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AN EMPIRICAL INVESTIGATION OF U.S. HOUSEHOLDS BEHAVIOR OF FINANCIAL RISK AVERSION AND BACKGROUND RISK

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Jonathan R. Powell
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ABSTRACT

Risk aversion behavior drives many financial decision-making regarding investments (real and/or financial assets), allocation of assets, insurance purchases, and consumer spending decisions of goods and services. Financial decisions are perplexing decisions that keep changing according to circumstances, conditions, and are time variant. An improved understanding of the determining attributes of the risk aversion behavior is hence fundamental to many areas of finance, economics, psychology and other social sciences. The willingness to take risky actions has been measured individually as a function of socioeconomic factors using wealth, income level, gender, age, marital status, education level, financial ability and knowledge, and other ethnic social backgrounds. The study specific objectives are to empirically assess the risk tolerance levels of US households using national data, to identify the demographic background factors on which risk tolerance is dependent, and to determine the significant socioeconomic factors that influence the risk tolerance level. The authors use large tracking-data of U. S. households from the National Financial Capability Study (NFCS) of the Financial Industry Regulatory Authority (FINRA). The NFCS is a national dataset that comprises information on financial risk aversion, financial knowledge, and other useful background information. The authors investigate the difference of demographic on financial risk aversion among U.S. households. A literature review of demographic determinants of financial risk aversion has shown dialectical results. The study attempts to expound the controversial issues in these results by studying the extenuating role of financial literacy in relationships to background characteristics and financial risk aversion levels.

Keywords: Financial Risk Preference, Wealth, Background Risk, Financial Knowledge

1. INTRODUCTION

1.1. Theoretical background and decision making under risk

People cannot change past outcomes; life essentially is about choices and decisions for future outcomes. While most choices are made automatically with little

conscious thought, others are perplexing that people encounter in situations that require some important decisions to be made. In due course, individuals (or groups) have to make decisions (not taking action is also a choice among alternatives) but it is not always clear to us what outcomes can we derive from these decisions. This is what we call making decisions facing risk or under uncertainty. Individual risk behavior can be analyzed using three approaches: rationalization of expected utility theory (EUT) (Neumann and Morgenstern, 1953), explanation of mean-variance (M-V) analysis/modern portfolio theory (MPT) (Markowitz, 1959), or narration of experimentation of peoples' behavior of prospect theory (PT) (Kahneman and Tversky, 1979), and we give explanations of how different kinds of individuals will behave differently when facing decision making under risk.

EUT was first formulated by Bernoulli (1738) and remained the standard theory of behavior toward risk. It is a normative (as opposed to descriptive) decision-making theory, it shows that when an individual is faced with a choice of alternatives or outcomes subject to several levels of probability, the 'optimum' decision will be the one that maximizes the expected value of the utility derived from the decided choice. (Bernoulli, 1954) Modelling EUT is the primary approach used by researchers to explain how risk aversion (or tolerance) is conceptually connected with risk taking behavior. Even though EUT is authoritative in economics and finance for the analysis of decision under uncertainty, it has been challenged, mostly by PT that individual actions, in experimental and market, deviate from the expectations of simple EUT models. As an extension of EUT, the MPT was originally developed by Markowitz (1952) and advanced by Tobin (1958) to construct a model of a diversified investment portfolio that maximizes the utility of a risk-averse individual. Generally, the M-V model describes the risk-return trade-offs of an individual with risk-averse utility function willing to take additional risk for an additional return. The two advantages of the M-V are simplicity and uniqueness; it uses only the first and second moments of the probability distribution and lends itself to two-dimensional graphical analysis, namely the mean and variance. The uniqueness stems from the model's capability to represent preferences (or indifferences) over random variables that can be embodied by a utility function that depends on the first two moments of the variable's distribution.

PT describes actual behavior of an individual or a group (people), it helps explain risk aversion (dislike for uncertainty) in the sense that the disutility of risking the loss of \$1000 is higher than the utility of winning \$1000. Also known as the "loss-aversion" theory, it essentially states that if two choices are put before an individual, both equal in 'value=outcome' with one presented in terms of probable gains and the other in terms of same probable losses, the former option will be chosen. PT shows individuals give greater weighting to a small certain gain over a probable larger gain, and may display risk-loving behavior preferring a loss that is probable over a small loss that is certain. The explanation is that potential losses and gains are recognized differently, and thus individuals make decisions based on perceived losses instead of perceived gains.

Research suggests that people do not evaluate monetary outcomes by their expected value, but rather by the expected value of the subjective value (utility) of these outcomes. The usual definition of risk aversion, developed by Pratt (1964) and Arrow (1971), defined the characteristics of utility function of a rational decision maker that delineate decreasing absolute risk aversion (DARA) using von Neumann-Morgenstern (NM) axioms of formulation.

The NM utility theorem provides necessary and sufficient conditions under which the expected utility theory holds.

If individual decision-making is not adequately described by the five axioms of rational behavior, then it becomes necessary to rethink the descriptive validity of EUT. It is safe to say that the mathematical foundations of EUT have not been unshaken by the empirical evidence. It was acknowledged that some of these axioms would be violated in real life experiences, nevertheless the conditions could be interpreted as 'axioms' of rational choice. Using experiments, Levy (1994) provided evidence that DARA is undeniably supported. The estimation of risk aversion can be generalized to support the introduction of background risks (Ross, 1981). Gollier and Pratt (1996) derived several sufficient and/or necessary conditions that guarantee that adding a background risk makes individuals become more risk averse. It is essential that we place more effort on empirical research intended to refine our understanding of risk aversion with background risks. Individuals make choices under risk and uncertainty practically in the background of other risks. Many theoretical studies have contributed sufficient and/or necessary conditions for the risk-taking behaviors of individuals after an increase in background risk in the past several decades.

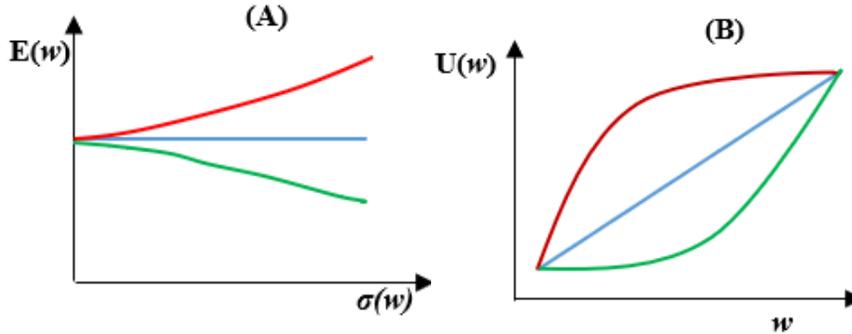
1.2. Characterization and Measuring Risk Aversion (or Risk Tolerance)

In general, individuals differ in their attitudes towards risk, and for different reasons some may accept risk of all kinds (health, driving, business, political, financial, environmental, employment, societal etc.) others would not. We will only concentrate on financial or economic risk, which involves uncertainty of an outcome governed by a chance (probability) and associated severity (amount) of an event (occurrence) in the future that may result in a loss/gain to his current state of wealth (or potential income). Based on the shapes of their utilities starting from current state of wealth, each individual who may be willing to accept a fair gamble event is labelled as a risk neutral, a risk averse individual will always reject this fair gamble, but a risk lover (a gambler) person will accept it.

An individual who cares merely about expected value of gain and is indifferent to its variability is a risk neutral, however, the one who prefers more variability for a given level of expected gain is said to be risk loving. Thus, a risk-averse individual still prefers more potential gain to less, but prefers less variability over greater variability. Furthermore, a more risk averse individual is willing to accept a smaller gain with certainty, relative to the expected value of the risky prospect. In our study we will concentrate only on risk averters and risk neutrals types of utilities. Figure

(1) shows the general shape of indifference curves (A) and utilities (B) for the above three types of individuals.

Figure (1) Utilities/ Indifferences: Risk averse (red), Risk Neutral (blue), Risk Loving (green)



As can be seen from Figure (1-B), risk averters have ever-increasing strictly concave utility functions (in wealth/income), while risk neutral utility is a linear one also increasing as wealth increases. A risk averter has a diminishing marginal utility of wealth (he recognizes each additional dollar of increased wealth gives him less satisfaction than the previous one). Whereas a risk neutral person has a constant marginal utility.

Pratt (1964) and Arrow (1971) defined a measure of Absolute Risk Aversion (ARA) for a given level of wealth. It answers the question that when a person's wealth increases would his ARA increase, decrease, or stay constant. Experimental and empirical evidence is mostly consistent with decreasing absolute risk aversion. Based on previous empirical tests and support by economic reasoning that as wealth increases the person's ARA decreases (usually termed DARA)(Friend and Marshall, 1975) A constant ARA (CARA) means that a person invests the same proportion of his wealth in risky assets as his wealth increases. In other words, a person whose aversion to a particular level of risk is not affected by their level of wealth is said to display CARA. CARA is not a desirable property because it fails to represent rational decision making. Most empirical studies in economics reject the assumption of CARA (Bougherara and Nauges, 2018).

ARA formula is shown to be equal to the negative of the second derivative divided by the first derivative of the utility function with respect to wealth. And, if we multiply ARA by the level of wealth, we obtain what is known as the Relative Risk Aversion (RRA). (note that $RRA=W.ARA$) RRA measures the intensity of risk aversion, and is defined as relative (proportional) risk aversion to the initial wealth rather than an absolute value. Thus, the degree of risk aversion is measured by coefficients of ARA and RRA and are independent of wealth level.

These coefficients are positive numbers for risk-averse individuals and they increase with the degree of risk aversion. Both measures are monotonic in wealth under DARA and constant in wealth under CARA. If a person experiences an increase in wealth level, he will seek to increase the number of dollars of the risky

asset held in the portfolio if absolute risk aversion is decreasing. As for the case of RRA, if an investor experiences an increase in wealth, he will seek to increase the proportion of the portfolio held in the risky asset, if relative risk aversion is decreasing. The function that holds for both DARA and constant RRA is the log function for a risk averse person and here is our example. The concept of Pratt Arrow ARA and RRA can be illustrated using the log utility function.

$U = \ln(W)$, the function should be continuously differentiable, with $W > 0$

$U'(W) = 1/W > 0$: First derivative of utility to wealth, marginal utility, measuring how utility changes as wealth changes,

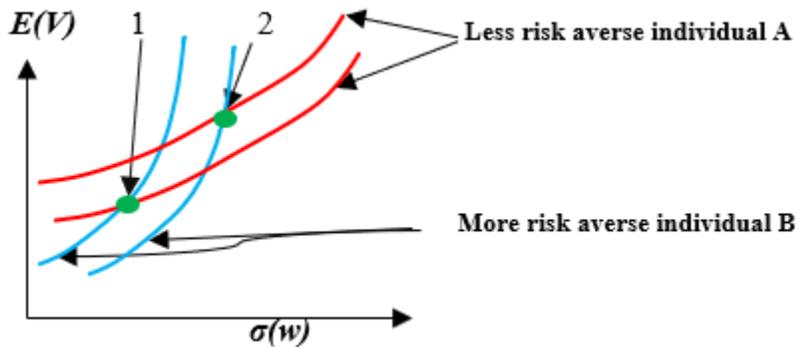
$U''(W) = -1/W^2 < 0$: Second derivative of utility to wealth, measuring how the rate of utility itself changes as wealth changes

ARA Coefficient: $- [U''(W) / U'(W)] = - [-1/W^2 / 1/W] = 1/W > 0$

RRA Coefficient = $W \cdot \{- [U''(W) / U'(W)]\} = W \cdot \{ARA\} = W \cdot \{1/W\} = 1$, unitary elastic constant.

In consumer economics, there exists an analogy between precautionary saving and risk aversion. A risk-averse person has a utility function over wealth W , and if his $U(W)$ is continuously differentiable, then he is not prudent unless the third derivative of his utility is positive, that is $U''' > 0$. Thus, a consumer is described as "prudent" if he saves more when faced with a riskier future wealth prospect. This additional saving is called precautionary saving and the strength this motive for saving can be measured by absolute prudence, measured by $U'''(W) / U''(W)$ and relative prudence that is measured by absolute prudence multiplied by the level of wealth. These measures are closely related to the concepts above and were advanced by Kimball (1993).

Figure (2) Indifference Curves of Less Risk Averse (Red) and More Risk Averse (Blue)

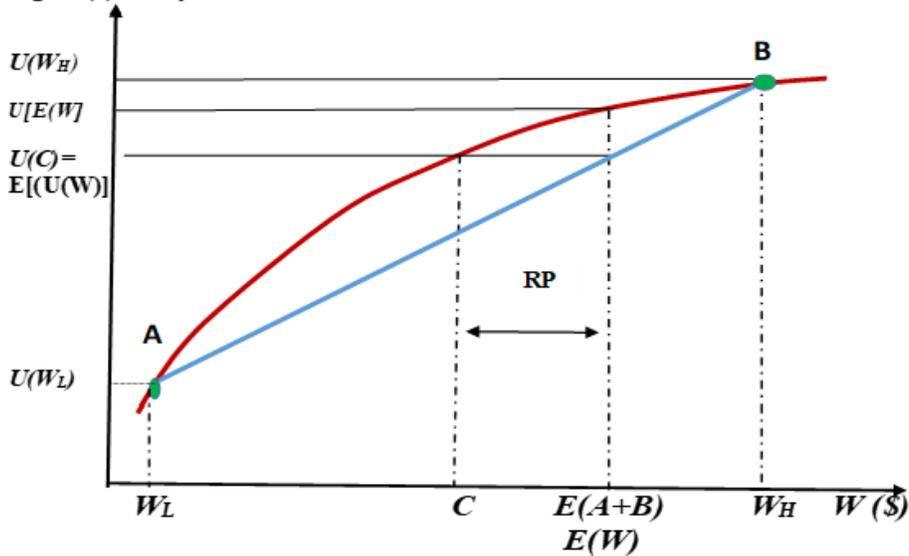


Every person has his own utility (disutility or indifference curves) that is different from others and perhaps changes with age (life cycle phase). Figure (2) shows two risk averse individuals (A and B) with two risky investment opportunities 1 and 2. The $E(V_1) < E(V_2)$ but $\sigma(V_1) < \sigma(V_2)$. Since individual A is less risk averse he has flatter indifference curves than individual B (a more risk averse) and thus has steeper indifference curves. Each individual will choose their opportunities based on their preference and the degree of risk aversion. If we accept that it is utility that

matters and not wealth per se, and we add the reality that no two human beings are alike, it follows that risk aversion can vary widely across individuals.

