

Running head: INTERNET COMMERCE AND BASIC FACTORS OF MOTIVATION

Internet Commerce and Basic Factors of Motivation

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EXECUTIVE SUMMARY

The goal of this study was to attempt to identify a correlation between Internet commerce and the basic factors of motivation. Three broad classes of basic factors of e-commerce were identified for analysis: a) level of affluence, b) level of Internet use, and c) level of e-commerce. Level of affluence included variables such as education, income, and race. Level of Internet use included variables such as email hours, surfing hours, and chatroom hours. Level of e-commerce included variables such as shopping online, investing online, and travel online. An analysis of 23 scholarly studies indicated relationships between these factors. In other words, these studies posited that Internet usage is a function of affluence and e-commerce is a function of Internet usage. Therefore, we decided to look for these trends in the General Social Survey, which is a database of 46,369 records. There was an average of 2,271 records dealing with variables for level of Internet usage and e-commerce in the database. Initial analyses failed to identify any strong statistical correlations between these variables. This was largely attributed to a survey design (e.g., General Social Survey) that was not sensitive to these types of analyses, small sample sizes for variables of interest, and simply the lack of strong statistical correlations between the data as collected.

INTRODUCTION

The purpose of this study is to examine Internet commerce and basic factors of motivation. Internet commerce is defined as sharing business information, maintaining business relationships, and conducting business transactions using the Internet (Zwass, 1994). In the context of this study, Internet commerce is defined as consumers who use the Internet for online shopping, banking, investing, paying bills, and other transactions that have financial value.

Internet commerce is distinguished from ordinary Internet surfing, which involves visiting new websites, using search engines, using online databases, visiting entertainment websites, designing web pages, and visiting chat rooms (Sheehan, 2002a). Why have we distinguished between Internet commerce and Internet surfing? For one thing, Sheehan (2002b) goes on to tell us that only about 25% of Internet surfers are concerned with factors affecting Internet surfing, while most consumers are concerned with factors affecting Internet commerce.

Lederer, Maupin, Sena, and Zhuang (2000) found that the factors underlying the technology acceptance model, such as perception, ease of use, attitude, and intention, explain whether consumers engage in Internet commerce. Torkzadeh and Dhillon (2002) found that the factors associated with web satisfaction, such as product choice, payment method, travel, convenience, ecology, customer service, and product value, explain whether consumers engage in Internet commerce. And, McKnight, Choudhury, and Kacmar (2002) assert the major factors of online trust, such as disposition to trust, perception of the Internet, trusting beliefs, and trusting intentions are important as well.

While these models are beyond the scope of this study, we propose to examine the correlations between level of affluence, level of Internet use, and level of e-commerce as a surrogate for accomplishing similar means and objectives. Level of affluence includes education, income, and race. Level of Internet use includes email hours, surfing hours, and chatroom hours. And, Level of e-commerce includes shopping online, investing online, and travel online.

LITERATURE REVIEW

Many sophisticated factors and models have been created since the 1980s and especially the late 1990s and early 2000s, with the advent of the Internet age. These tend to be scholarly theoretical conceptual models involving various psycho-sociological phenomena in an attempt to explain why consumers may or may not use Internet technologies or engage in Internet commerce. The following paragraphs briefly describe some of these prevailing theories.

The technology acceptance model (TAM) was created in the 1980s to investigate why people do or do not prefer to use new computer systems (Davis, 1986). TAM was based on Fishbein's and Ajzen's (1975) theory of reasoned action (TRA). TRA said "a person's attitude toward a behavior is determined by his or her salient beliefs about consequences of performing the behavior multiplied by the evaluation of those consequences" (Fishbein & Ajzen, 1980).

Cho and Park (2001) produced one of the first studies, which identified product information, consumer service, purchase result and delivery, website design, purchasing process, product merchandizing, delivery time and charge, payment options, ease of use, and additional information services as important determinants of Internet commerce customer satisfaction. McKinney, Yoon, and Zahedi (2002) found that information quality and system quality were significant determinants of customer satisfaction. Srivastava (1999) developed one of the first models of trust for Internet commerce, consisting of business practice assurance, transaction integrity assurance, information protection assurance, and legal environment assurance.

In perhaps the first empirical study of online trust, Gefen (2000) found that familiarity and disposition to trust were linked to product inquiry and purchase among 217 online shoppers. Finally, Easley, Devaraj, and Crant (2003) conducted a study of 122 graduate business students in the U.S. to identify the significant determinants or factors affecting online behavior. Their study indicated that factors such as education and high levels of computer usage were positively correlated to successful outcomes not unlike the act of engaging in Internet commerce.

However, the goal of this study is to examine basic factors of motivation surrounding Internet commerce, primarily motivated by common availability of supporting data. Basic factors fall into three broad categories of data: a) level of affluence, b) level of Internet use, and c) level of e-commerce. Level of affluence includes factors such as education, income, and race. Level of Internet use includes factors such as email hours, surfing hours, and chatroom hours. Level of e-commerce includes shopping online, investing online, and travel online.

Ironically, these factors are generally associated with a popular genre of scholarship, which carefully chronicles the theory called the “digital divide” (Brodie & Flourney, 2000). Proponents of the “digital divide” claim that society’s use of the Internet for pleasure and business is associated with factors such as education, income, race, age, gender, and proximity to cities. That is, people who use the Internet are generally well-educated, wealthy, and white, and their use of the Internet leads to activity such as the buying and selling of goods on the Internet.

Let’s examine some of this literature. It is important to note that the notion of “Internet usage” crosses both genres of literature previously mentioned. That is, “Internet usage” is important to literature examining complex theories of Internet use as well as factors related to the digital divide. So, this literature review will examine both types of literature. And, most of this literature is part of scholarly studies and have theories tested using quantitative survey research. Of course, our goal is to identify and justify the basic factors motivating Internet commerce.

Loh and Ong (1998) found that consumers were more likely to buy and sell stocks using the Internet if online trading systems were easy to use, ensured the highest security and privacy, and the consumers were already immersed in the stock market. While, looking for sophisticated factors of consumer behavior, Balabanis and Vassileiou (1999) found that income was an overriding factor influencing Internet commerce. In yet another study, seeking complex models to explain consumer behavior, Korgaonkar and Wolin (1999) discovered that younger, less educated, and lower income people were more likely to be users of the Internet.

Citrin, Sprott, Silverman, and Stem (2000) felt that innovativeness was a personality trait influencing the use of the Internet, which ultimately led to increased Internet commerce. Once again, increased income was associated with additional leisure time, which was linked to increased Internet usage and e-commerce activity in a study by Comor (2000). In Germany, it was found that young, university educated men with high incomes were more likely to own personal computers and use the Internet (Haisken-DeNew, Pischner, & Wagner, 2000).

Prior experience using the Internet has been linked to increased online activity (Jiang, Hsu, Klein, & Lin, 2000). In a breakthrough study, LaFerle, Edwards, and Lee (2000) found that teenagers were more likely to use the Internet for doing their homework and socializing with friends rather than engage in e-commerce, advising advertisers to increase their assault on this demographic. In yet another study of age, looking for that magic number, which is associated Internet use, Madden and Savage (2000) and Chang and Samuel (2004) found that affluent 30 to 34 year old Australian men were most likely to own a personal computer and use the Internet.

