Towards Luxury Goods. *International Journal of Retail & Distribution Management,41*(11), 885-890. doi:10.1108/IJRDM-01-2013-0018

Manchanda, P., Dubé, J., Goh, K., & Chintagunta, P. (2006). The Effect of Banner Advertising on Internet Purchasing. *Journal of Marketing Research, 43*(1), 98-108. Retrieved from http://0-www.jstor.org.tiger.coloradocollege.edu/stable/30163374

Levin, R. L,. & Lowitz, N. J., (2018). *How'd the iPhone X Do? It's Complicated* (pp. 1-2, Rep.). Chicago, IL: Consumer Intelligence Research Partners, LLC.

Pavlou, P. (2003). Consumer Acceptance of Electronic Commerce: Integrating trust and risk with the technology acceptance model. *International Journal of Electronic Commerce, 7*(3), 101-134. Retrieved from http://www.jstor.org/stable/27751067

Perrin, A., & Duggan, M. (2015, June 26). Americans' Internet Access: 2000-2015. Retrieved March 04, 2018, from http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/

Scheleur, S., & King, C. (2002). *Retail e-commerce sales in first quarter 2002 were $9.8 billion, up 19.3 percent from first quarter 2001* (pp. 1-3) (US Census Bureau, Economics and Statistics Administration). Washington, DC: United States Department of Commerce News.

Smith, A., & Anderson, M. (2016, December 19). Online Shopping and E-Commerce. Retrieved March 04, 2018, from http://www.pewinternet.org/2016/12/19/online-shopping-and-e-commerce/

US Census Bureau, Economics and Statistics Administration. (2017). *Quarterly Retail E-commerce Sales, 1st Quarter 2017* (pp. 1-5). Washington, DC: United States Department of Commerce News.

Zhou, L., Dai, L., & Zhang, D. (2007). Online Shopping Acceptance Model - A critical survey of consumer factors in online shopping. *Journal of Electronic Commerce Research, 8*(1). Retrieved from http://www.jecr.org/node/166