As we stated before, a risk neutral individual will be willing to play a fair gamble, but a risk averse will not because the fair gamble's expected return is 0%. Generally, if the expected rate of return for a risk averse investor is greater than 0%, he may or may not choose to play the game, depending on his utility function and his current wealth level (W_0). For exposition of the gamble and what follows, please reference Figure (3).

Figure (3) Utility Functions of wealth for Risk Averse and Risk Neutral Individuals



Suppose that an individual is offered a choice between two mutually exclusive risky outcomes (A and B). While the A outcome of the gamble may decrease his W_0 to W_L , the B outcome could increase his W_0 to W_H . He can estimate the expected value of his wealth ($E(W)$) after the gamble based upon the probabilities, p and $(1-p)$ across the two (bad=A or B=good) outcomes. Thus, $E(W) = p A + (1-p) B$. Furthermore, assume that he knows his separate utilities that will be derived from each of these outcomes; $U(W_L)$ and $U(W_H)$. If he is a risk neutral (blue line in Figure 3), he will have the same utility from obtaining $U(E(W))$ with certainty as he would if he were offered the expected value of the utility of the two risky outcomes $\{E [(U(W_L) + U(W_H))]\}$. For a risk neutral individual, the utility of expected wealth is equal to the expected utility of wealth: $U(E(W)) = (E (U(W))) = p U(W_L) + (1-p) U(W_H)$. However, a risk averse individual (red curve in Figure 3) would derive much greater utility from current wealth $U(W_0)$ by not participating in the fair gamble, or the utility of expected wealth $U(E(W))$, than from the expected utility of wealth ($E (U(W))$). For a risk averse individual, his utility of $U(E(W)) > E (U(W)) = p U(W_L) + (1-p) U(W_H)$.

There exists some guaranteed amount, which is called the certainty equivalent (C), that should be received now that will provide the same utility as the uncertain gamble. This C amount is a guaranteed quantity if added now to the gamble would

make the risk averse accept the gamble. For risk neutral people, $U(E(W)) = E(U(W)) = U(C)$, and are measured in utility units (economists called it Utils). The difference between the expected payoff of the gamble ($E(A+B)$) and the certainty equivalent C is called the risk premium. Risk Premium = $RP = E(A+B) - C$, and these terms are measured in monetary units (\$). The RP is always a positive amount, but the cost of the gamble could be positive, zero, or negative (when the cost of gamble is negative that means the risk averse investor's W_0 is increased with any outcome of the gamble, and would be willing to pay a price to enter the gamble). The cost of the gamble depends on the risk of the gamble and how much it is expected to change the investor's current wealth. As the risk aversion of an individual rises, he demands more risk premium. Risk premium is zero for a risk neutral individual because the $E(A+B)$ of the gamble and his C are the same. His linear utility is generated from the expected value of an uncertain gamble and will be equal to the utility from receiving the same certain amount of C .

1.3. An Illustrative Example of Risk Aversion

A very simple example may be in order using a log utility function, $\ln(W)$, W = wealth or income. Assume that an individual is decided on a gamble where he can be rewarded \$ 1 or \$1000, with 50% probability allocated to each reward. This is not actuarially fair gamble since $E(W)$ is >0 . The expected value of this gamble can be calculated independent of his current wealth (W_0) as follows:

$$E(W) = .50(\$1) + .50(\$1000) = \$ 500.50.$$

The utility that this individual will be receiving from the expected value of the gamble is:

$$U(E(W)) = \ln(\$ 500.5) = 6.21560 \text{ units}$$

Since the individual is risk averse his expected utility from payoff of the gamble will be lower:

$$E U(W) = 0.5 \ln(\$1) + 0.5 \ln(\$1000) = 0.5(0) + 0.5(6.9077) = 0 + 3.45387 = 3.45388 \text{ Utils}$$

The certainty equivalent (C) will therefore be the guaranteed value that will bring about the same utility to him as the gamble, thus the utility of C is:

$$U(C) = \ln(C) = 3.4538 \text{ Utils, solving for } C \text{ using inverse function } (U^{-1}(\ln(C))) \text{ gives us } C: C = e^{3.4538} = \$31.62$$

The individual's RP is the difference between the expected value of the gamble and the certainty equivalent of it: $RP = E(W) - C = \$500.5 - \$31.62 = \$ 468.88$.

The cost of the gamble = current wealth (W_0) - C , if we assume $W_0 = \$0$, then the cost of the gamble is negative. The individual would pay up to 486.88 to play the gamble and if he is less risk averse, he would pay more.

2. FACTORS INDUCING RISK AVERSION, DATA AND HYPOTHESES

An ample amount of research over the past few decades has been dedicated to comprehension of financial risk aversion and factors that impact risk-aversion behavior of individuals. Theoretical and empirical research advances over half of the 20th century tried to gauge an individual's attitude regarding his behavior that

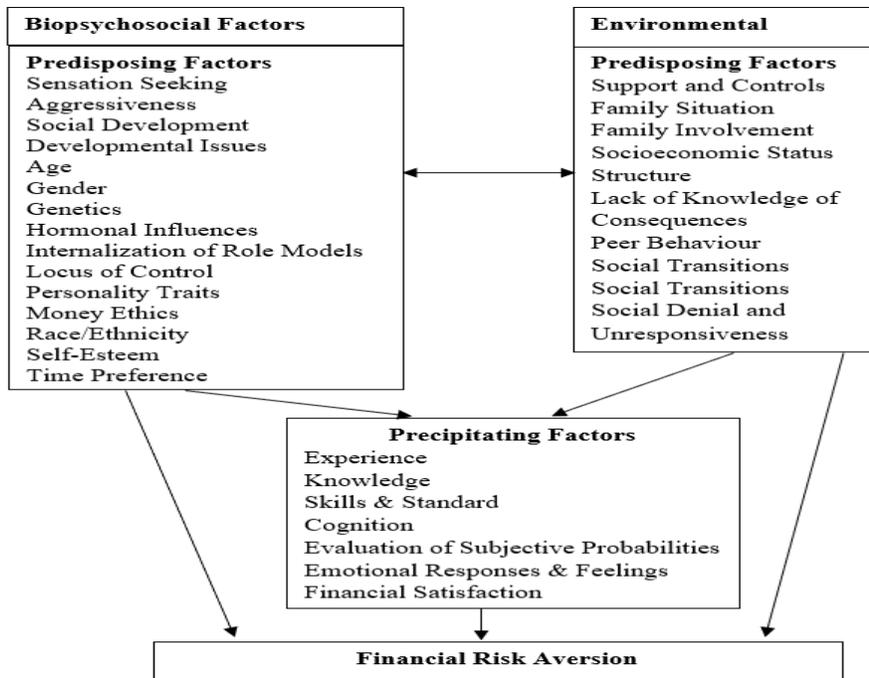
collapses in four directions: (1) risk-taking tendencies, (2) investment, speculation, and gambling, (3) severity, probability of gains/losses exposures (from none to catastrophic) (4) knowledge, experience, and value judgement. Assessing an individual's financial risk aversion is an elusive concept that is multidimensional. Researchers attempted to explain risk aversion and decision-making through normative and descriptive models. While the EUT theory is the primary normative model, descriptive models tend to be based on behavioral, psychological frameworks. An individual's risk aversion has a significant consequence on his judgement, it is crucial to have a conceptual understanding of factors that compelled him to make such judgment. In addition to the economical wealth factor, there are multiple other factors (demographical, psychological, sociological) generally play a significant part in decision-making associated with his financial risk aversion. When one asks someone how risk tolerant are you, these questions measure only a small part of the multidimensional nature of risk and in these situations most people miss characterizing their risk tolerance. For instance, risk perception, according to Nobre and Grable (2015), is a person's subjective evaluation of the riskiness inherent in a decision outcome. Risk preference is a person's general feeling that one decision choice is superior to another. Risk need is a proxy term for the amount of risk someone must accept in order to achieve a particular financial goal. When financial planners see client behavior change over time, it may be a variation in one of these or other factors that is driving the change, rather than a significant modification in risk tolerance. It has been argued that the best way to concisely and accurately identify a person's financial risk tolerance (FRT) is to use an assessment instrument designed specifically to measure subjective risk tolerance using multidimensional financial scenarios and situations (Chaulk, Johnson, and Bulcroft, (2004).; Hanna, Gutter, & Fan, (2001); Hanna & Lindamood, (2004); Xiao (2008). Past literature shows several underlying factors that determine the level of risk tolerance. Among the most important demographic factors, including net worth, are gender, age, and marital status, income, education, financial literacy, retirement plans, knowledge sophistication, income, and sources of information. Xiao (2008) presents biological, demographic and socioeconomic factors and their level of support in literature, a recreation of that illustration is presented in Figure (5). Both biopsychological (endogenous) and environmental (exogenous) factors influence are acquired either in the development phase of a person and they may also include genetics, life events, or temperament. Predisposing factors are those factors which might mean that a person is vulnerable to developing a problem. Precipitating factors are those factors which lead to the problem occurring at the time it did, thus they refer to a specific event or trigger to the onset of the current problem. All factors directly or indirectly affect the person's decisions or course of action leading to changes in a person's FRT attitude.

2.1 Objectives of the Study

The overall objective of this study is to contribute to the interconnections between financial risk aversion (or tolerance) and the risk-taking behaviors within the fields of economics and (consumer) finance. The specific objectives, however, are to

empirically assess the risk tolerance level of US households using national data to identify the demographic factors on which risk tolerance is dependent, and identify the socioeconomic factors that influence the risk tolerance level. Among other factors, recent studies by Van Rooij & Lusardi, (2012) and Swarn, Fan, Jacobs, & Haas, (2017) show that financial literacy has a positive impact on wealth accumulation, retirement and savings plans of households after controlling for risk tolerance. Few studies have looked at this interaction and ours intend to fill an important hole in the literature by examining the latent factor of financial literacy effect on risk aversion decisions.

Figure (4) Principal Factors Influencing Financial Risk Tolerance Adopted from J.J. Xiao 2008 (Ed.) Handbook of Consumer Finance Research.



In this study, our data is from the most recent (2018 wave) of the Financial Industry Regulatory Authority (FINRA), National Financial Capability Study (NFCS). The NFCS national dataset includes extensive information on the socioeconomic and demographic characteristics of US households participating in the 2018. The survey of state-by-state is an online survey of 27,091 American adults (500 per state, plus the (D. C.)). The data includes information on many of the factors above with risk tolerance including financial market of the US. In our analysis we restricted our sample to 20,813 observations after excluding the missing, non-responses, and non-employed.

2.2 Hypotheses

Our study investigates the special effects of demographic characteristics on financial risk tolerance. One of the objectives of this study is investigating the

direct effect of financial literacy on risk tolerance. The study will also investigate the level of risk tolerance (aversion) levels as they relate to demographic characteristics. Thus, our study will examine the following Hypotheses:

H1: There exists a relationship between the individual's demographic variables (age, gender, ethnicity, education level, income level, marital status, financial education, homeownership) and his/her financial risk tolerance.

H2: There exists a relationship between the individual's financial literacy and his/her financial risk tolerance, and higher level of financial literacy is expected to associate positively with lower risk tolerance level.

2.3 Financial Risk Tolerance Scale

Risk preference has long been known to be too complex to be described by a single parameter. There literature on measuring normative relative risk aversion are more than a few, nevertheless, there is no one commonly acknowledged estimate. Perhaps the most commonly accepted measures of the coefficient of relative risk aversion set between 1 and 3. A worldwide comparison of risk preference shown by l'Haridon and Vieider (2019) study to be an estimates ranging from a low of 0.2 to a high 10 or more, depending on assessment methods, sample size, and country development, along with assumption in individual's utility function. In many studies, the most common method in assessing risk tolerance is asking hypothetical questions with cautiously stated scenarios measuring actual behavior and collecting data from a small sample. Sometimes, researchers rely on data obtained from a local or international for-profit-organizations that provides risk tolerance profiling services. We instead will be using a US non-profit data-collecting foundation; NFCS, that has created datasets in four waves since its inception in 2009.

The dependent variable of this study is the person's Risk Tolerance Level (RTL), it is one of numerous questions in the dataset that the surveyed participants had to answer: "*When thinking of your financial investments, how willing are you to take risks?*" The participants had to assign this subjectively measured question a score from 1 to 10. This is an ordinal scale of the person's RTL (i.e., Risk Aversion Level=RAL). If the participant assigns 1 (*not at all willing to take risk*) that is the lowest step on his/her RTL scale, and if he/she assigns 10 then he/she is (*very willing to take risk*) representing a highest step on the RTL scale. Even though we are only emphasizing risk averse category, we regrouped the original scale to a three categories scale (Low, Moderate and High) to make risk levels categorized for ease of comparison in terms of financial literacy analysis. Distributions of the participants' responses for both scales are shown in Table (1).

2.4 Methodology

The suitability of testing and using continuous as opposed to dichotomous variables dictates a procedure for deploying two different models; Analysis of Covariance (ANCOVA) and Multiple Logistic Regression (MLR), to test the two hypotheses above. The first hypothesis is tested using the MLR model and the second hypothesis is tested using the ANCOVA model. While the three-category

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scale of RTL is used as a dependent variable in the MLR model, the RTL now is used as an independent variable. For the second hypothesis, our dependent variable (Financial Literacy Score = *FNLLIT_SC*) is measured by probing the participant’s ability and understanding of several questions concerning basic financial aspects of investing, and the RTL is used as an independent variable in the ANCOVA model. See Appendix (1) for questions from the 2018 National Financial Capability Study (NFCS) survey pertaining to the financial literacy score (*FNLLIT_SC*).