Reminding us of the importance of geography, Kelly and Lewis (2001) assert that Australians living in cities were more likely to use the Internet than the rural community. In a broad ranging study, organizational influences such as pressure to be cost competitive was a major determinant of Internet commerce activity (Kennedy & Deeter-Schmelz, 2001).

Kolodinsky and Hogarth (2001) warn the banking industry that the sheer availability of online banking methods, alternatives, and technologies is related to increased Internet commerce.

In a scholarly, yet unusually ethereal study, Novak, Hoffman, and Yung (2001) identify 14 major factors representing a “compelling online environment,” which are linked to increased e-commerce among Internet users. In a pointed study of over 1,100 travelers passing through Hong Kong’s international airport, Heung (2003) found that wealthy and well-educated travelers from Western nations were more likely to engage in arranging travel plans using the Internet. Ono and Zovodny (2003) say minorities are less likely to own a computer and use the Internet.

While most studies attempt to link Internet usage to e-commerce, Park and Jun (2003) say high levels of Internet use and e-commerce are not related among Koreans and Americans. Rice and Katz (2003) conducted a groundbreaking study showing digital divides not only exist for personal computers and Internet usage, but cellular phones as well, which is a major concern. In an unusual twist, people with higher personal values tended to use the Internet more and engage in e-commerce more frequently, while chatrooms were found to be associated with people exhibiting poor values (Schiffman, Sherman, & Long, 2003).

Young, affluent, well educated, and risk tolerant consumers were more likely to use the Internet for online investing in a study by Lin and Lee (2004). Brengham, Gueins, Wijters, Smith, and Swinyard (2005) developed a common framework to measure Internet behavior among American and Belgian consumers, though culture did affect the levels within each factor. In a recent study, Calvert, Rideout, Woolard, Barr, and Strouse (2005) continue to emphasize age, gender, ethnicity, income, and education as determinants of personal computer usage. In a fresh study, lower income adults who receive practical instruction on how to use the Internet to find interesting information, such as reading newspapers, are more likely to use personal computers and the Internet, than if they had only received instruction on how to use e-mail and other chatroom functions (Jackson, Von Eye, Biocca, Barbatsis, Zhao, & Fitzgerald, 2005).

What does all of this mean? Well, the objective of this literature review was to serve as a broad ranging cross section of literature, which examines the major factors driving Internet usage and willingness to engage in e-commerce. The message is rather loud and clear, socio-economic factors such as education, income, and race, among others, continue to be major determinants of the level of Internet use and the level of e-commerce. According to these sources, a cursory scan of just about any broad ranging social survey should reveal relationships between factors of affluence, Internet use, and e-commerce. Table 1 provides a summary of the literature covered here in order to provide a brief synopsis of major scholarly studies and their associated factors.

Table 1

Summary of 23 Scholarly Studies Identifying Major Factors Associated with Level of Affluence, Level of Internet Usage, and Level of E-Commerce

Author	Year	Hypothesis	Factors	Methodology	Results
Loh, Ong	1998	Probability of users accepting a new Internet-based stock trading system is related to perceptions of system evaluations and usage	User evaluations, usage behavior, adoption of Internet-based stock trading, user satisfaction, issues and concerns	Online survey of 84 Internet consumers	Consumers were more likely to use the Internet for stock trading if systems were easy to use, they ensured security and privacy, and they were already heavy stock traders
Balabanis, Vassileiou	1999	Income, Internet shopping experience, attitudes towards retailer's websites and brands affect intention to buy	Income, involvement, home-shopping, Internet shopping, Attitude toward retailer's website, prior attitudes towards retailer's brand, experience with retailer's branded products	Survey of 102 Internet shoppers in the U.K.	High income is a strong predictor of an Internet shoppers intention to buy
Korgaonkar, Wolin	1999	Demographic factors such as age, income, gender, and education are significantly correlated with Web usage	Social escapism motivation, transaction-based security and privacy concerns, information motivation, interactive control motivation, social motivation, non-transactional privacy concerns, economic motivation	Six focus groups used to develop questions to survey 401 Internet users	Younger, less educated, and lower income people use the Internet more for personal purposes than their counterparts
Citrin, Sprott, Silverman, Stem	2000	Usage of the Internet for non-shopping purposes increases the likelihood of e-commerce activity	Internet usage, consumer innovativeness	Survey of 403 Internet shoppers	People who use the Internet for any purpose are more likely to engage in e-commerce, especially if they are particularly innovative
Comor	2000	Income and amount of leisure time are predictors of Internet commerce	Income, deficit or surplus of leisure time, amount of time spent on the Internet other than for e-commerce	Analysis of literature on social, economic, and Internet trends	People with higher incomes and more leisure time are more likely to engage in e-commerce
Haisken-DeNew, Pischner, Wagner	2000	Use of computers and the Internet are related to age and education	Rate of personal computer ownership, amount of leisure time spent on the Internet, age of computer user, educational level of computer user	Analysis of 7,500 cases from the German Socio-Economic Panel (GSEOP)	18 year old university educated German men with a high income were most likely to own personal computers and use the Internet
Jiang, Hsu, Klein, Lin	2000	Ease of use and promotion determine level of Internet use	Experience with the Internet, near-term consequences, facilitating conditions, long-term consequences,	Survey of 335 Internet users	All factors are significant predictors of Internet use, but level of experience is important

LaFerle, Edwards, Lee	2000	The purchasing power and activity of teenagers is increasing, therefore their consumer behaviors and patterns must be analyzed and understood by advertising agencies	Time spent with media, adolescent media used by activity, frequency of use of the Internet for activities by gender and location of Internet connection, where teens find out about websites by gender and location of the Internet connection	Survey of 189 teenagers from an affluent, technology rich high school in the Southwestern U.S.	Teenagers most often use the Internet for research, homework, news, current events, participating in activities, and making friends, versus Internet shopping
Madden, Savage	2000	Price of Internet access, socio-demographic variables, and capacity of Internet connection are related to usage of the Internet	Gender, age, education, occupation, income, Internet usage, type of use, mode of access, Internet bill	Analysis of 1,136 Australian Internet users from the Communications Economics Research Program (CERP)	Affluent, 30 year old, and highly educated Australian men are most likely to use the Internet if flat rate pricing is available
Kelly, Lewis	2001	Availability of Internet connections are determinant of Internet use over socioeconomic status	Percentage of households connected to the Internet, average income, age, language spoken, university enrollment, technical/vocational school enrollment, region	Analysis of Australian Internet Service Providers and the 1996 Census of Population and Housing survey	Income, age, location, and education are determinants of Internet access among Australians, with urban dwellers having the highest rate of Internet access
Kennedy, Deeter-Schmelz	2001	Factors such as individual innovativeness, shopping convenience, cost pressures, power and status, and supplier pressures are correlated to use of the Internet for e-commerce	B2B Internet use and benefits, demographics, perceptions of technology, structural demographics, organizational influences	Qualitative interviews of organizational buyers and survey of 232 Internet shoppers	Organizational influences such as supplier support of online purchasing, pressure to reduce costs, and influence of other departments are linked to use of the Internet for e-commerce
Kolodinsky, Hogarth	2001	Technologies such as phone banking, direct bill payment, electronic funds transfer, and PC banking influence whether consumers use the Internet for banking	Observability, relative advantage, compatibility, trialability, simplicity	Analysis of 1,000 cases from the October 1999 University of Michigan's Surveys of Consumers	The percentage of households using phone banking, direct bill payments, electronic funds transfer, and PC banking is higher when people see others using the Internet, consumers perceive benefits to doing so, it suits their personality, multiple services are available, and they are easy to use