Since RTL is a categorical variable, thus, we used MLR, and the model is repented as follows:

$$f (RTL) = f (GEN, AGE, ETHN, MARITS, G_FNLED, INC, FNLLIT_SC, RETPLN, DEP, HMOWN)$$

As for the second model, ANCOVA, it is formulated as follows

$$f (FNLLIT_SC) = f (GEN, AGE, G_MATHED, INC, ETHN, G_FINKGW, RTL, G_FINKGW, G_MATHED *M4 G_FINKGW, SAT-FNLCON)$$

All variables definitions are listed in Table (2)

Table (1) The Scales of Risk Tolerance Levels							
Ten Categories Scale				Three Categories Scale			
RTL Cat.	Category Frequency	Cum. Frequency	Cat. % of Total	RTL Cat.	New Grouping of RTL Category	Category Freq.	Cat. % of Total
1	3165	3165	15%	1 to 3	LRT=HRA	6329	30%
2	1524	4689	7%	4 to 6	MRT=MR A	7570	36%
3	2225	6914	11%	7 to 10	HRT=LRA	6914	33%
4	2173	9087	10%	1 to 10	Total	20813	100%
5	3013	12100	14%				
6	2384	14484	11%				
7	2605	17089	13%				
8	1700	18789	8%				
9	704	19493	3%				
10	1320	20813	6%				
Total	20813		100%				

Table (2) Variables Definitions			
Var. Name	Description	Var. Name	Description
AGE	25-34, 35-44, 45-54, 55-64, 65 plus	DEP	Having Dependent Children (DEP/ND)
ETHN	Ethnicity: White/Non-White	HMOWN	Home Ownership (Y/N)

MARITS	Married, Single, Divorced, Separated, Widowed/Widower	RETPLN	Does Have Investment/Saving Plan beyond Retirement Account (Y/N)
G_FINKGW	Having Good Financial Knowledge (Y/N)	G_FINKGW * $ETHN$	Interaction of G_FNLED and ETHN
LN_INC	Natural log of Income, \$15K-\$150K +,	GEN	Gender F/M
INC	or 1-8	RDF	Have Rainy Day Fund
FNLLIT_SC	Score on Financial Literacy Questions, possible score 0-5	G_MATHE D	Are you Good with Math-scale 1-7
		SAT- FNLCN	Satisfied w Financial Conditions

3. RESULTS AND ANALYSIS

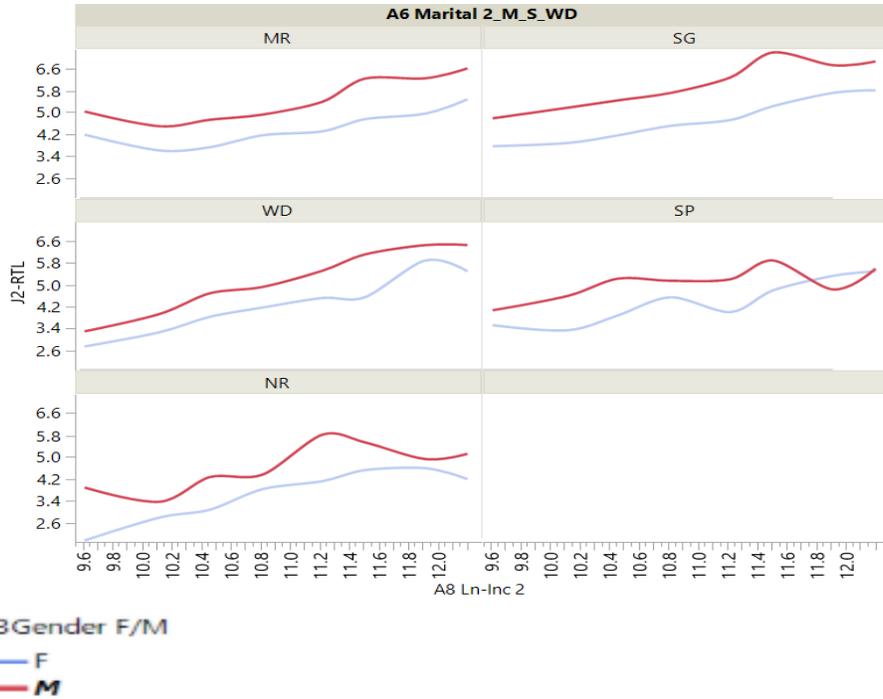
As expected, many of the demographic variables (e.g., GEN, AGE, ETHN, MARITS) and their relationships with RTL confirm the results of previous studies. For example, male-GEN have assumed more risk tolerance with high support in the literature over female-GEN. A contingency Table (3) shows the account of GEN and ETHN by RTL and a significant ChiSq with probability <0.0001. The difference between male and female reading RTL given income measured by log of income is illustrated in Figure (5). It shows the male is dominating the female on all income levels the marital statuses.

Testing the first hypothesis requires using a categorical dependent variable, RTL, representing the three categories shown in table (3). The independent variables are metrics that could be nominal, ordinal, or continuous, thus, the MLR is justifiably used. It is used to predict the probabilities of the different possible outcomes of a categorically (nonmetric) distributed dependent variable, given a set of independent variables (which may be real-valued integer; AGE, binary; SEX, or categorical; MARITS, etc.). Potential applications of the MLR model include new product success or frailer, classifying students as to vocational interest, type of car for a particular group of customers, determining the category of credit risk for a person. The results of our application of the model are shown in Figure (6).

Looking at P-values of the effect summary, with the exception of last interactions variable all the independent variables are significant at the .001 level. The whole model using Chi Square is significant R^2 is about 10%. The model is fit and the likelihood ratios tests are significant as well. The effect of the independent (explanatory) variable on the predicted probabilities of all RTL categories are shown in the last panel of Figure (5).

Said and Powell

Figure (5) Graph Builder Mean (J2-RTL) vs. A8-LN-INC with Wrap of MARITS



Count Total % Col % Row %	HRT=LR	MRT=MR	LRT=HR	Total	Count Total % Col % Row %	HRT=LRA	MRT=MA	LRT=HRA	Total
	A	A	A			A	A	A	
NW	1817	1875	1532	5224	F	2375	4351	4774	11500
	8.73	9.01	7.36	25.10		11.41	20.91	22.94	
	28.71	24.77	22.16			37.53	57.48	69.05	
	34.78	35.89	29.33			20.65	37.83	41.51	
W	4512	5695	5382	15589	M	3954	3219	2140	9313
	21.68	27.36	25.86	74.90		19.00	15.47	10.28	
	71.29	75.23	77.84			62.47	42.52	30.95	

	28.94	36.53	34.52			42.46	34.56	22.98	
Total	6329	7570	6914	20813	Total	6329	7570	6914	20813
	30.41	36.37	33.22			30.41	36.37	33.22	

Table (6) shows the Pearson correlation between variables, many of them have positive correlation with the exception of RETPLN (retirement plan) even with RTL but it is small (close to zero) and possibly insignificant. The highest positive correlation is .5117 and that is between G_FINKGW and G_MATHED, which means having good math ability is associated with better financial knowledge.

Figure (6) Multiple Logistic Regression for J2 RTL (LRT, MRT, HRT) Effect Summary

Source	LogWorth		PValue
J1 SAT-FNLCON	174.688		0.00000
A3 GEN F/M	160.733		0.00000
A8 INC	73.615		0.00000
A11 DEP 2_DEP/ND	58.572		0.00000
A4A_ETHN	40.846		0.00000
M1_G_MATHED	25.908		0.00000
FNLLIT_SC	19.848		0.00000
J5 RDF Y/N	6.181		0.00000
M1_G_FINKGW	6.168		0.00000
M1_G_FINKGW*FNLLIT_SC	0.116		0.76498

Whole Model Test

Model	-LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	2205.071	32	4410.143	<.0001*
Full	20604.809			
Reduced	22809.881			
RSquare (U)				0.0967
AICc				41277.7
BIC				41547.7
Observations (or Sum Wgts)				20813

Source	DF	- LogLikelihood	ChiSquare
Lack Of Fit	29616	15373.223	30746.45
Saturated Fitted	29648	5231.586	Prob>ChiSq
	32	20604.809	<.0001*

Effect Likelihood Ratio Tests

Source	Nparm	DF	L-R ChiSquare	Prob>ChiSq
A3 GEN F/M	2	2	740.20081	<.0001*
A4A_wEthnic=1-2	2	2	188.102182	<.0001*
J5 RDF Y/N	4	4	34.2613622	<.0001*
FNLLIT_SC	2	2	91.4039261	<.0001*
J1 SAT-FNLCON	2	2	804.469508	<.0001*
A11 DEP 2_DEP/ND	2	2	269.734718	<.0001*
M1_G_MATHED	12	12	153.256795	<.0001*
M1_G_FINKGW	2	2	28.4024772	<.0001*
M1_G_MATHED * FNLLIT_SC	2	2	0.53579906	0.7650
A8 INC	2	2	339.010166	<.0001*

Table (4) Multivariate Correlations

	RETPLN	G_FINKGW	AGE	G_MATHED	FNLED	INC	FNLLIT_S	RTL
RETPLN	1.0000							
G_FINKGW	-0.1385	1.0000						
AGE	-0.0780	0.2663	1.0000					
G_MATHED	-0.1081	0.5117	0.1689	1.0000				
FINLED	-0.1173	0.4850	0.1973	0.4305	1.0000			
INC	-0.0321	0.2437	0.1618	0.2129	0.2952	1.0000		
FNLLIT_SC	-0.1552	0.2566	0.2595	0.3155	0.2769	0.3043	1.0000	
RTL	-0.0096	0.1104	-0.1213	0.1451	0.2753	0.2368	0.1297	1.0000

Analysis of covariance is usually employed to test the main and interaction effects of categorical variables (RTL) on a continuous dependent variable (score on financial literacy= FNLLIT_SC), controlling for the effects of selected other continuous variables, which co-vary with the dependent. The independent variables are called the covariates. In ANCOVA, we looked at the effects of the categorical independents on a metric dependent (i.e. FNLLIT_SC) variable, after effects of interval covariates are controlled. (Huitema, 2011).

Before we discuss the results of the ANCOVA model, we may narrate the two basic advantages of using ANCOVA over ANOVA. First it has greater power, second reduction bias caused by differences between groups that exist before the treatments are administered, and third non-normality in the dependent variable has little effect on the ANCOVA F in most behavioral studies because the covariates employed in these fields are generally a crude approximation of normally distributed variables. Our results of ANCOVA are shown in Table (5). We limited

our independent variables to the following: GEN, AGE, G_MATHED, INC, RTL, ETHN, AGE*INC, SAT-FNLCON, G_MATHED * G_FINKGW.

**Table (5) Response of FNLLIT_SC
Effect Summary**

Summary of Fit		Analysis of Variance				
RSquare	0.238484	Source	DF	Sum of Squares	Mean Square	F Ratio
RSquare Adj	0.238081	Model	11	10633.448	966.677	592.2036
Root Mean Square Error	1.27763	Error	20801	33954.286	1.632	Prob > F
Mean of Response	2.487003	C. Total	20812	44587.734		<.0001*
Observations (or Sum Wgts)	20813					

Source	LogWorth		PValue
A3 AGE	188.516		0.00000
A8 INC	160.816		0.00000
M1_G_MATHED	142.981		0.00000
A3 GEN	121.662		0.00000
A3 AGE*A8 INC	41.395		0.00000
J2 RTL	31.273		0.00000
M4 G_FINKGW	27.024		0.00000
A4A_ETHN	18.305		0.00000
J1 SAT-FNLCON	14.814		0.00000
M1_2G_MATHED	2.267		0.00541
*G_FINKGW			

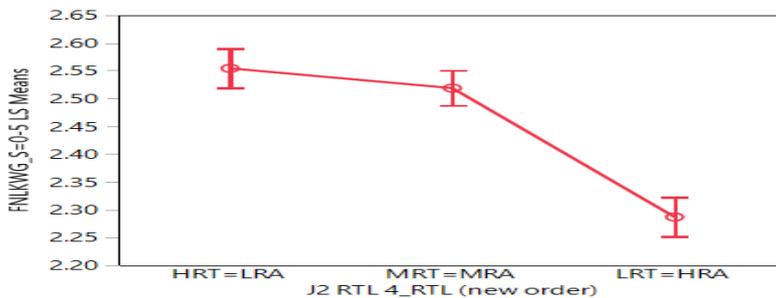
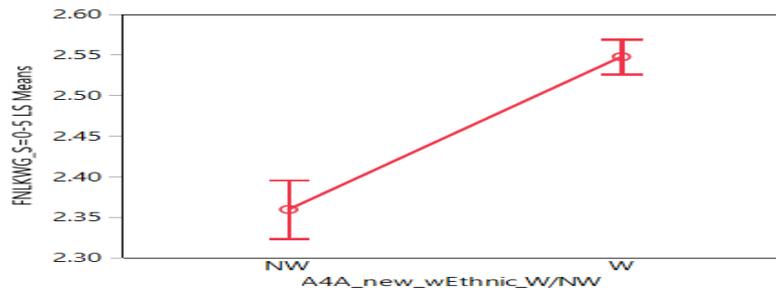
Parameter Estimates				
Term	Estimate	Std Error	t Ratio	Prob>[t]
Intercept	0.046771	0.045874	1.02	0.308
A8 INC	0.1329131	0.004864	27.32	<.0001*
A3 GEN	-0.22087	0.009326	-23.68	<.0001*
J2 RTL 5_RTL [HRT=LRA]	0.1009766	0.014212	7.1	<.0001*
J2 RTL 4_RTL [MRT=MRA]	0.0653907	0.012378	5.28	<.0001*
A4A_ETHN	-0.09411	0.010548	-8.92	<.0001*
J1 SAT-FNLCON	-0.019028	0.003637	-7.98	<.0001*
M1_2G_MATHED	0.1588431	0.006174	25.73	<.0001*
M4 G_FINKGW	0.0831733	0.007607	10.93	<.0001*
A3 AGE*INC	0.0365268	0.00268	13.63	<.0001*
M1_2G_MATHED *G_FINKKW	-0.008824	0.003172	-2.78	<.0001*
A3ArAGE	0.1750967	0.0025906	29.65	<.0001*