Novak, Hoffman, Yung	2001	Creating a compelling online environment for Internet consumers is linked to higher levels of e-commerce activity	Web usage, arousal, challenge, control, exploratory behavior, flow, focused attention, interactivity, involvement, playfulness, positive effect, skill, telepresence, and time distortion	Analysis of 3,616 cases from Georgia Tech's 1998 Ninth Annual Graphic, Visualization, and Usability (GVU) Center Survey	Skill and control, challenge and arousal, flow, focused attention, and telepresence and time distortion are significant determinants of creating a compelling online experience leading to increase Internet commerce
Heung	2003	Internet perceptions, concerns about security, availability of time, and access to travel agents are predictors Internet use to make travel reservations	Gender, age, income, National origin, Internet usage	Survey of 1,104 international travelers using the Hong Kong International Airport	International travelers from Western nations having a higher education and income are more likely to use the Internet for making travel reservations
Ono, Zovodny	2003	Minorities (e.g., blacks and Hispanics) face less price discrimination using the Internet versus face-to-face interactions	Computer in household, computer usage at home, computer usage at home given ownership, Internet usage at home given computer usage, shop online, frequency of online shopping, online spending given online shopping	Analysis of 1,009 cases from the 2000 Nomura Research Institute technology usage survey and 69,489 cases from the August 2000 Current Population Survey	Minorities (e.g., blacks and Hispanics) are less likely to own a personal computer and use the Internet, and therefore may be subject to greater price discrimination
Park, Jun	2003	Internet usage, Internet innovativeness, perceived risk of Internet buying, and Internet buying behaviors differ based on National culture	Internet usage, innovativeness, perceived risk, demographic variables (e.g., age and gender), nationality, Internet shopping	Survey of 115 Korean Internet consumers and 133 U.S. Internet consumers	Internet usage and perceived risks vary across National cultures, but not Internet buying intentions or online buying experience. Koreans use the Internet more, are more innovative, and perceive greater risks to using the Internet, though they engage in less e-commerce than Americans
Rice, Katz	2003	A digital divide exists for users and non-users of mobile phones, as well as users of the Internet	Work, age, education, income, gender, children, phone calls, marital status, user vs. non-user, user vs. dropout, recent vs. veteran user	Survey of 2,125 Internet and mobile phone users	A digital divide exists for mobile phone and Internet users along income and education

Schiffman, Sherman, Long	2003	The personal values of consumers affect their attitudes, preferences, and activities associated with e-commerce	Personal values (e.g., sense of belonging, excitement, warm relationships with others, self-fulfillment, being well respected, fun and enjoyment in life, security, self-respect, sense of accomplishment) and Internet activities (e.g., business-related uses of the Internet, information and research-related uses of the Internet, e-commerce and related uses of the Internet, fun and entertainment-related uses of the Internet)	Survey of 506 Internet users	People with high personal values were more likely to use the Internet for learning, gathering information, making travel reservations, work and business, personal investment, hobbies, and entertainment, but not chatrooms
Chang, Samuel	2004	Age, gender, income, and location are determinants of Internet shopping frequency	Age, gender, income, location	Analysis of 4,752 cases from the Global Mindset Online Survey	34 year old Australian men living in cities with high incomes represent Internet shoppers
Lin, Lee	2004	Investment self efficacy, risk tolerance, age, and income are related to use of the Internet for investing money	Subjective knowledge, amount of investment risk tolerance, age, income, use of literature, use of media, use of the Internet	Analysis of 3,759 respondents from the 2000 to 2001 MacroMonitor survey	The probability of investing money over the Internet is greater for younger consumers with greater subjective knowledge, risk tolerance, education, and income
Brengman, Gueins, Weijters, Smith, Swinyard	2005	The market preferences of Internet shoppers can be categorized using a common framework across National cultures	Internet convenience, perceived self-inefficacy, Internet logistics, Internet distrust, Internet offer, Internet window-shopping	Survey of 4,000 Internet shoppers in the U.S. and Belgium	Internet consumer preferences differ according to National culture, though they can be measured using common scales
Calvert, Rideout, Woolard, Barr, Strouse	2005	Age, ethnicity, and socioeconomic status are significant determinants of personal computer usage	Age, gender, ethnicity, income, education	Telephone survey of 1,065 families	Age, ethnicity, income, and education are determinants of personal computer usage, though not gender
Jackson, Von Eye, Biocca, Barbatsis, Zhao, Fitzgerald	2005	Adults in lower income brackets are more likely to use the Internet if they receive instruction on how to find useful information rather than merely the use of e-mail	Success or failure using personal computers and the Internet, anxiety associated with using personal computers, attitudes and experience with personal computers and the Internet, various demographic data, type of instruction received (e.g., communication or information)	Longitudinal survey of 117 low income respondents (at a 3 month interval)	Lower income adults who received practical instruction on how to find useful and interesting information are more likely to use computers and the Internet

RESEARCH THEORY

The research theory has been designed to examine the statistical correlations between the level of affluence, level of Internet use, and level of e-commerce, based on the literature review. In particular, it is designed to test the nomological network among the dimensions of affluence, Internet use, and e-commerce. This section consists of a theoretical conceptual model with nine major factors: a) education, b) income, c) race, d) email hours, e) surfing hours, f) chatroom hours, g) shopping online, h) investing online, and i) travel online. These factors have been identified and formulated in order to answer the following research questions in Table 2.

Table 2

Research Questions for Correlating Level of Affluence, Internet Use, and E-Commerce

Factors	Questions
Education	Q ₁ Are the level of Internet use and level of e-commerce functions of education?
Income	Q ₂ Are the level of Internet use and level of e-commerce functions of income?
Race	Q ₃ Are the level of Internet use and level of e-commerce functions of race?

The conceptual model exhibited in Figure 1 shows the possible correlations between level of affluence, Internet use, and e-commerce. As a percentage of the total studies found in the literature review, 35% cited education, 57% cited income, and 48% cited socio-economic factors such as race, when explaining Internet usage. And, nearly 75% of the studies in the literature review linked increased level of Internet use to increased level of e-commerce. Based on an analysis of the 23 scholarly studies in the literature review, the conceptual model exhibited in Figure 1 should hold true, if it were tested against the data found in those studies. Education, income, and race are common predictors of Internet use, which should predict e-commerce.

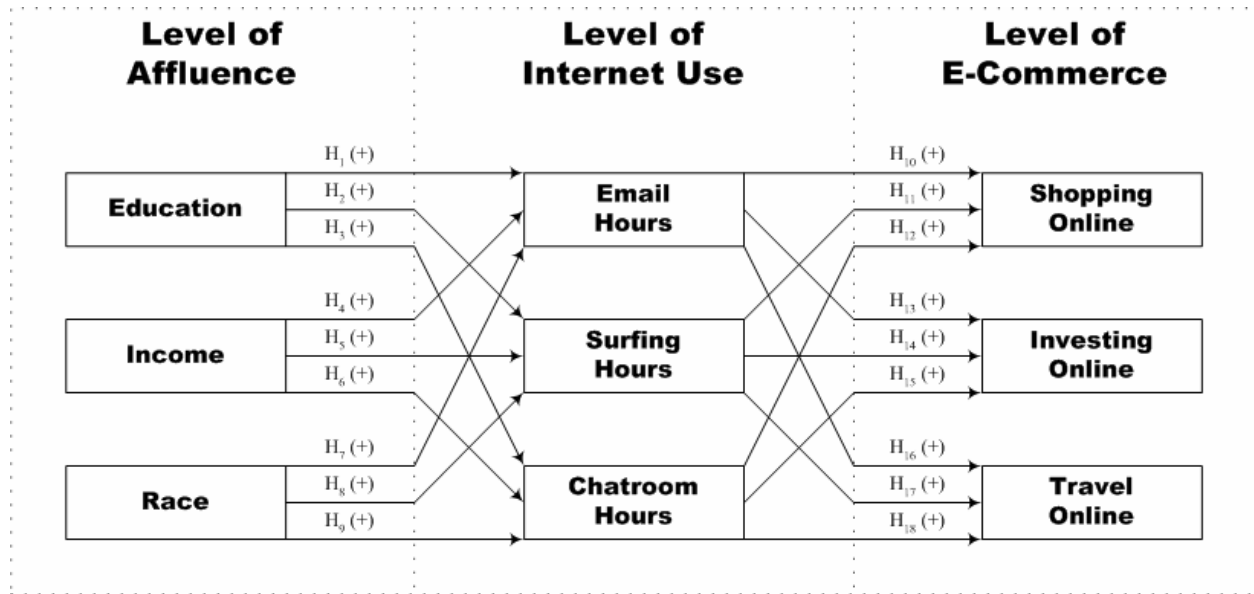


Figure 1. Conceptual model for examining the statistical correlations between level of affluence, level of Internet use, and level of e-commerce.

Education is often associated with people who have or hold university degrees (Haisken-DeNew, Pischner, & Wagner, 2000). Some studies however attempt to show that people with some sort of post secondary education are more likely to be Internet users. Income is just that, the level of income associated with a potential respondent. Some studies analyze total household income (Calvert, Rideout, Woolard, Barr, & Strouse, 2005), while most are only interested in individual income (Madden & Savage, 2000). Race is most often associated with white, black, or Hispanic (Ono & Zovodny, 2003). Some studies attempt to measure language spoken as a measure of race, in an attempt to attribute race to a migratory labor class (Kelly & Lewis, 2001). Email, surfing, and chatroom hours are self explanatory. However, it is important to note that some studies do not show strong correlations between these factors of Internet usage and increased levels of e-commerce (Schiffman, Sherman, & Long, 2003). Shopping, investing, and travel online are by and large the most common terms or factors used to study, analyze, and measure the level of e-commerce activity (Schiffman, Sherman, & Long, 2003). Figure 1 denotes 18 potential statistical correlations. But, we will also look for correlations between categories.

A total of 18 research hypotheses have been formulated to test the correlations between level of affluence, Internet use, and e-commerce (as shown in Table 3). Nine hypotheses have been formulated to test the correlations between level of affluence (e.g., education, income, and race) and level of Internet usage (e.g., email hours, surfing hours, and chatroom hours). And, an additional nine hypotheses have been formulated to test the correlations between level of Internet use and level of e-commerce (e.g., shopping online, investing online, and travel online). For the purposes of this study, shopping online means just that, “shopping.” And, shopping online does not mean that any products or services were actually purchased.

Table 3

Research Hypotheses for Correlating Level of Affluence, Internet Use, and E-Commerce

Factors	Hypotheses
Education	H ₁ Email hours are a function of education.
	H ₂ Surfing hours are a function of education.
	H ₃ Chatroom hours are a function of education.
Income	H ₄ Email hours are a function of income.
	H ₅ Surfing hours are a function of income.
	H ₆ Chatroom hours are a function of income.
Race	H ₇ Email hours are a function of race.
	H ₈ Surfing hours are a function of race.
	H ₉ Chatroom hours are a function of race.
Email hours	H ₁₀ Shopping online is a function of email hours.
	H ₁₃ Investing online is a function of email hours.
	H ₁₆ Travel online is a function of email hours.
Surfing hours	H ₁₁ Shopping online is a function of surfing hours.
	H ₁₄ Investing online is a function of surfing hours.
	H ₁₇ Travel online is a function of surfing hours.
Chatroom hours	H ₁₂ Shopping online is a function of chatroom hours.
	H ₁₅ Investing online is a function of chatroom hours.
	H ₁₈ Travel online is a function of chatroom hours.

METHODOLOGY

Data on level of affluence (e.g., education, income, and race), level of Internet use (e.g., email hours, surfing hours, and chatroom hours), and level of e-commerce (e.g., shopping online, investing online, and travel online) were obtained from the General Social Survey (University of Chicago, National Opinion Research Center, 2004). The purpose of the General Social Survey is to “gather data on contemporary American society in order to monitor and explain trends and constants in attitudes, behaviors, and attributes” (University of Chicago, National Opinion Research Center). This survey has been administered 25 times since 1972 and more than 38,000 individuals have answered over 3,260 questions within 43 categories.

The General Social Survey has recently been updated to expand it from 2002 to 2004, and it is this new dataset, which will be used. The General Social Survey observes the highest possible standards in the field of quantitative research for survey design, sampling, interviewing, processing, and documentation. Survey instruments and items (e.g., questions, questionnaires, individual variables, and scales) are designed by leading specialists in their fields and they are tested and piloted to obtain the maximum possible response rate, reliability, validity, and data quality. There are five major cycles or periods associated with the General Social Survey.

Cycle I from 1973 to 1977 involved the basic design of the survey instrument, which involved as few as 20 questions focusing on abortion, feminism, and race relations. Cycle II from 1978 to 1982 contained the first cross national items or questions involving Germany and expanded the sample size of African Americans. Cycle III from 1983 to 1987 began to measure annual topical issues, welfare and poverty, socio political participation, expanded cross national studies, sources of financial support, issues of inequality, and even larger sample sizes of African Americans. Cycles IV from 1988 to 1992 and V from 1993 to 2000 continued to expand cross national studies, make use of contingent surveys, and began a long period of decline for its application.

The categories of the General Social Survey include personal and family information, attitudinal measures, personal concerns, societal concerns, and workplace and economic concerns. It also includes controversial social issues, military issues, obligations and responsibilities, social networks, socio political participation, religion, inter group relations, and work organizations. Culture, family mobility, multiculturalism, and family finances and donations are also included. For the purposes of this study, we are interested in the personal and family information category, which contains 143 questions or variables, and the web use questions category, which contains 262 questions or variables.

From the personal and family information category, we've selected three variables: highest year of school completed (e.g., educ), total family income (e.g., income), and race of respondent (e.g., race). And, from the web use questions, we've selected six variables: email hours per week (e.g., emailhr), world wide web hours per week (e.g., wwwhr), chatroom hours per week (e.g., chathr), sought information purchase past year (e.g., buyinfgn), invested money past year (e.g., investgn), and made travel reservations past year (e. g., travelgn).