Effect Tests					
Source	Nparm	DF	Sum of Squares	F Ratio	Prob>F
A8INC	1	1	1218.7666	746.6381	<.0001*
A3 GEN	1	1	915.6547	560.9463	<.0001*

J2_RTL	2	2	235.8983	72.2577	<.0001*
A4A_ETHN	1	1	129.9371	79.6018	<.0001*
J1SAT-FNLCON	1	1	103.9596	63.6875	<.0001*
M1_2Good w/Math2	1	1	1080.3538	661.844	<.0001*
M4 G_MATHED	1	1	195.1374	119.5446	<.0001*
A3Ar AGE*INC	1	1	303.2556	185.7798	<.0001*
M1_2G_MATHED *G_GFINKGW	1	1	12.6341	7.7399	.0054*
A3Ar AGE	1	1	1434.8635	879.0229	<.0001*

Figure (7) Effects of Ethnicity and RTL Variables on Dependent Variable Financial Literacy Score Least Squares Means Plot (ETHN)

Least Squares Means Table (RTL)			
Level	Least Sq. Mean	Std Error	Mean
NW	2.3592253	0.0184719	2.15984
W	2.547445	0.01102748	2.59664



Least Squares Means Table (ETHN)			
Level	Least Sq. Mean	Std Error	Mean
MRT=LRA	2.5543117	0.01817272	2.77137
MRT=MRA	2.5187258	0.0160218	2.5572
LRT=HRA	2.2869679	0.0178933	2.14984

These variables were sufficient to produce R^2 of 23.85% of explanatory power and P-value of less than 1% for all. All parameter estimates were significant too, at a P-value of less than 1%, some are positive for example INC and RTLs (both HRT and MRT) have a positive effect on FNLLIT_SC, but GEN and ETHN have produced less mean for the non-white relative to the white individuals. Figure (7) shows the effects of financial literacy on the two factors ethnicity and RTL; where the variable financial literacy score was able to discriminate between the white and non-white groups and have influence for the classification of risk tolerance levels. Also, the table in figure 7, the least square means of both factors, is presented as significant evidence of the two factor effect on individual households in the US. Confirming previous findings, the results shown here are that higher levels of risk tolerance are associated with higher levels of financial literacy. Furthermore, the results show that other influential factors besides literacy are also influencing the risk tolerance level, some these factors are characteristically demographic in nature (age, gender, ethnicity) others are behaviorally or socially developed traits or factors, such as knowledge in mathematics or financial education, yearning for a higher status of income levels, or just feeling financially satisfied. Less evidential support is revealed in this study for home ownership and education level influencing risk aversion level.

4. SUMMARY AND IMPLICATIONS

We started by recognizing that uncertainty is not always stated in probabilities, but by describing the expected utility theory as it supplied the basis for risk aversion and studying the attitude towards risk-taking behavior and rational decision-making. In economics, risk taking and attitude towards it has always been investigated by theorists in consumer economics. One objective of this paper is to review the risk aversion literature by comparing the invariant nature of attitude and risk preferences. We reviewed some of the theoretical advancements in modern portfolio theory and discussed a few of the most common shapes of utility functions and gave hypothetical illustrations of typical risk aversion decisions for a rational person. We also alluded to the mounting empirical evidence that led many behavioral economists and financial practitioners to counter the expected utility theory and its applications in real life practices. We detailed the common conception that individuals with high income or wealth levels are likely to be less risk averse than others because of their ability to sustain more losses. Our aim was to empirically and closely re-examine the ample supply of differences between theory and applications of risk aversion actions. It has been documented that married men with children or heads of households have very similar risk preferences, and single young men are more inclined to a higher level of financial risk than older men. Many researchers utilized a questionnaire developed by Grable and Lytton (1999) to assess the level of financial risk tolerance and make concluding discoveries. We opted to test risk aversion of US households using a large recent dataset from a quasi-government agency (NFCS), a FINRA foundation. The objective of this paper is to review the risk aversion literature by comparing the invariant and dynamic nature of risk preferences. Furthermore, the

study sought to empirically examine the level of risk aversion as it relates to financial literacy and background information. The background information as well as individual preferences are complex, depending on a variety of economic, political, human, or even cultural factors. We used two methodologies to test two hypotheses. The two testing models for the hypotheses are analysis of covariance and multiple logistics regression. The results demonstrated that financial literacy has a strong positive relationship with risk tolerance and many factors that are associated with financial literacy. This study confirms many previous findings regarding demographic characteristics of individuals and their tendency to take risks. We found that gender, age, ethnicity, financial knowledge and mathematical ability are highly associated with risk tolerance levels. There is a possible divergence between subjective and objective risk measurements due to background information that needs to be investigated further.

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Appendix (1)

There were six questions in total from the 2018 NFCS, State-By-State Survey listed below, now in this study they are combined into one score, called *FNLLIT_SC*, measuring the financial literacy variable.

1. M6 (120)
Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
2. M7 (121)
Imagine that the interest rate on Your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
3. M8 (122)
If interest rates rise, what will typically happen to bond prices?
4. M31 (123)
Suppose you owe \$1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
5. M9 (124)
A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.
6. M10 (125)
Buying a single company's stock usually provides a safer return than a stock mutual fund.

**THE EMERGING POLITICAL ACTOR:
AN ANALYSIS OF CORPORATE AMERICA'S
INFLUENCE ON CONSUMER POLITICAL
ENGAGEMENT**

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Oklahoma City University

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ABSTRACT

An increasing number of companies are now participating in polarized political discourse. This new component of organizational activity has been studied to understand its impact on purchase intentions. Not yet examined is its impact on consumer political engagement. The increasing number of companies using new methods to engage in said polarized political discourse and the persistently low relative voter turn-out in the United States substantiate the importance of examining this unique phenomenon. Accordingly, this study examines the impact of organizational engagement in divisive social-political issue discourse and its impact on consumer political engagement. Likelihood of voting, a component of political engagement, receives an individual examination. Utilizing a two-context experimental design, this study examines the method of organizational engagement in polarized political discourse (direct, indirect, or silence), impact of the engagement (positive, negative, or no awareness of impact), and consumer and organization stance on divisive social-political issues (agree, disagree, or uncertain) to assess the impact on consumer political engagement. The results show that direct engagement increases the likelihood of consumer political engagement, one aspect of which is voting, irrespective of whether a consumer agrees with an organization's stance. Further, an organization's direct engagement that results in a positive/negative impact makes consumers more/less likely to vote. Indirect engagement and silence effectively have no impact on voting likelihood. Implications are discussed.

Keywords: Political-Corporate Social Responsibility; Divisive issues; Consumer political engagement; Marketing communications

INTRODUCTION

American politics is currently experiencing an unparalleled phase of political polarization (Foran 2017). This era of divisiveness has given rise to an increasing

number of ideologically-diverse voices contributing to political discourse. In addition to the opinions of various political party representatives and individual citizens, companies themselves are emerging as participants in the political discourse arena by publicly taking stances on social-political issues via pointed and politically-positioned advertising. This activity and its impact on consumer purchase intentions has begun to draw attention in the literature (e.g. Dodd and Supa 2014, 2015; Supa and Dodd 2015; Frynas and Stephens 2015); however, the literature has not yet examined a related but unique phenomenon: whether company engagement in divisive social-political discourse impacts consumer political engagement. The current state of political polarization in the United States, coupled with persistently low voter turnout, necessitates further study of corporate America's influence on consumer behavior beyond those behaviors solely related to monetary outcomes.

Political division in the United States reached record levels during the Obama administration and have increased during the Trump administration (Foran 2017). Relatedly, in 2018, 64% of consumers indicated that a brand's position on a social-political issue influenced their decision to buy or boycott a brand ("Earned Brand" 2018). In contrast, in 2014 only 44% of consumers indicated the same influence was present ("Earned Brand" 2017).

During this time the number of organizations engaging in discourse related to divisive social-political issues increased. Communication vehicles used by organizations to engage in said discourse are, for example, commercials aired during a Super Bowl, social media posts, and/or decisions about serving a customer(s) by small organizations. Several specific examples include:

- Chevrolet's "The New Us" commercial aired during the 2014 Super Bowl in which Chevrolet advocates for LGBTQ inclusivity while also communicating about the Traverse.
- Audi's "Daughter" commercial aired during the 2017 Super Bowl in which Audi advocates for gender equality while also communicating about the S5.
- 84 Lumber's "The Journey Begins" commercial aired during the 2017 Super Bowl in which 84 Lumber advocates for humanizing the national immigration debate while recognizing the sacrifice and grit of many immigrants.
- Budweiser's "Born the Hard Way" commercial aired during the 2017 Super Bowl in which it raises awareness about its founder, an immigrant, and the sacrifice and grit necessary to emigrate and prosper in the United States.
- Penzey's Spices 2019 social media campaign calling for other companies to no longer advertise on Fox News while also spending more than any other company on Trump pro-impeachment ads run on Facebook.
- Coca-Cola's "Equal Love" advertisements in Hungary during 2019 in which the company advocates for same-sex couple acceptance while communicating about its product.

- Volkswagen's "There's Room for Everyone" commercial aired during 2019 in which it advocates for diversity while communicating about the Atlas.
- Nike's ongoing "Believe in something. Even if it means sacrificing everything." campaign in which it makes clear its alignment with Colin Kaepernick's anti-racism initiatives.

Examples of small organizations include:

- Washington D.C. restaurant Red Hen's decision in 2018 to deny service to Sarah Sanders (former Trump administration White House press secretary) in protest of various Trump administration policies.
- Birmingham, Alabama restaurant Shu Shop's decision in 2019 to close for a day to avoid serving what was described as "MAGA racists" attending a nearby event.
- Atlanta, Georgia craft brewery Scofflaw's decision to offer free beer to Trump supporters in 2018; this prompted its Scottish craft brewery partner BrewDog to cancel a planned joint series of events to clarify their political positions were not aligned with Scofflaw's.

Relatedly, Duke University's *The CMO Survey* showed that in August of 2019, 26.5% of "top marketers" indicated they believe it is appropriate for their brand to take a stance on divisive social-political issues. In February 2018, the same survey showed that only 17.4% of respondents held that position (Mandese 2019). The increase from 2018 to 2019 appears consistent with the recent increase of observable activity demonstrating corporate engagement in divisive social-political issue discourse.

While companies typically have more reach when engaging in any form of public communication than the average consumer, consumers also have power that is exercised via voting behavior. However, this power is often not exercised by eligible voters in the United States. According to the Pew Research Center (Desilver 2018), only 56% of eligible voters cast ballots during the 2016 presidential election; this percentage has remained consistent over the past several decades. In 2016, the United States rate of voter turnout was ranked 26th out of 32 countries in the Organization for Economic Cooperation and Development peer group.

The aforementioned environment of political polarization, new avenues for corporate engagement in political discourse related to divisive social-political issues, and low voter turnout drives the goal of this research: to explore whether consumers' political engagement is influenced by companies' political engagement, or lack thereof, in divisive social-political issues.

The focus of this study answers Frynas and Stephens' (2015) call for research that examines the Political-Corporate Social Responsibility (P-CSR) context. Frynas

and Stephens (2015) describe P-CSR as a nascent area of CSR in which, among other characteristics, companies act in a manner that may impact government regulation. These actions may have a global governance or national public regulation-type impact when existing government regulation does not address the social-political aspect of interest. Arguably, an organization's engagement in a polarized political environment may have the aforementioned impact. The outcome of interest in this study is whether consumer political engagement behavior changes due in part to company engagement in politically divisive discourse.

CONCEPTUAL BACKGROUND

The recent increase of organizations publicly engaging in divisive political discourse is novel. However, the notion that organizations exert significant political influence is not. From an internal organizational perspective, an organizations' political influence on an individual's value and belief development can supersede the influence of family, church, schools, and one's community (Cheney and McMillan 1990; Deetz 1992). From a broader societal perspective, large corporations possess, and at times use, their resources, technology, and finances to influence public policy development (Cheney and Dionisopolous 1989). Most relevant for this study is that an increasing number of organizations are now wielding this power in arguably the most public way possible for an organization – mass communication. Except for a series of exploratory studies in which corporate social advocacy related to controversial social issues was found to influence consumer behavioral intentions (Dodd and Supa 2014, 2015; Supa and Dodd 2015), this area remains mostly unexplored in the literature (Supa and Dodd 2015).

The specific aspects of interest in this study derive from observing how organizations engage in divisive social-political issue discourse, the potential impact of said discourse, and consumers' political stances relative to an organization's stance on a social-political issue(s). These aspects are explored across a two-context study.

Context 1: Social-political Issue Engagement Method and Impact

Direct engagement, indirect engagement, and silence represent three broad categories of organizational engagement in divisive social-political issue discourse. The three types of impacts associated with the type of organizational engagement are: positive impact, negative impact, or no consumer awareness of an impact.

Direct Engagement

Direct engagement is exhibited by an organization communicating a position that establishes their stance on a social-political issue. Examples include the Chevrolet Traverse “The New Us” commercial in which Chevrolet makes clear that the company is LGBTQ inclusive. Another example is Nike’s unwavering support of Colin Kaepernick aligned social justice positions, which is made evident via commercials and product development decisions (e.g. 13-star U.S. Flag themed tennis-shoe cancelled launch in 2019).