Highest year of school completed (e.g., educ) refers to the highest grade or number of years of elementary school, high school, or college education. Total family income (e.g., income) consists of 12 fine grained measures of income ranging from \$1,000 to \$25,000 per year or more. Email hours per week (e.g., emailhr), world wide web hours per week (e.g., wwwhr), and chat room hours per week (chathr) are self explanatory.

These were the last three questions asked: In the last twelve months, have you looked for information about a product you might want to buy (e.g., buyinfgn)? In the last twelve months, have you invested money in a stock or mutual fund (e.g., investgn)? In the last twelve months, have you made an airplane or other travel reservations (e.g., travelgn)? These variables offered fine grained measures, such as: a) 0 not at all, b) 1 or 2 times, c) 3 to 5 times, and d) 6 or more times. These were chosen to maximize sensitivity of the data for correlational analyses.

ANALYSIS PLAN

The analysis plan for examining the correlations between level of affluence, Internet usage, and e-commerce is shown in Figure 2. A description of each of the steps illustrated in the figure is provided in the following subsections along with the results of the analysis. The general approach was to download a dataset with the nine variables relating to level of affluence, Internet usage, and e-commerce. Basic descriptive statistics were generated and a correlational analysis of each of the variables ensued to look for statistically significant relationships. First, the variables of level of affluence were correlated to the variables associated with both level of Internet usage and level of e-commerce. Then, the variables of level of Internet use were correlated to the variables associated with level of e-commerce. Summary reports were generated from these analyses and hypothesis testing was illustrated from these results.

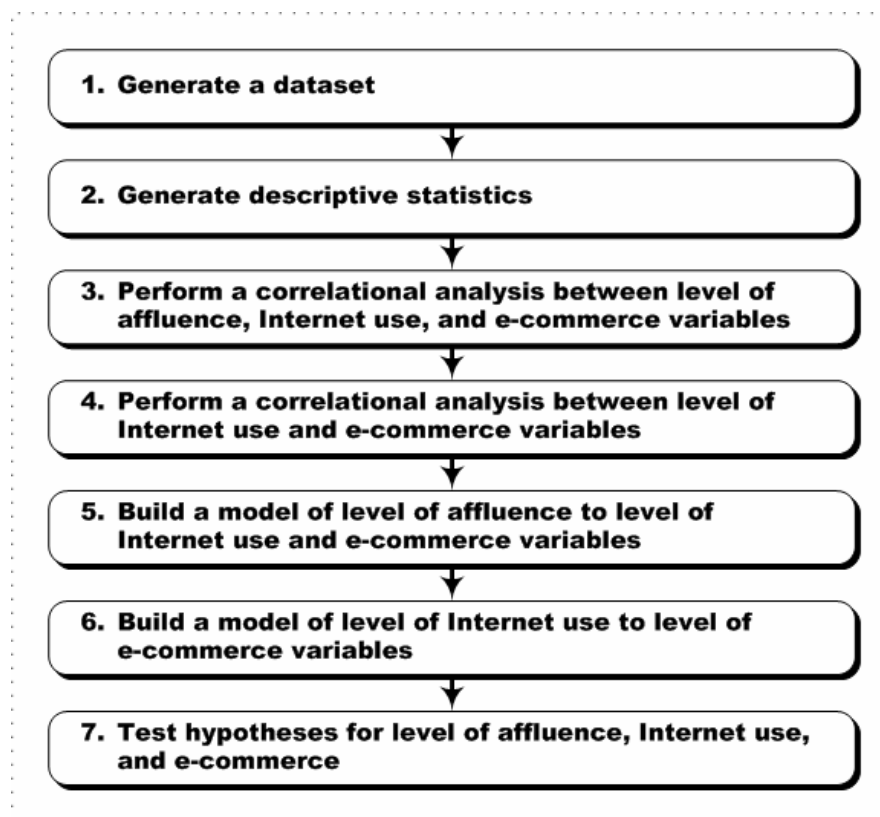


Figure 2. Analysis plan for examining the statistical correlations between level of affluence, level of Internet use, and level of e-commerce.

Generating the Dataset

The first step was to generate the dataset, which consisted of selecting a database from the General Social Survey website (e.g., GSS Cumulative Datafile 1972-2004 - Full Analysis). The option, “download a customized subset” was chosen and the nine variables were entered into the field, “Enter names of individual variables to include.” A codebook, datafile, and SPSS file were then downloaded. The extension of the SPSS file was changed from “.txt” to “.spss” and the command file was executed. The file pathname was changed to “datafile.txt” and the script was executed. From this, an SPSS database was automatically created.

Generating the Descriptive Statistics

The second step was to use SPSS 13.0 for Windows Graduate Student Version Release 12.0 (1 Sep 2003) to generate the descriptive statistics. The menu item, “Analyze → Descriptive Statistics → Descriptives” was selected. The nine variables representing level of affluence, Internet use, and e-commerce were moved to the variable field. The descriptive statistics were then generated as shown in Table 4. From this, we observe that a total of 46,369 individual cases were downloaded from the General Social Survey website. However, note that the largest number of records associated with the variables of interest is 3,822 (e.g., surfing hours).

Table 4

Descriptive Statistics for Level of Affluence, Internet Use, and E-Commerce Variables

Variable	Description	n	Minimum	Maximum	Mean	STDEV
educ	Highest year of school completed	46,369	0	20	12.61	3.167
income	Total family income	42,816	1	13	9.91	2.954
race	Race of respondent	46,510	1	3	1.21	0.484
emailhr	Email hours per week	2,664	0	70	5.98	8.132
wwwhr	World wide web hours per week	3,822	0	130	7.11	9.693
chathr	Chatroom hours per week	260	1	75	5.77	7.785
buyinfgn	Sought information purchase past year	2,293	0	3	1.10	1.101
investgn	Invested money past year	2,293	0	3	0.54	0.912
travelgn	Made travel reservations past year	2,293	0	3	0.59	0.811

Correlational Analysis Between Level of Affluence, Internet Use, and E-Commerce Variables

The third step consisted of conducting a correlational analysis between level of affluence, level of Internet use, and level of e-commerce. Since the number of education records is 46,369, as shown in Table 4, each of the correlational analyses were only limited by the number of target variables. For instance, there were 2,662 records for e-mail hours, so all of those records were selected for correlational analysis to education. Careful attention was made so that incorrect categorical values were not chosen for analysis (e.g., 8, 9, 998, or 999 representing don't know or not applicable), so that these values would not skew the results of the analysis.

A total of 18 individual SPSS databases were constructed in order to perform the individual correlational analyses. Once these were constructed and organized, a simple linear regression between each of the 18 pairs was performed using the SPSS command, "Analyze → Regression → Linear." The results of these linear regressions are shown in Table 5. Note that the largest β values are 0.636 for race to emailhr, 1.019 for race to wwwhr, and -1.131 for race to chathr (highlighted in yellow). However, also note that the *adjusted R² values* for these three β values are 0.002, 0.003, and 0.005 (highlighted in orange), rendering them ineffectual.