Bank of America’s 2019 decision to cease lending to organizations that operate immigrant detention centers clearly demonstrates what Frynas and Stephens (2015) describe as organizational activity that seeks to address a specific social-political aspect when existing government regulation does not. Bank of America explicitly stated that its decision was driven in part by a sense of responsibility to de facto create public policy when needed reforms had not occurred via government (Telford and Merle 2019). In the context of persuasive speaking, a “powerful” communication style, or “direct engagement” as described in this study, leads to perceptions of the communicator as more influential (Erickson et al. 1978) and worthy of respect (see Fragale 2006).

Indirect Engagement

Indirect engagement is exhibited by an organization that does not take a position on a specific divisive social-political issue. Rather, indirect engagement is described in this study as an organization seeking to elucidate commonalities amongst individuals or to provide an example of a more sympathetic or empathetic way to interact. Examples of this include McDonald’s “We have more in common than we think” commercial aired in 2018, Jeep’s 2017 “Free to be you” Super Bowl commercial aired in 2017, and Marriot’s “Human: The Golden Rule” commercial aired in 2017.

Notably, these types of efforts are occurring during a time in which consumer behavior is increasingly influenced by an organization’s stance on a social-political issue(s) (see “Earned Brand” 2017, 2018). Though organizational communication efforts described in this study as “indirect engagement” are well intentioned, they are notable for not directly addressing any specific divisive social-political issue. The lack of direct engagement is arguably sufficient to explore whether it influences consumer political engagement (in)consistent with other communication approaches.

Silence

Silence is exhibited by an organization that neither directly nor indirectly engages in divisive social-political issues. Silence is included in this exploratory study due

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to the changing nature of the impact of organizational activity on consumer behavior (e.g. “Earned Brand” 2017, 2018) and the current context of social-political divisiveness. Additionally, a lack of engagement by organizations in this P-CSR context may be notable, due at least in part to the increasing engagement in the P-CSR context by other organizations.

Impact

In this study impact refers to possible outcomes associated with organizational engagement, or lack thereof, in P-CSR activities. The deontological and teleological moral philosophy of ethics, which is grounded in the normative theory of ethics (Hunt and Vitell 1986) guide the inclusion of impact in this study. In ethics studies, this foundation helps determine the basis of judgment that leads one to perceive an act as right or wrong (Shaw 2008). The basis of judgment is determined by understanding whether the judgment of an act is influenced by the outcome it produces (teleological) or if the method used to produce an outcome (deontological) is the more influential component. Understanding the basis of this judgment helps to better understand the antecedent(s) of the behaviors and/or behavioral intentions associated with various actions and outcomes.

Though ethical judgment is not the focus of this study, this study includes impact as one key variable to observe; thus, impact is the teleological component. Specifically, this study assesses whether differences in consumer responses occur due in part to organizational engagement in divisive social-political issues that results in a positive or negative impact on a social-political issue or if a consumer has no awareness of an impact. Combining the method of engagement with impact for observational purposes allows for assessing the extent to which any influence on consumer political engagement intentions is based on perceptions of the action taken by organizations (deontological) or the impact (teleological) of said action on the issue.

Context 2: Issue Stance

Dodd and Supa (2015) found that a consumer’s agreement/disagreement with the stance taken by an organization pertaining to a controversial social-political issue positively/negatively influences purchase intentions. The influence was found to be stronger when consumers disagree with a pro-stance (e.g. pro-LGBTQ) an organization takes and when both the organization and consumer take an anti-stance (e.g. anti-LGBTQ). These intriguing findings, and the social-political issue context in which they were found, support the relevancy of issue stance in this study.

Further, in the context of P-CSR, some organizations are motivated to impact government regulation in relation to social-political issues. While government relations are a more traditional avenue for this type of influence, a novel and

intriguing area of organizational and societal life is the notion of organizations potentially influencing electorate behavior by taking stances on divisive social-political issues via marketing communication. Accordingly, the specific aspect of interest in this study is whether a social-political issues stance advocated by an organization impacts consumer political engagement. This type of influence would suggest that organizations have the potential to impact government regulation indirectly via influencing consumer political engagement.

Control variables: Perceived Political Self-Efficacy and Demographics

Perceived political self-efficacy refers to an individual's belief that their political engagement can impact political outcomes; this perception is positively related to political engagement (Vecchione et al. 2014). Age, education, gender (Verba et al. 1995), and ethnicity (Krogstad and Lopez 2017) correlate with variations in political engagement. These variables were controlled for in this study.

METHOD

Research Design

The aspects of interest in this study were operationalized using a two-part experimental design consisting of the following two contexts: (1) three (direct/indirect engagement and silence) x three (positive/negative/no awareness of impact) and, (2) three (stance agreement/disagreement or stance uncertainty) x one (direct engagement that includes communication of stance). Utilizing this approach enables a more precise manipulation operationalization and control of potentially unmanageable variables (Bitner et al. 1990).

In the context 1 scenarios, a fictitious company was described as having engaged directly, indirectly, or not at all in divisive social-political issue discourse via a commercial. This was followed by describing the impact of said action as positively/negatively contributing to an outcome related to the social-political issue. No mention of impact was incorporated in the "no awareness of impact" condition. In the context 2 scenarios, a fictitious company was described as taking a direct approach to communicating its stance on a controversial social-political issue via a commercial. This was followed by stating that the respondent agreed/disagreed with the stance or was uncertain of their stance.

In contexts 1 and 2 scenarios, the focus on a specific divisive social-political issue was determined by which of eight pre-selected issues the respondent ranked as the most important to them. The eight issues that were ranked are based on the 2019 Pew Research list of the most divisive contemporary political issues (Bialik 2019) and the respondents' rankings occurred prior to scenario exposure. Perceived divisiveness of the issue was then measured. For context 2, whether a respondent could proceed in the experiment was determined by which condition they were

exposed to and whether they indicated that they did or did not have a stance on their top-ranked issue. Thus, for example, the respondent must have a stance on their top-ranked issue to proceed in the “agree/disagree with issue stance” condition.

Sample

A sample of 672 (57% male) responses were collected via Qualtrics with each of the 12 scenarios having between 51 and 60 responses (see Table 2 or 3). Participants' ages ranged from 18 to 70 years ($M = 33.7$; $SD = 9.6$). Qualtrics identified and obtained samples from individuals who have lived in the United States for at least 10 years. The 10-year minimum was established to increase the likelihood that respondents were aware of the state of political polarization occurring during the past two presidential administrations (Foran 2017) and the unique context of organizations using mass communication vehicles to address various divisive social-political issues.

Measurement

Political engagement was measured using a six-item scale where one is significantly more likely to engage and seven is significantly less likely (Vigoda-Gadot 2006). A four-item perceived political self-efficacy scale (Vecchione et al. 2014), one-item perceived scenario realism scale (Dabholkar and Bagozzi 2002), and one-item perceived divisiveness measure all utilized a seven-point Likert measure(s) where one is “strongly disagree” and seven is “strongly agree.” A manipulation check was used to ensure the distinctions associated with the operationalized variables were accurately understood.

Results

Scenario realism scores ranged from 5.14 to 6.13 and perceived issue divisiveness ranged from 5.15 to 5.81. Factor analysis of political engagement and perceived political self-efficacy, respectively, led to excluding likelihood of “becoming a candidate for public office” from the political engagement scale. The remaining political engagement items pertain to likelihood of political party membership, voting in general elections, and engaging in political protests or discussions. Subsequent analysis deemed political engagement and perceived political self-efficacy, respectively, suitable for analysis based on the following (Hair et al. 2010; Pallant 2010): Kaiser-Meyer-Olkin (KMO) (.921; .819), Bartlett's test of sphericity ($p=.000$; $p=.000$), standardized factor loadings (.787-.858; .829-.869), variance explained (69.11%; 71.62%), and Cronbach's Alpha (.930; .910).

Group Analysis

Analysis of the 12 groups' responses to the various conditions reveals intriguing

Conditions	Conditions Description
1. Direct, No Impact	Specific issue stance taken, no knowledge of impact
2. Direct, Positive Impact	Specific issue stance taken, positive impact on issue resolution
3. Direct, Negative Impact	Specific issue stance taken, negative impact on issue divisiveness
4. Indirect, No Impact	Emphasize general societal commonalities and/or advocate for kindness, no knowledge of impact
5. Indirect, Positive Impact	Emphasize general societal commonalities and/or advocate for kindness, positive impact on reduction of general political divisiveness and issues resolutions
6. Indirect, Negative Impact	Emphasize general societal commonalities and/or advocate for kindness, negative impact on general political divisiveness and issues resolutions
7. Silence	No engagement in divisive social-political discourse environment
8. Silence, Positive Impact	No engagement in divisive social-political discourse environment, positive impact on reduction of general political divisiveness and issues resolutions
9. Silence, Negative Impact	No engagement in divisive social-political discourse environment, negative impact on general political divisiveness and issues resolutions
10. Direct, Stance Agreement	Specific issue stance taken, agreement with stance
11. Direct, Stance Disagreement	Specific issue stance taken, disagreement with stance
12. Direct, Stance Uncertainty	Specific issue stance taken, uncertain of stance position

differences. The 12 different conditions are briefly explained in Table 1. Tables 2 and 3 illustrate the statistical differences pertaining to political engagement and likelihood of voting in general elections, respectively, across the 12 conditions.

Table 1: Conditions

A one-way between-groups analysis of variance was conducted to assess whether differences in political engagement are observed based on the method of organizational engagement in divisive social-political issue discourse and its associated impact. There was a statistically significant difference at the $p < .05$ level: $F(11, 660) = 6.045, p = .000$. A medium-large effect size of 0.09 was found using eta squared. For reference, an effect size of 0.01 is considered small, 0.06 medium, and .14 large (Cohen 1988; Pallant 2010). Specifically, as Table 2 illustrates, the direct, stance agreement condition is the one in which the highest

degree of political engagement was likely. This condition also has the most significant differences in said engagement across all conditions. Of the 11 comparison condition groups, the direct, stance agreement condition differs significantly in its impact on political engagement from nine groups. The two condition groups it does not differ from are (a) direct, stance disagreement condition and (b) direct, positive impact on issue resolution condition. The only other unique significant differences occurred with the direct, negative impact on issue condition (direct, positive impact; direct, stance disagreement) and the direct, stance disagreement condition (indirect, no awareness of impact).

**Table 2 -
Political Engagement: Descriptive Statistics and Multiple Comparisons**

Conditions	N	Mean	S.D.	Min.	Max.	*Significant Differences by Conditions Mean Difference, p-value
1. Direct, No Impact	52	23.08	7.21	11.00	38.00	10: 6.98, p=.000
2. Direct, Positive Impact	56	20.04	7.22	6.00	35.00	3: -5.75, p=.006
3. Direct, Negative Impact	51	25.78	7.26	11.00	40.00	2: 5.75, p=.006 10: 9.68, p=.000 11: 6.33, p=.001
4. Indirect, No Impact	59	24.12	7.48	8.00	39.00	10: 8.02, p=.000 11: 4.67, p=.042
5. Indirect, Positive Impact	54	22.57	7.31	9.00	40.00	10: 6.47, p=.000
6. Indirect, Negative Impact	58	22.40	7.97	7.00	40.00	10: 6.29, p=.001
7. Silence, No Impact	56	22.18	8.00	8.00	42.00	10: 6.07, p=.001
8. Silence, Positive Impact	53	23.23	8.05	6.00	40.00	10: 7.13, p=.000
9. Silence, Negative Impact	55	21.78	7.54	7.00	40.00	10: 5.68, p=.005
10. Direct, Stance Agreement	58	16.10	7.30	6.00	37.00	9 group differences; please reference groups 1, 3-9, and 12
11. Direct, Stance Disagreement	60	19.45	7.60	6.00	41.00	3: -6.33, p=.001 7: -4.67, p=.042
12. Direct, Stance Uncertainty	60	21.63	7.32	6.00	39.00	10: 5.53, p=.005
TOTAL	672	21.80	7.83	6.00	42.00	(Effect Size = .09)

* Condition number indicates which comparative condition results are reported; condition number corresponds with conditions column

The political engagement results are the first of the two outcomes-based foci of this research. The second is whether any of the conditions of interest impact voting behavior specifically. Accordingly, a one-way between-groups analysis of variance was conducted to explore whether differences in intentions to vote in general elections are observed depending on the method of organizational engagement in divisive social-political issue discourse and its associated impact. There was a statistically significant difference at the $p < .05$ level: $F(11, 660) = 7.412, p = .000$.

Table 3 - Voting: Descriptive Statistics and Multiple Comparisons

Condition	N	Mean	S.D.	Min.	Max.	*Significant Differences by Condition Mean Difference, p-value
1. Direct, No Impact	52	3.63	1.572	1	7	10: 1.32, $p=.000$
2. Direct, Positive Impact	56	2.91	1.180	1	5	3: -1.58, $p=.000$ 4: -1.07; $p=.008$
3. Direct, Negative Impact	51	4.49	1.362	2	7	5 group differences; please reference groups 2 and 9-12
4. Indirect, No Impact	59	3.98	1.420	1	7	2: 1.07, $p=.008$ 10: 1.67, $p=.000$ 11: .983, $p=.020$
5. Indirect, Positive Impact	54	3.54	1.476	1	7	10: 1.23, $p=.001$
6. Indirect, Negative Impact	58	3.59	1.697	1	7	10: 1.28, $p=.000$
7. Silence, No Impact	56	3.59	1.474	1	7	10: 1.28, $p=.000$
8. Silence, Positive Impact	53	3.57	1.474	1	7	10: 1.26, $p=.001$
9. Silence, Negative Impact	55	3.45	1.608	1	7	3: -1.04, $p=.021$ 10: 1.14, $p=.003$
10. Direct, Stance Agreement	58	2.31	1.353	1	6	8 group differences; please reference groups 1 and 3-9
11. Direct, Stance Disagreement	60	3.00	1.687	1	7	3: -1.49, $p=.000$ 4: -.983, $p=.020$
12. Direct, Stance Uncertainty	60	3.20	1.614	1	7	3: -1.29, $p=.000$
TOTAL	672	3.42	1.580	1	7	(Effect Size = .10)

*** Condition number indicates which comparative condition results are reported; condition number corresponds with conditions column**

A medium-large effect size of 0.10 was found using eta squared. Specifically, and generally consistent with political engagement, Table 3 illustrates that the direct, stance agreement condition is the one in which the highest degree of general election voting participation was likely.