Upon further investigation, we can see that the β values of 0.115 for educ to buyinfgn, 0.100 for educ to investgn, and 0.108 for educ to travelgn show some levels of statistical significance (highlighted in blue). Note that the *adjusted R² values* for these β values are 0.089, 0.097, and 0.138 (highlighted in green). That is, they explain 8.9%, 9.7%, and 13.8% of the variance associated with level of education to level of e-commerce. Also note that the significance of the overall models and *p-values* for these six correlations were 0.000 (highlighted in lilac), which may further indicate these correlations are significant.

The 18 databases were further examined to search for multi-collinearity in the datasets, as well as quadratic and cubic relationships. The data were reduced and trimmed using visual inspections of graphs and plots. However, these analyses did not strengthen the correlations.

Table 5

Correlational Analysis of Level of Affluence, Internet Use, and E-Commerce Variables

Level of Affluence	Statistic	Level of Internet Use			Level of E-Commerce		
		emailhr	wwwhr	chathr	buyinfgn	investgn	travelgn
educ	<i>n</i>	2,662	3,818	260	2,287	2,287	2,290
	<i>R</i>	0.075	0.026	0.134	0.299	0.312	0.372
	<i>R</i> ²	0.006	0.001	0.018	0.089	0.097	0.139
	<i>Adjusted R</i> ²	0.005	0.000	0.014	0.089	0.097	0.138
	<i>Std Error</i>	8.113	9.695	7.730	1.051	0.868	0.753
	<i>F</i>	15.127	2.591	4.722	223.630	245.760	367.974
	<i>F-Sig</i>	0.000	0.108	0.031	0.000	0.000	0.000
	<i>Beta</i>	0.237	0.098	-0.386	0.115	0.100	0.108
	<i>t-value</i>	3.889	1.610	-2.173	14.954	15.677	19.183
	<i>Beta-Sig</i>	0.000	0.108	0.031	0.000	0.000	0.000
income	<i>n</i>	2,449	3,528	243	2,033	2,035	2,035
	<i>R</i>	0.038	0.020	0.164	0.203	0.221	0.220
	<i>R</i> ²	0.001	0.000	0.027	0.041	0.049	0.048
	<i>Adjusted R</i> ²	0.001	0.000	0.023	0.041	0.048	0.048
	<i>Std Error</i>	8.058	9.718	7.811	1.088	0.906	0.799
	<i>F</i>	3.615	1.414	6.700	86.905	104.420	103.477
	<i>F-Sig</i>	0.057	0.234	0.010	0.000	0.000	0.000
	<i>Beta</i>	0.165	-0.102	-0.557	0.092	0.084	0.074
	<i>t-value</i>	1.901	-1.189	-2.588	9.322	10.219	10.172
	<i>Beta-Sig</i>	0.057	0.234	0.010	0.000	0.000	0.000
race	<i>n</i>	2,664	3,822	260	2,293	2,293	2,296
	<i>R</i>	0.044	0.060	0.093	0.092	0.088	0.116
	<i>R</i> ²	0.002	0.004	0.009	0.009	0.008	0.013
	<i>Adjusted R</i> ²	0.002	0.003	0.005	0.008	0.007	0.013
	<i>Std Error</i>	8.126	9.677	7.766	1.096	0.909	0.806
	<i>F</i>	5.181	13.609	2.267	19.749	17.784	31.316
	<i>F-Sig</i>	0.023	0.000	0.133	0.000	0.000	0.000
	<i>Beta</i>	0.636	1.019	-1.131	-0.178	-0.140	-0.164
	<i>t-value</i>	2.276	3.689	-1.506	-4.444	-4.217	-5.596
	<i>Beta-Sig</i>	0.023	0.000	0.133	0.000	0.000	0.000

Correlational Analysis Between Level of Internet Use and E-Commerce Variables

The fourth step consisted of conducting a correlational analysis between level of Internet use and level of e-commerce. Since the number of e-mail hours records is 2,664, as shown in Table 4, each of the correlational analyses were only limited by the number of target variables. For instance, there were 958 records for shopping online, so all of those records were selected for correlational analysis to e-mail hours. Careful attention was made so that incorrect categorical values were not chosen for analysis (e.g., 8, 9, 998, or 999 representing don't know or not applicable), so that these values would not skew the results of the analysis.

A total of nine individual SPSS databases were constructed in order to perform the individual correlational analyses. Once these were constructed and organized, a simple linear regression between each of the nine pairs was performed using the SPSS command, "Analyze → Regression → Linear." The results of these linear regressions are shown in Table 6. Note that the largest β values are 0.009 for emailhr to travelgn, 0.019 for wwvhr to buyinfgn, and -0.007 for chathr to buyinfgn (highlighted in yellow). But, also note that the *adjusted R²* values for these three β values are 0.006, 0.024, and -0.012 (highlighted in orange), rendering them ineffectual.

Upon further investigation, we can see that the β values of -0.007 for chathr to buyinfgn, 0.004 for chathr to investgn, and 0.005 for chathr to travelgn have the strongest *adjusted R²* values in this analysis (highlighted in blue). Note that the *adjusted R²* values for these β values are -0.012, -0.014, and -0.013 (highlighted in green). That is, they explain 1.2%, 1.4%, and 1.3% of the variance associated with number of chatroom hours to level of e-commerce. Also note that the significance of the overall models and p-values for these six correlations were quite high (highlighted in lilac), which may further indicate these correlations do not actually exist.

The nine databases were further examined to search for multi-collinearity in the datasets, as well as quadratic and cubic relationships. The data were reduced and trimmed using visual inspections of graphs and plots. However, these analyses did not strengthen the correlations.

Table 6

Correlational Analysis of Level of Internet Use and E-Commerce Variables

Level of Internet Usage		Level of E-Commerce		
Internet Usage	Statistic	buyinfgn	investgn	travelgn
emailhr	<i>n</i>	958	957	958
	<i>R</i>	0.031	0.039	0.084
	<i>R</i> ²	0.001	0.001	0.007
	<i>Adjusted R</i> ²	0.000	0.000	0.006
	<i>Std Error</i>	1.100	1.044	0.909
	<i>F</i>	0.941	1.433	6.779
	<i>F-Sig</i>	0.332	0.232	0.009
	<i>Beta</i>	0.004	0.005	0.009
	<i>Beta t-value</i>	0.970	1.197	2.604
	<i>Beta-Sig</i>	0.332	0.232	0.009
wwwhr	<i>n</i>	1,000	1,001	1,001
	<i>R</i>	0.159	0.046	0.027
	<i>R</i> ²	0.025	0.002	0.001
	<i>Adjusted R</i> ²	0.024	0.001	0.000
	<i>Std Error</i>	1.075	1.045	0.901
	<i>F</i>	25.877	2.074	0.726
	<i>F-Sig</i>	0.000	0.150	0.395
	<i>Beta</i>	0.019	0.005	0.003
	<i>Beta t-value</i>	5.087	1.440	0.852
	<i>Beta-Sig</i>	0.000	0.150	0.395
chathr	<i>n</i>	72	72	72
	<i>R</i>	0.043	0.022	0.029
	<i>R</i> ²	0.002	0.000	0.001
	<i>Adjusted R</i> ²	-0.012	-0.014	-0.013
	<i>Std Error</i>	0.753	0.924	0.823
	<i>F</i>	0.130	0.035	0.058
	<i>F-Sig</i>	0.720	0.853	0.811
	<i>Beta</i>	-0.007	0.004	0.005
	<i>Beta t-value</i>	-0.360	0.188	0.240
	<i>Beta-Sig</i>	0.720	0.853	0.811

Model of Level of Affluence to Level of Internet Use and E-Commerce Variables

The fifth step was to build a model of level of affluence to level of Internet use and level of e-commerce variables. A total of six individual SPSS databases were constructed in order to analyze the individual models. Once these were constructed and organized, a simple linear regression between each of the six groups was performed using the SPSS command, “Analyze → Regression → Linear.” The results of these linear regressions are shown in Table 7. This step did yield statistically significant models. Note that the *adjusted R² values* for buyinfgn, investgn, and travelgn are 0.106, 0.116, and 0.157 (as highlighted in green). These values equate to 10.6%, 11.6%, and 15.7% explanatory power for the variance. Also note that the significance of these models is also interesting (as highlighted in lilac). These results indicate that level of e-commerce may be a function of level of affluence. Other *adjusted R² values* were insignificant.

Table 7

Model of Level of Affluence to Level of Internet Use and E-Commerce Variables

Level of Affluence	Level of Internet Use			Level of E-Commerce		
	emailhr	wwwhr	chathr	buyinfgn	investgn	travelgn
<i>n</i>	2,447	3,526	243	2,029	2,031	2,031
<i>R</i>	0.091	0.067	0.211	0.327	0.342	0.398
<i>R²</i>	0.008	0.004	0.045	0.107	0.117	0.158
<i>Adjusted R²</i>	0.007	0.004	0.033	0.106	0.116	0.157
<i>Std Error</i>	8.037	9.704	7.772	1.051	0.874	0.752
<i>F</i>	6.810	5.231	3.719	81.001	89.565	127.233
<i>F-Sig</i>	0.000	0.001	0.012	0.000	0.000	0.000
<i>(Constant)</i>	0.311	5.570	16.614	-0.633	-1.058	-0.949
<i>t</i>	0.229	4.095	4.833	-4.235	-8.515	-8.864
<i>Sig.</i>	0.819	0.000	0.000	0.000	0.000	0.000
educ	0.227	0.095	-0.231	0.101	0.087	0.097
<i>t</i>	3.585	1.483	-1.215	11.746	12.165	15.693
<i>Sig.</i>	0.000	0.138	0.226	0.000	0.000	0.000
income	0.139	-0.096	-0.546	0.054	0.052	0.037
<i>t</i>	1.600	-1.107	-2.474	5.323	6.162	5.157
<i>Sig.</i>	0.110	0.268	0.014	0.000	0.000	0.000
race	0.594	1.001	-1.230	-0.124	-0.084	-0.110
<i>t</i>	2.080	3.483	-1.597	-3.053	-2.496	-3.792
<i>Sig.</i>	0.038	0.001	0.111	0.002	0.013	0.000

Model of Level of Internet Use to Level of E-Commerce Variables

The sixth step was to build a model of level of Internet use and level of e-commerce variables. A total of three individual SPSS databases were constructed in order to analyze the individual models. Once these were constructed and organized, a simple linear regression between each of the three groups was performed using the SPSS command, “Analyze → Regression → Linear.” The results of these linear regressions are shown in Table 8. This step did yield one potentially statistically significant model. Note that the *adjusted R²* value for investgn is 0.128 (as highlighted in green). This value equates to 12.8% explanatory power for the variance. Also note that the significance of this model is also interesting (as highlighted in lilac). This result indicates that level of investing online may be a function of level of Internet use. Other *adjusted R²* values were insignificant. (Note one problem area highlighted in orange.)

Table 8

Model of Level of Internet Use to Level of E-Commerce Variables

Level of Internet Use	Level of E-Commerce		
	buyinfgn	investgn	travelgn
<i>n</i>	58	58	58
<i>R</i>	0.293	0.417	0.254
<i>R²</i>	0.086	0.174	0.065
<i>Adjusted R²</i>	0.035	0.128	0.013
<i>Std Error</i>	0.761	0.866	0.822
<i>F</i>	1.687	3.782	1.245
<i>F-Significance</i>	0.181	0.016	0.302
<i>(Constant)</i>	1.290	0.657	0.850
<i>t</i>	8.234	3.689	5.029
<i>Sig.</i>	0.000	0.001	0.000
emailhr	0.013	0.009	0.002
<i>t</i>	1.312	0.788	0.220
<i>Sig.</i>	0.195	0.434	0.827
wwwhr	0.017	0.041	0.024
<i>t</i>	1.360	2.931	1.807
<i>Sig.</i>	0.179	0.005	0.076
chathr	-0.035	-0.035	-0.025
<i>t</i>	-1.466	-1.300	-0.981
<i>Sig.</i>	0.148	0.199	0.331

Hypothesis Testing

The seventh and final step was to transpose the β values from Table 5 and Table 6 onto the conceptual model from Figure 1 to depict the results of the initial hypothesis tests as shown in Figure 3. An initial scan of the β and R^2 values showed no significant correlations to justify any of the 18 hypotheses (as indicated by the *dashed* lines between variables). An analysis of the β and R^2 values from Table 7 and Table 8 illustrated some significant statistical correlations between the categories of variables (e.g., level of affluence to level of e-commerce and level of Internet use to level of investing online), as indicated by values highlighted in green and lilac in Table 7 and Table 8.

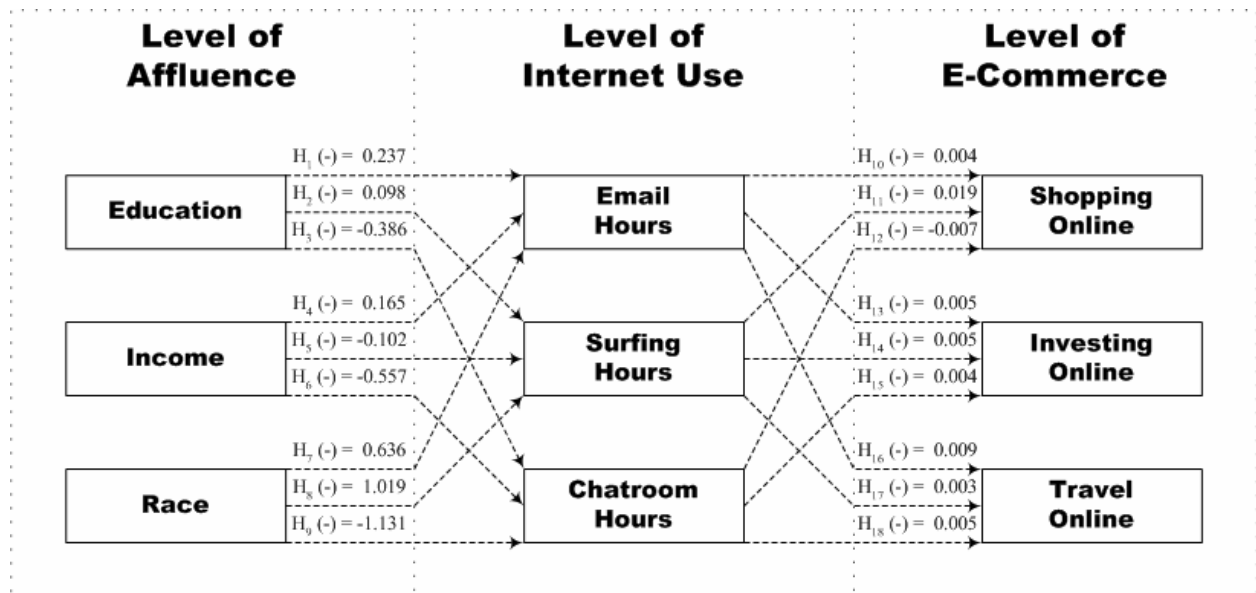


Figure 3. Hypothesis testing of the statistical correlations between level of affluence, level of Internet use, and level of e-commerce.