The direct, stance agreement condition also has the most significant differences for voting across all conditions. Of the 11 comparison condition groups, the direct, stance agreement condition differs significantly in its impact on voting likelihood from eight groups. The three condition groups it does not differ from are (a) direct, stance disagreement condition, (b) direct, stance uncertainty condition, and (c) direct, positive impact condition. The direct, negative impact condition resulted in significant differences between five of the 11 comparison condition groups. Notably, the direct, negative impact condition is the only condition of all 12 in which there was a reported decrease in likelihood of voting in general elections. The remaining 11 ranged from no impact to more likely to vote.

SUMMARY AND CONCLUSIONS

The present research builds on pioneering work on P-CSR (Frynas and Stephens 2015) and corporate social advocacy (Dodd and Supa 2014, 2015). Our empirical study delves further into the nascent P-CSR context in part because it is increasingly evident that customers want companies they support to act more like citizens (Mandese 2019). Influencing the electorate via mass communication related to divisive social-political issue discourse appears to be how some in corporate America believe organizations should act within the P-CSR context. Nike founder Phil Knight is unequivocal on this matter: “You can’t try to go down the middle of the road. You have to take a stand on something...” (Beer 2019).

This study provides interesting findings related to the impact of organizational engagement in divisive social-political issue discourse on consumers. Results for political engagement and voting behavior were similar, thus allowing for a closer examination of the likelihood of voting in general elections. The conditions in which direct engagement was utilized resulted in the highest relative impact on likelihood of voting. These results appear consistent with Erickson et al. (1978), which posits that the use of a powerful communication style, described in this study as akin to direct engagement, leads one to be perceived as more influential. Interestingly, the positive correlation holds regardless of whether a consumer agrees, disagrees, or is uncertain whether they agree with an organization’s social-political issue stance.

In Erickson et al. (1978) a powerful speaking style was established as a factor that increases the likelihood of a message receiver accepting an advocated position. In this study one manipulation introduces the explicit disagreement with a position.

In this condition the results show the impact of direct engagement on likelihood of voting is similar, regardless of an organization's or individual's social-political issue stance. Thus, the social-political issue position being advocated is less influential than the direct method of engagement when likelihood of voting is the outcome of interest. These findings differ from those of Dodd and Supa (2015), in which stance agreement/disagreement had a positive/negative impact; however, it is important to note that the context of Dodd and Supa (2015) involved exploring the influence on purchase intentions.

The results also showed that neither an indirect nor silent approach impact voting likelihood. This suggests that the method of engagement (the deontological component of the scenarios) is the basis of an individual's judgment that drives their response in the context of this study. However, a negative impact associated with a direct approach is the only condition in which voting likelihood decreased; this suggests a teleological-type judgment and response occurs when the impact is known in direct engagement conditions. This finding is particularly intriguing when considering the potential impact of this type of organizational P-CSR activity on consumers and how emphasizing different aspects (e.g. engagement method, issue stance, and/or impact) via marketing communication influences the likelihood of voting.

Also noteworthy is that two of the three conditions in which direct engagement occurs have a positive associated aspect (stance agreement or positive impact) and these two conditions positively impact likelihood of voting. Developing a preliminary understanding of this outcome may begin with Press (2018) in which it is posited that perceived social ties with like-minded coconspirators are an antecedent of individual acts of moral courage. In other words, in this study seeing organizations take a like-minded stance or having a positive impact on divisiveness reduction and issue resolution may have an empowering effect on consumers. Interestingly, the results also suggest that a direct stance disagreement condition increases voting likelihood. The stance disagreement condition, which essentially establishes a barrier between the organization and a consumer based on the social-political issue stance, motivates a consumer to vote.

Several notable limitations and future research avenues exist for the current research. First, a real brand was not used in this study thereby leaving unaddressed the influence of brand perception on political engagement. Future research can investigate the impact of, for example, brand equity perceptions in the context of this study to assess its relative impact on political engagement. Second, political candidates also use marketing communication to make clear their positions on various social-political issues during general election seasons. Thus, future research can examine the relative influence of political candidate messaging and organizational messaging when each occurs concurrently to better understand the impact of these messages on consumers. Third, in this study only one exposure to an example of the phenomenon of interest occurred followed by an immediate

response measurement. This leaves the question of, for example, whether the affect measured in this study holds constant if a general election occurs at different points of time in the future. Finally, we were not able to measure actual voting behavior. A pre- and post-general election study can better assess whether the self-reports provided by respondents in this study reflect actual voting behavior.

Implications

Whether one cites the previously noted Duke University *The CMO Survey*, the development of P-CSR, the most recent Edelman Earned Brand studies, or Phil Knight, it is apparent that organizations can no longer avoid political issues as has occurred in previous decades. Consumers are increasingly demanding that organizations act as citizens and more organizations are responding as such through, for example, advertising efforts. In this capacity, organizations should be aware of the potential to influence the electorate and the conditions in which that influence occurs.

The findings are relevant to the influence on the electorate in that they show organizations can make it more or less likely that consumers, who are citizens first, will vote in general elections. For organizations choosing to enter this realm of society, the results suggest it should contemplate its purpose deeply before engaging in this P-CSR role. Whether or not the intention is to influence how these divisive social-political issues are legislated, this outcome can occur due to its impact on the electorate's likelihood of voting. This seems potentially more likely when considered simultaneously with the persistently low voter turn-out in the United States.

Specifically, the results suggest that direct organizational engagement in divisive social-political issues via marketing communication leads consumers of these messages to be more likely to vote. This effect occurs regardless of whether they agree with the organization's stance on the issue. Thus, for example, an organization should be aware of potentially unintended outcomes if the organization seeks to influence a social-political issue by directly taking a stance on the issue. The unintended outcome is that directly taking a stance also invigorates those who hope for the issue to be addressed in a manner different than what the organization desires. This outcome can be further compounded if, for example, by invigorating both sides of a divisive debate the degree of divisiveness related to the issue increases. Should this type of negative impact be presumed to be due in part to an organization's actions, then the electorate becomes less likely to vote.

Relatedly, if an organization determines that its political engagement has contributed to a positive outcome such as the resolution of an issue or improvement of the environment pertaining to a politically divisive issue, then the organization should consider communicating about that outcome. Consumers are more likely

to vote when they are aware that direct organizational engagement in politically divisive issue discourse contributed to a positive impact on said issue. Conversely, consumer awareness of a negative impact has the opposite effect. This suggests that organizations should seek to gauge the likelihood of a positive or negative impact when engaging directly in divisive social-political issue discourse. Though this suggestion appears obvious given the findings of this exploratory study, it should be considered in the broader context of shifting general consumer expectations that organizations engage in discourse pertaining to social-political issues and the current lack of guidance for organizations in this context.

Finally, if part of the reason an organization engages in social-political issue discourse is to influence how those issues are ultimately legislated via influencing electorate voting behavior, then indirectly engaging in this realm of society is not advisable. Though seeking to illuminate more positive aspects of society as the indirect engagement approach does is well-intentioned, it does not impact one's likelihood of voting. This outcome occurs regardless of any potential positive or negative impact associated with indirect engagement. Thus, the results suggest it is not advisable to communicate about a positive impact if that impact is coupled with an indirect approach. This contrasts with it being advisable to communicate about a positive impact if that impact is coupled with a direct approach. Silence evidences no discernable impact in this study.

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THE CONSTITUENTS OF JAPANESE CUSTOMER SENTIMENT TOWARD OFFSHORED CALL SERVICE CENTERS: AN EXPLORATORY STUDY

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ABSTRACT

How do customers whose inquiries are being handled by offshored call service centers (CSC) feel about the services with which they are provided? Previous researches suggest that CSC offshoring has negative effect on a customer's perception of service. These research results, however, are derived from data about offshoring conducted by U.S. businesses as it affects U.S. consumers. Therefore, this paper aims to discover the factors that comprise Japanese consumer perceptions toward CSC offshoring. The results indicate that Japanese customers are expecting a similarity to themselves, a 'Japanese-ness,' from the agents with whom they interact, including agents who are located offshore. The results also indicate that the level of 'Japanese-ness' perceived by Japanese customers could be categorized into at least two extreme types: lower standard and higher standard. In addition, the results find that the act of 'going easy due to distance' of the offshore CSC agents can play an important role in constructing a more detailed scale to measure the 'Japanese customer sentiment toward offshored call service centers'.

Keywords: Call Service Centers, Service Ethnocentrism, Customer Sentiment, Offshoring, Japanese

INTRODUCTION

In an increasing number of developed countries, the process of supplying services from call service centers (CSCs) is being moved offshore. Typically, CSCs deal with a wide range of inquiries that come both through phone lines and over the Internet (Stratman, 2008). When businesses offshore CSCs, they are mainly aiming to control costs and improve the quality of the services being offered. Since employees at CSCs must handle customer inquiries on a case by case basis, the majority of the costs associated with running a CSC

are labor costs (e.g., Lewin, 2006; Stratman, 2008). By moving operations offshore, companies expect to be able to take advantage of the low cost of labor in foreign countries, thus reducing labor costs connected to CSCs (e.g., Roza, Van den Bosch, and Volberda, 2012). Furthermore, offshoring is advantageous in that well-trained personnel are easy to secure in offshore locations, raising the quality of the services offered (e.g., Le Bon and Hughes, 2008; Stringfellow, Teagarden, and Nie, 2008). Taken together, these advantages are driving the offshoring of CSCs.

This is a description of offshoring from the point of view of businesses. In contrast, how do customers whose inquiries are being handled by offshored CSCs feel about the services with which they are provided? Customers interacting with offshore CSC agents (offshore employees charged with responding to customer inquiries) are not aware before they call the CSC that the agents they will be dealing with are located in another country (Roggeveen, Bharadwaj, and Hoyer, 2007). In other words, willing or not, customers that call offshored CSCs become involved in offshoring (Hopkins, Hopkins, and Hoffman, 2005). Once contact is made, the customer may realize that they are participating in offshoring due to clues that surface during the course of the service interaction. Conversely, businesses performing offshoring may seek to conceal from the customer the fact that they have offshored a CSC (Government Accounting Office, 2005; Honeycutt, Magnini, and Thelen, 2012; Thelen and Shapiro, 2012; Thelen, Yoo, and Magnini, 2011). As a result, tension arises between the customer and the CSC agent.

Previous research has primarily relied on existing frameworks to examine the consequences of offshoring CSCs on customers (e.g., Bharadwaj and Roggeveen, 2008; Sharma, 2012; Sharma, Mathur, and Dhawan, 2009; Thelen and Shapiro, 2012; Walsh, Gouthier, Gremler, and Brach, 2012). The preponderance of evidence suggests that CSC offshoring has negative effect on a customer's perception of service. Thelen, Yoo and Magnini (2011) identified factors that constitute customer sentiment toward offshored services. The five factors included: (1) anxiety about data security, (2) concern that foreigners have taken jobs that could have gone to domestic workers (3) lack adequate cultural understanding of domestic customers), (4) concerns about barriers to communication, and (5) enmity regarding foreign service providers (for example, preconceived notions or prejudice towards foreign service providers based on beliefs that although we are not perfect ourselves, our culture is superior to other culture).

These research results, however, are derived from data about offshoring conducted by U.S. businesses as it affects U.S. consumers. Reactions to the offshoring of CSCs may be dependent on both country and context.

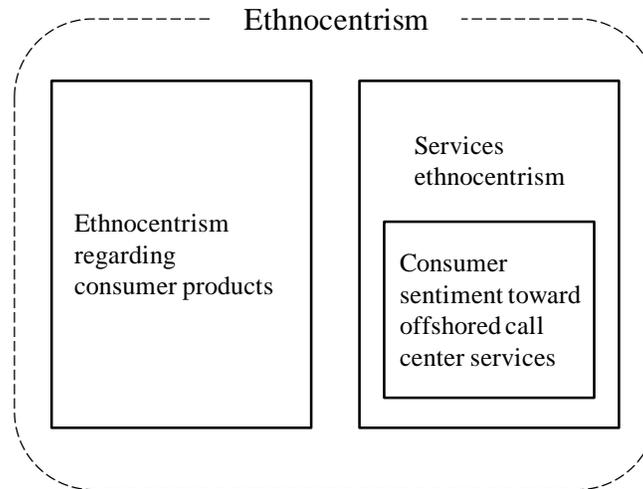
Reactions of U.S. consumers to offshoring by U.S. companies may be different from reactions of Japanese consumers to offshoring by Japanese companies. This research examines this possibility and fills a gap in the literature by examining the reactions of Japanese customers involved in interactions with offshore agents. The research aims to discover the factors that comprise Japanese consumer perceptions toward CSC offshoring.

LITERATURE REVIEW AND RESEARCH QUESTION

In order to understand how consumers regard the offshoring of services, we will anchor this discussion in the concept of ethnocentrism, as defined in previous research (e.g., Bharadwaj and Roggeveen, 2008; Honeycutt, Magnini, and Thelen, 2012; Jeong, Bekmamedova, and Kurnia, 2012; Roggeveen, Bharadwaj, and Hoyer, 2007; Sharma, 2012; Sharma, Mathur, and Dhawan, 2009; Thelen and Shapiro, 2012; Walsh, Gouthier, Gremler, and Brach, 2012; Whitaker, Krishnan, and Fornell, 2008). Past studies of ethnocentrism have focused on the level of loyalty and patriotism of consumers buying imported goods. However, in adapting this concept to the context of offshoring, we are not dealing with ethnocentrism pertaining to foreign/offshored consumer goods but, rather, with ethnocentrism pertaining to foreign/offshored consumer services (Figure 1). A common aspect of these scenarios is the perception that sourcing from an outgroup (a foreign country) may be dangerous and/or morally wrong. However, the product versus service scenarios differ in an important way. Services, unlike physical products, tend to involve substantially more human elements and activities (Jeong, Bekmamedova, and Kurnia, 2012; Thelen, Yoo, and Magnini, 2011).

According to previous research, consumer perception concerning the offshoring of services has two sources: perception generated through interactions and perception concerning the existence of offshoring itself (e.g., Sharma, 2012; Sharma, Mathur, and Dhawan, 2009; Thelen, Magnini, and Thelen, 2009; Thelen and Shapiro 2012; Walsh, Gouthier, Gremler, and Brach, 2012).

Figure 1. Ethnocentrism



Perception due to direct interaction:

Perception due to direct interaction can become problematic if a fatal misalignment occurs in the interface between the offshore CSC service provider and the customer (Honeycutt, Magnini, and Thelen, 2012). Customers attempt to evaluate how committed a business is to understanding their needs based on the quality of the interaction that occurs between the customer and the CSC. A characteristic of the offshoring of CSCs is that services are provided over the phone by a CSC agent who has a different cultural and ethical background than the customer. In addition, as the service encounter is conducted through speech alone, there is a lack of non-verbal cues. The combination of these factors leads to a scenario in which the customer may become dissatisfied or anxious.

Communication is an important factor in the quality of the service provided by the offshore CSC agents. In order for the agent to build a trusting relationship with the customer and provide satisfactory services, the agent must be vigilant, sensitive, and responsive in every interaction with the customer. However, even if the agent is all of these things, it is possible that communication between the CSC agent and the customer will break down. One of the primary reasons for this has to do with judgments made by the customer. If an agent has an accent or uses syntax and grammar that cause the customer to realize that the agent is a foreigner, the customer will tend to feel that the quality of the service provided is low (Bharadwaj and Roggeveen, 2008). Other CSC agent behaviors that can be problematic to consumer perceptions include if the agent does not respond to a call promptly, if the agent puts the customer on hold

for a long period of time, if the agent does not understand the customer's inquiry, if a long period of time is necessary to resolve the inquiry, if the agent appears to be providing answers from a script, or if the agent lacks expert knowledge necessary to resolve a complicated inquiry (Compass, 2007; Honeycutt, Magnini, and Thelen, 2012; Sharma, Mathur, and Dhawan, 2009).

Perception due to knowledge of existence of outsourcing itself:

Perception related to the existence of offshoring itself is not, like the former, an endogenously generated perception that finds its source in interpersonal interactions; rather, it is an exogenous perception that is formed by sources of information including the media and word of mouth communication. In the West, it is composed of (1) concerns related to security, and (2) concerns related to business, government, or the economy. (1) is based on the fear that the customer's personal information, medical records, credit card information, information related to taxes, or financial information may be stolen or exposed by the offshore service provider. Interestingly, this fear is also directed at those offshore locations where the actual incidence of the theft or exposure of information is often small in comparison to the customer's home country (e.g., Lewin and Peeters, 2006; Sharma, 2012; Sharma, Mathur, and Dhawan, 2009; Mandel, 2007). (2) is related to the gradual sensitizing of consumers to the topic of offshoring. This sensitivity comes from reports about problems associated with offshoring and information in the media about the negative effects on jobs and salary growth in the customer's home country due to offshoring. Specifically, offshoring is regarded as something that harms the home country's businesses, as it 'causes even well-paying jobs to be outsourced to countries with low labor costs,' 'causes the stagnation of salaries for domestic jobs,' 'reduces the GDP growth rate,' 'increases domestic poverty,' and 'reduces worker morale' (e.g., Mandel, 2007; Stack and Downing, 2005). Impressions such as these indicate that a business that continues to move jobs or processes offshore may be regarded as acting in bad faith towards the economy and workers of its own country and, in doing so, may engender negative feelings from its home country's customers (Thelen, Yoo, and Magnini, 2011).

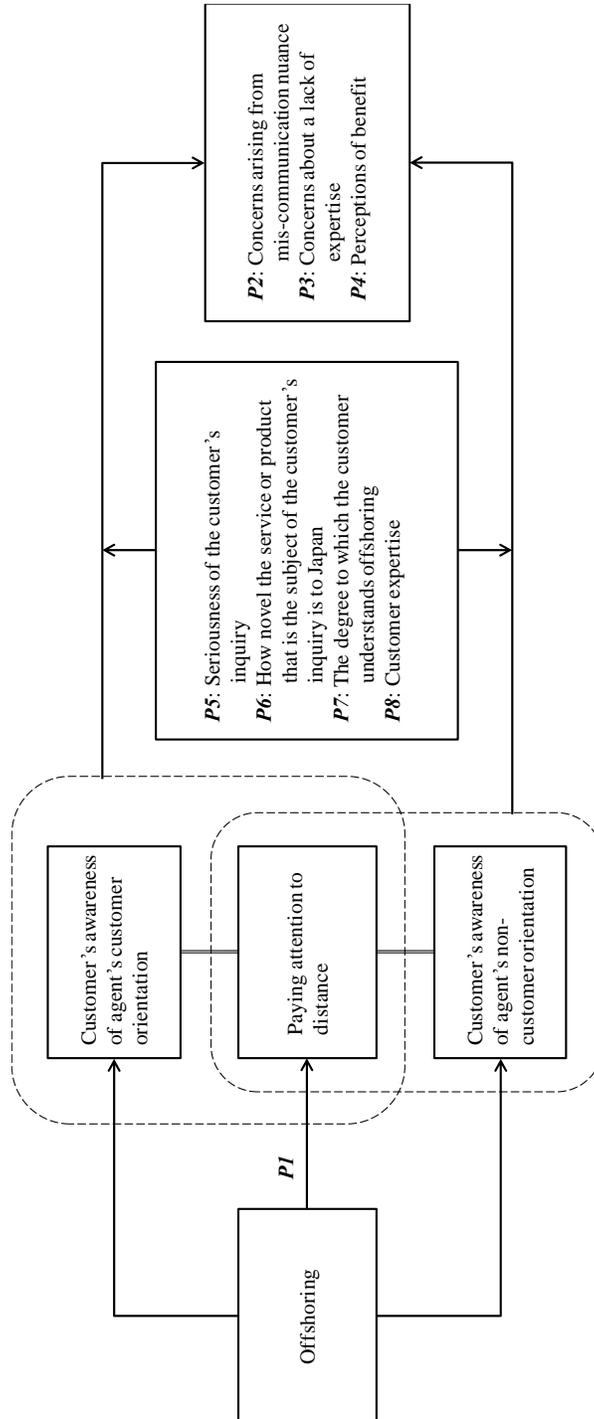
Although the factors that constitute these perceptions have been elucidated before, previous research has focused on offshoring performed in Western countries. However, as reactions to the offshoring of CSCs are highly dependent on country and context, it should not be assumed that negative customer reactions elicited in the West will necessarily be elicited in non-Western countries. Therefore, in the following sections, this research explores answers to the question established below.

Research Question: What are the factors that make up ‘consumer perception regarding offshore call service centers’ for Japanese customers?

METHODOLOGY

To investigate the various factors that make up ‘customer perception regarding offshore call service centers in Japan,’ semi-structured, in-depth interviews were conducted (Mariampolski, 2001). The reason for choosing in-depth interviews is that they are a useful method for investigating topics that are new or in the process of being studied (Carson, Gilmore, Perry, and Gronhaug, 2001). The subjects of these interviews were chosen from consumers (all residents of Niigata Prefecture) registered with a company specializing in Internet surveys. Specifically, a screening email that included questions such as ‘When making inquiries of a call center (support center), has your call been handled by a non-Japanese employee who spoke Japanese?’ was sent to 6,993 consumers. The screening resulted in 76 people who reported ‘Yes’ and 64 who reported ‘I’m not sure, but I did speak to someone who didn’t sound Japanese.’ Of these 140, 41 people expressed an interest in being interviewed. As final interview subjects, 10 people were chosen from these 41, without regard to gender, age, or employment status. Interviews were conducted by telephone, and each interview took about 30 minutes. All interviews were recorded and transcribed. The transcribed data was carefully analyzed using an approach based on grounded theory (Glaser and Strauss, 1967), and attempts have been made to generalize the results of this analysis (Miles and Huberman, 1994). The output of this first analysis will be a conceptual model of the constituents of Japanese customer sentiment toward offshored call center services. The study will then conduct a qualitative comparative analysis (QCA) of the sample (e.g., Ragin, 1987; Rihoux and Ragin, 2009), elaborate the first model, and summarize it as a second model.

Figure 2. First Conceptual model



ANALYSIS

Constructing a basic model using manual comparisons:

The phone interviews consistently showed that customers who call CSCs have no choice but to come into contact with offshoring. (*For example, 'When I dialed the number to make an inquiry, the person handling my call spoke very broken Japanese,' 'When I selected Japanese by pushing the appropriate number on the phone, the person I was connected to spoke in a way that made it clear they were not Japanese,' 'Although the number I dialed was a Japanese one, the person I was connected to spoke completely unnatural Japanese, as if I had been directly connected to a foreign country without being warned or consulted,' etc.*) Also, customers realized that their calls had been connected to offshore facilities soon after they were connected. (*For example, 'The Japanese of the person handling my call lacked any dialect, and had the lightness that is peculiar to the Japanese of foreigners. I soon realized that I had been connected to a non-Japanese,' 'The pronunciation, intonation, and way of speaking were clearly different from those of a native speaker. Also, the employee's name was not Japanese, so I immediately understood I was speaking to a foreigner,' 'Although the words and meanings were understandable, the connections between words were different from the ones a Japanese person would use, so I knew I was speaking to a non-Japanese,' 'I could hear voices in the background speaking a non-Japanese language that I was unfamiliar with, so it quickly became clear that the person handling the call was not Japanese,' etc.*)

The interviews also show that these customers became highly aware of the distance between themselves and the agents they were talking to. The agents they spoke with were sometimes attentive to the needs of the customers, but they were also sometimes inattentive. Also, the difference between the consequences of an attentive versus an unattentive CSC on Japanese consumer perception were clarified and moderating variables were discovered. The conceptual model discovered in this paper appears in Figure 2.

Paying attention to distance: Customers connected to offshore agents who may have been foreigners, became highly aware of the distance between themselves and the agent (or of the differences between services originating in their own country and those located in a foreign country). In surprising contrast to research with Western consumers, this awareness took the form of the customer reflecting and going easy on the agent. (*For example, 'One thing I realized was that I would have to use Japanese that the agent could understand,' 'Although the agent was responding in Japanese, there were differences in specific wording. I would listen to what was being said while thinking to myself about what the meaning could be,' etc.*) To the customers, the agents sometimes appeared to

respond in a manner attentive to the needs of the customer and they sometimes did not. Customers encountering the attentive agents were both highly aware of the distance between themselves and the agents and also satisfied with the service that was provided. *(For example, 'The intonation of the agent's Japanese was a little bit off, but their wording was correct and they were conscientious in responding to my inquiry, so I was satisfied,' 'Although they spoke Japanese in a non-Japanese manner, they were more polite and careful than if I had been connected to an unhelpful Japanese person. We were dealing with a financial issue related to a credit card and the agent carefully explained the situation while occasionally reassuring me that it would work out in such-and-such a way and that there was no need for concern. The conversation proceeded smoothly and we were able to resolve the problem,' etc.)* Perhaps in greater contrast to research with Western consumers, even with inattentive CSC agents, the customer's reflections and tendency to go easy on the agent were sufficient to counteract what past research might predict would be an inherently negative evaluation. A portion of the customers, regardless of whether they felt that the agents acted in an attentive manner or not, ultimately treated problems that occurred during interactions as ones caused by their own actions or the environment. *(For example, 'Although the agent listened to my explanation many times, when I used difficult words or explained things that felt complex, it seemed that I couldn't communicate, perhaps because I have a soft voice,' 'There were no problems with the agent's responses, but the line was soon cut off. As they normally don't hang up for a moment or two, I remember a certain sense of discomfort with the way the call ended. However, the agent may have been busy,' etc.)* From the foregoing, the first proposition follows:

P1: In cases where they deal directly with CSCs that have been offshored, customers go easy on the agent regarding differences attributable to the agents they are dealing with and/or differences attributable to services provided.

Outcomes: Three outcomes appeared in this survey. The outcomes anticipated by previous research distinguished between sentiment generated through interactions and sentiment regarding the existence of offshoring itself. However, the outcomes that appeared in this survey are all related to communication between customers and agents. In some cases, the three outcomes are produced independently, while in some cases they appear in combination with other outcomes. Although there are degrees of difference in the combined outcomes, in every combination of outcomes a negative outcome ('concerns arising from nuances that are not communicated' or 'concerns about a lack of expertise') occurs simultaneously with a positive outcome ('a perception of benefit'). What this means is that, even in interactions with agents who are not attentive to customer concerns, the cushion of 'customers' consideration and going easy on agents' that was discussed previously does not engender the degree of negative

effects revealed in studies with Western consumers. The evaluation of the interaction shifts from a net ‘minus’ to a ‘plus.’

1. Concerns arising from mis-communication nuance. Most respondents felt a sense of discomfort that arose from mistakes in the intonation, pronunciation, smoothness, and connections between statements that agents made when speaking Japanese. However, the lack of skill that agents showed in speaking Japanese did not by itself directly lead to negative outcomes such as respondent dissatisfaction or anxiety. (For example, ‘Although the agent spoke non-native Japanese with the pronunciation and intonation typical of those who speak Japanese as a second language ... I was satisfied,’ ‘Although we were speaking Japanese, I felt uneasy ... It took a little time, but the problem was resolved,’ ‘The agent spoke broken Japanese and the name they gave was not a Japanese name. Also, I was asked to repeatedly explain the issue that I was having with the equipment. However ... I was mostly satisfied with the response,’ etc.) A portion of respondents worried about the possibility that errors might be produced as a result of their inability to communicate fine details in a comprehensible manner using only unsophisticated Japanese. (For example, ‘I was a little bit worried about whether what I was saying was being properly communicated to the agent,’ ‘As the agent’s Japanese was broken, I was concerned that they weren’t able to understand what I wanted to say,’ ‘As the Japanese they spoke was harder to understand than the Japanese of a native speaker, I did not feel at ease communicating with them,’ etc.) From the foregoing, the next proposition follows:

P2: In cases where they deal directly with CSCs that have been offshored, customers feel anxious about the possibility that they have failed to communicate their intended meaning to the CSC agent.