The analysis fails to corroborate any of the findings from the 23 scholarly studies summarized in Table 1, suggesting strong relationships between level of affluence, Internet use, and e-commerce. After careful consideration, the explanation for this may be that the variables in the General Social Survey along with its associated measurement instrument are simply not sensitive to these hypotheses. A summary of the hypothesis testing is also shown in Table 9.

Table 9

Hypothesis Testing for Level of Affluence, Internet Use, and E-Commerce

Factors		Hypotheses	<i>Adj-R</i> ²	β	<i>t-value</i>	<i>p-value</i>
Education	H ₁	Email hours are a function of education.	0.005	0.237	3.889	$p < 0.05$
	H ₂	Surfing hours are a function of education.	0.000	0.098	1.610	$p > 0.05$
	H ₃	Chatroom hours are a function of education.	0.014	-0.386	-2.173	$p < 0.05$
Income	H ₄	Email hours are a function of income.	0.001	0.165	1.901	$p > 0.05$
	H ₅	Surfing hours are a function of income.	0.000	-0.102	-1.189	$p > 0.05$
	H ₆	Chatroom hours are a function of income.	0.023	-0.557	-0.258	$p < 0.05$
Race	H ₇	Email hours are a function of race.	0.002	0.636	2.276	$p < 0.05$
	H ₈	Surfing hours are a function of race.	0.003	1.019	3.689	$p < 0.05$
	H ₉	Chatroom hours are a function of race.	0.005	-1.131	-1.506	$p > 0.05$
Email hours	H ₁₀	Shopping online is a function of email hours.	0.000	0.004	0.970	$p > 0.05$
	H ₁₃	Investing online is a function of email hours.	0.000	0.005	1.197	$p > 0.05$
	H ₁₆	Travel online is a function of email hours.	0.006	0.009	2.604	$p < 0.05$
Surfing hours	H ₁₁	Shopping online is a function of surfing hours.	0.024	0.019	5.087	$p < 0.05$
	H ₁₄	Investing online is a function of surfing hours.	0.001	0.005	1.440	$p > 0.05$
	H ₁₇	Travel online is a function of surfing hours.	0.000	0.003	0.852	$p > 0.05$
Chatroom hours	H ₁₂	Shopping online is a function of chatroom hours.	-0.012	-0.007	-0.360	$p > 0.05$
	H ₁₅	Investing online is a function of chatroom hours.	-0.014	0.004	0.188	$p > 0.05$
	H ₁₈	Travel online is a function of chatroom hours.	-0.013	0.005	0.240	$p > 0.05$

Note that some (e.g., 28%) of the β values in Table 9 indicate negative correlations between the factors. However, since all of the R^2 values are insignificantly small as shown in Table 5, Table 6, and Table 9 above, these do not appear to be valid negative correlations. Note that the only interesting correlation appeared to be race to chatroom hours, but its *adjusted R*² *value* was only 0.005. Also note that many (e.g., 61%) of the *p-values* exceed a nominal threshold of $\alpha = 0.05$. After building the databases twice, repeating the analyses twice, selecting variables with sensitive ranges, and searching for multi-collinearity, as well as quadratic and cubic relationships between the variables, we are confident in the reliability and validity of these findings and results.

ASSUMPTIONS AND LIMITATIONS

The first major assumption is that the General Social Survey is appropriate for conducting studies associated with the basic factors of Internet commerce. That is, what are the variables that are sensitive to studying issues surrounding Internet commerce? The General Social Survey has 262 questions and variables associated with the Internet. Surely the creators of the General Social Survey meant these variables to be sensitive for studies of social behavior or they wouldn't have been added to their measurement instrument. However, there are weaknesses in these questions. In particular, the ranges of values for Internet commerce are not very wide. And, more importantly, the ranges of values for income are rather outdated.

The second major assumption is that the General Social Survey contains a large enough sample of data for analyzing sociological phenomenon associated with the Internet. In fact, this isn't the case. The sample size of surfing hours only represents about 8% of the total observations given the total size of the General Social Survey. And, furthermore, the sample size of chatroom hours only represents 0.5% of its total size. Worse yet, the total sample size of a single population with all nine of the variables chosen for this study only represents 0.1% of the total size of the General Social Survey. Less than 1% of its respondents are answering all questions identified for this analysis of the basic factors of motivation for Internet commerce.

A major limitation of this study is its reliance on simple linear regression. While other types of analyses were conducted to search for multi-collinearity, as well as quadratic and cubic relationships between the variables, simple linear regression was the primary analysis method. Furthermore, the goal of this study was to search for common relationships between factors such as level of affluence, Internet usage, and e-commerce. It may be necessary to return to the literature review and identify factors, which are proven to have strong relationships. Then, we can search the General Social Survey for these factors and repeat the analysis. Of course, the basic goal would be, not only to look for valid relationships between these types of variables, but prove that the General Social Survey is suited for this class of study, that is, the Internet studies.

SUMMARY

In spite of the fact that many of the 23 scholarly studies found relationships between level of affluence, Internet use, and e-commerce, the results of this analysis failed to find strong correlations between these factors. There could be several explanations for these initial results. We believe that the General Social Survey is not sensitive to corroborating the existence of the “digital divide” (at least not from the variables or statistical analyses chosen for this study).

Of course there is always the possibility that different statistical techniques will have to be applied in order to reinterpret the data. And, perhaps there were mere mistakes in the analysis, which have hidden evidence to corroborate the existence of the “digital divide” from the General Social Survey data. One of the assumptions is that the General Social Survey data is valid and hasn’t been corrupted, either advertently or inadvertently to hide these politically-charged social trends. However, this is not likely. Perhaps collaboration with other experts on the “digital divide” is necessary in order to identify any errors in the analysis or sensitivities in the data.

Since the literature review did identify 23 scholarly studies, which did find evidence of the digital divide in their datasets, many of which were from publicly available sources, it may be justified to discard use of the General Social Survey and identify a dataset that will reveal these trends. But, before this is done, it is necessary to examine the data that was selected for this initial analysis, ensure it is sensitive to the kinds of analyses we want to perform, and ensure correct statistically valid tests are being performed.

Of course, the objective is not to torture the data until evidence of the “digital divide” is found, but merely ensure that no obvious mistakes have been made in analyzing the data and conducting the statistical tests. An additional step is to contact expert scholars and poll them on their opinion as to whether the General Social Survey is sensitive to these goals, objectives, and analyses. This is why researchers prefer to design their own scholarly theoretical conceptual models and collect their own data, in order to obtain a dataset sensitive to their needs.

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