2. Concerns about a lack of expertise. Although dissatisfaction with the poor quality of an agent’s Japanese fluency itself was not directly a constituent factor in the outcomes, concerns that customers held about the expertise of the agent did directly create negative outcomes. (For example, ‘Although they listened to specific details of my inquiry, I felt concerned that the agent may not have understood what I said or may not have been capable of responding to it,’ etc.) Especially in cases in which agents answered by following a manual, or when customers were put on hold for long periods of time after asking questions, customers felt doubts about the expertise of the agent. (For example, ‘After saying something like, “Please wait for a moment,” there was a long wait before the answer came back ... since the answer to my question took a long time, I felt concerned that the agent might only be able to handle inquiries in everyday Japanese, and that they were incapable of dealing with more complicated matters,’ ‘As the agent was following a manual, I was concerned that they might

be unable to adapt to an unfamiliar circumstance, ' etc.) From the foregoing, the next proposition follows:

P3: In cases where they deal directly with CSCs that have been offshored, customers feel anxious about the expertise of the agent they talk to.

3. *Perceptions of benefit:* Although there were differences of degree, almost all of the subjects either explicitly stated or implied that they perceived or received benefits from the interaction. The survey subjects included customers who had experiences with agents who behaved in a manner attentive to the customer's need, customers who had experiences with agents who did not behave in such a manner, and customers who had both kinds of experiences. Nonetheless, each of these types of customers expressed responses that indicated that they had received benefits related to the 'the resolution of the problem that I was inquiring about' or to 'being fully satisfied with the service I received.' (*For example, 'I felt dissatisfied with the way the call ended, but my problem was resolved,' 'As the agent was following a manual, I felt concerned that they might be unable to adapt to an unfamiliar circumstance, ... However, the problem I had was resolved,' 'The intonation of the agent's Japanese was a little bit off, but their wording was correct and they were conscientious in responding to my inquiry, so I was satisfied,' 'Although they spoke Japanese in the manner of a non-Japanese, they were more polite and careful than if I had been connected to an unhelpful Japanese person. As we were dealing with a financial issue related to a credit card, the agent carefully explained the situation while occasionally reassuring me that it would work out in such-and-such a way and that there was no need for concern. The conversation proceeded smoothly and we were able to resolve the problem,' etc.)* From the foregoing, the next proposition follows:

P4: In cases where they deal directly with CSCs that have been offshored, customers either perceive that benefits were received.

Moderating variables: Interactions between a Japanese customer who is aware of the distance between themselves and the agent, whether the agent is attentive or inattentive to the customer's needs, can lead to equivalent outcomes. According to the results of this survey, the strength of the effects that these interactions exert on the outcome depends on how serious the customer's inquiry was, how novel the product or service was, the degree to which the customer understood offshoring, and the expertise of the customer.

1. Seriousness of the customer's inquiry. In cases in which the customer was inquiring about a serious problem, an effect was often observed on two of the three outcomes, 'concerns about the nuance of the communication' and 'concerns about the lack of expertise.' On the other hand, regarding 'perceptions of benefit,' even if the problem was a serious one, the customer still perceived

benefit. (For example, 'I bought a product from overseas, and the payment process was split into several sections. I was concerned about this, and made an inquiry ... Although I was able to converse with the agent in everyday Japanese, anything more complicated was not possible, which left me still feeling anxious ... The problem was taken care of,' 'I received an email saying that my credit card information may have been used, so I became concerned and dialed the call center ... from the way the agent spoke it was clear that they were not Japanese, and I worried that my call wasn't being handled in Japan ... However, the agent was conscientious and polite, so we had a reassuring conversation ... the problem was resolved,' etc.) Therefore, the following proposition is suggested:

P5: When customers make inquiries about serious problems to CSCs that have been offshored, concerns about the nuance of communication and about the expertise of the CSC agent increase. Nevertheless, customers still perceive benefit.

2. Degree of novelty of the service or product. If the product or service that the customer is making an inquiry about is not commonplace in Japan, just as is the case with inquiries about serious matters, customer concerns regarding 'the communication of nuance' and 'the expertise of the agent' tend to increase. However, even for inquiries about products or services that are very new, customers still maintained a perception of benefit. (For example, 'The website that I bought a foreign product from was not in Japanese. It was different from typical Japanese websites made by Japanese people, so I became concerned as I looked at it ... Since the payment process was one that is not very common in Japan, I was also worried about that aspect ... When I spoke to an agent, they responded to my questions as if they were reading from a manual ... The answers to my questions took a long time ... However, my problem was resolved,' 'The service that I had a problem with is not one that is commonplace in Japan ... I was concerned since the agent spoke Japanese in a non-Japanese manner ... However, I felt that the agent's responses were more polite and conscientious than if I had been connected to an unhelpful Japanese agent, so I wasn't upset ... My problem was resolved,' etc.) As a result, the following proposition is suggested:

P6: If the service or product that is the subject of the inquiry is novel, customers who deal with CSCs that have been offshored have increased concerns about the nuance of communication and about the expertise of the CSC agent. Nevertheless, customers still perceive benefit.

3. The degree to which the customer understands offshoring. Survey respondents included both customers who had never heard the word 'offshoring,' much less

understood what it meant, as well as customers whose own job was related to offshoring and, therefore, had an excellent understanding of offshoring both conceptually and in practice. The latter type of customer had a tendency to take conscious action so as to avoid miscommunication and a tendency to create a relaxed relationship between themselves and the agents. (*For example, 'The computer support center that we use at my job has been offshored ... I came to the realization that I had to use Japanese that the agent was capable of understanding ... As I was concerned about whether what I was saying was being properly communicated, I took time to carefully explain myself in a step-by-step manner,' etc.*) From this, the following proposition is suggested:

P7: When customers who are knowledgeable about offshoring deal with offshore CSCs, concerns about communication nuance are mitigated.

4. Customer expertise. One of the study respondents was employed in a field related to the product (computer) about which an inquiry was made. This customer repeatedly emphasized that the response he received from the agent would have been difficult to understand if he had not been able to interpret it based upon his own expertise. This person also suggested that if another individual who was a novice regarding computer issues, their problem may not have been solved, based on the response received. (*For example, 'I made an inquiry about the operation and problems related to a personal computer ... I am engaged in computer-related work at my own job, but if I had been a novice to the field, I do not think that I would have understood the response that I received,' etc.*). Nevertheless, the answer was not one that implied a complete lack of perception of benefit. Based on this, it can be expected that if the effectiveness of the service provided by the agent is dependent upon the expertise of the customer making the inquiry, then the relationship between perceptions of benefit and the two types of relationships that can exist between the agent and the customer will tend to be reinforced. That is, a knowledgeable customer will perceive greater benefit than a regular customer would from an agent providing service that is marked by expertise or conscientiousness and will also perceive less benefit than a regular customer from an agent providing inattentive or inexperienced service.

P8: The strength of the relationship between a customer dealing with a CSC that has been offshored and the customer's 'perception of benefit' is affected by the degree of expertise the customer has with the product or service in question.

Further analysis using qualitative comparative analysis (QCA):

Application of QCA: Next, a search was conducted for a more detailed understanding of the relationship between the variables based on the reconciliation of the foregoing interview results. The QCA used in this paper is the crisp-set version (e.g., Ragin, 1987; Rihoux and Ragin, 2009). In Boolean algebra, the existence of a variable is expressed using a 1 and its absence is expressed with a 0. Accordingly, in this paper, each case can be expressed as a 10-bit string with the value of each variable expressed by either a 0 or a 1. Of these variables, 3 were treated as outcomes, 3 were treated as causal factors, and 4 were treated as moderators (see Table 1). Outcomes in the cases studied in the analysis were broken down into (a) those which resulted only in feelings of anxiety, (b) those which resulted only in perceptions of benefit, and (c) those which resulted in the experience of both anxiety and benefit. Specifically, the patterns of outcome which are shown in cases collected in this paper are not exhaustive but limited to (1) concerns about communication, (2) concerns about the expertise of the agent, (3) perceptions of benefit, (4) concerns about nuance not being communicated and perceptions of benefit, (5) concerns about the expertise of the agent and perceptions of benefit.

Table 1. Variables

OUTCOMES	
YA	: Concerns arising from mis-communication nuance
YB	: Concerns about a lack of expertise
YC	: Perceptions of benefit
CAUSAL CONDITIONS	
XA	: Paying attention to distance
XB	: Customer’s awareness of agent’s customer orientation
XC	: Customer’s awareness of agent’s non-customer orientation
MODERATORS	
XD	: Seriousness of the customer’s inquiry
XE	: How novel the service or product that is the subject of the customer’s inquiry is to Japan
XF	: The degree to which the customer understands offshoring
XG	: Customer expertise

As a consequence, in the analysis carried out in this research, a search was conducted for combinations of causal conditions that led to these 5 outcomes.

Interpreting the results of the analysis: Certain issues require decision-making in the application of QCA, such as with logical reminders and contradictory rows. Furthermore, we need to consider which causal condition should be discussed to interpret the analysis results. The present paper adopted generally accepted solutions concerning the issues relating to logical reminders and contradictory rows (Rihoux and Ragin, 2009). We also interpreted above-mentioned analysis results by focusing on XA, XB and XC. If the customer feel the lack of consideration and politeness in CSC agent, XC is expressed with 1.

The present paper obtained the following QCA results through these considerations:

$$\begin{aligned} \text{YA} &= \text{XA (XB+XC)} && \dots\dots (1) \\ \text{YB} &= \text{xa (XC+xb*zc)} && \dots\dots (2) \\ \text{YB*YC} &= \text{xa (XC+xb*zc)} && \dots\dots (3) \end{aligned}$$

This shortened Boolean algebra signifies the following: for equation (1), customers are concerned whether the nuance of their communication is understood, when they become aware of the distance with offshored CSC agents; for equation (2), customers are concerned over the agent's lack of expertise of the inquiry, even when they are unaware of the distance with offshored CSC agents. Customers sometimes perceive benefits, when simultaneously feeling concerned about the lack of expertise of these offshored CSC agents (equation 3).

These findings indicate how Japanese customers uniquely perceive offshore CSCs. Japanese customers are fully aware of the distance with offshored CSC agents but are forgiving about communication issues for foreign agents. When the Japanese customer's concern over their inquiry is mainly due to communication issues, the customer will try to support the agent in providing services smoothly without being prejudiced towards the offshored CSC. In short, Japanese customers seem to become co-creating partners with the call center agents in order to facilitate the service transaction, when their inquiry is generic and does not require expertise.

On the other hand, Japanese customers will consider the agent being a foreigner as irrelevant, when the customer's inquiry requires expertise. Japanese customers require these agents to have high expertise, regardless of whether the agents are foreign, when their inquiries are highly specialized (when the

customer is also comparatively knowledgeable). They expect these agents to be able to provide the highest quality service.

DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

Up until now, research on the services provided by offshore CSCs has proceeded on the basis of existing frameworks (consumer product ethnocentrism and service quality). In one of the studies that makes up this previous research (Thelen, Yoo, and Magnini 2011), the factors that compose consumer perceptions regarding offshored services were elicited through in-depth interviews and the development and verification of a method of measurement for these factors was conducted. However, as the research conducted by Thelen, Yoo, and Magnini (2011) took American consumers as its subjects, it may not be possible to generalize to customers from other countries and cultures. This paper has explored the constituent factors of perception held by Japanese customers, customers from a relatively more collectivistic culture, who are unexpectedly connected to offshore call service centers. These relationships have been organized in the form of conceptual models and propositions.

The research results of the first analysis in this paper represent a starting point into an examination of the perceptions of non-western consumers to offshored CSCs. The research results are not complete and going forward additional theoretical considerations will need to be added on the basis of the research results obtained here. For example, in examining directions for future theoretical developments, the following facts should be considered. Japanese customers, in contrast to U.S. customers, do not appear to be affected by concerns that offshoring will cause an expansion of domestic poverty as a result of the movement of jobs overseas (cf. Thelen, Yoo, and Magnini 2011).

What was characteristic to this paper's findings was that Japanese customers, while forgiving shortcomings of offshoring agents in a manner uncharacteristic of western customers, expected a high level of accuracy in the communication and a high level of expertise from the agent. Taken together, these results may indicate that Japanese customers are expecting a similarity to themselves, a 'Japanese-ness,' from the agents with whom they interact, including agents who are located offshore (Ito and Gehrt 2016). As a result, it is possible that the way Japanese customers evaluated the services they received when dealing directly with agents over the phone was based on references to this standard of 'Japanese-ness' (how similar the agent was to someone from the customer's culture).

Furthermore, the application of QCA which followed construction of the conceptual model, indicated the level of 'Japanese-ness' perceived by Japanese customers could be categorized into at least two extreme types. Japanese

customers have a 'lower' standard for Japanese-ness for more generic inquiries (in which the customer would be concerned over communication issues). As such, once a customer acknowledges the CSC agent as a foreigner, the customer works to support the agent and co-create an experience in order to receive the service they would have had if they had received it from a Japanese agent. On the other hand, Japanese customers tend to have a 'higher' standard for Japanese-ness when that customer is knowledgeable and has inquiries which require high expertise (where the customer would be concerned over the agents' expertise). In such cases, while the customer acknowledges the agent to be a non-Japanese, they still require a high level of expertise from the agent. The customer will treat the agent the same regardless of whether the agent is foreign or Japanese. The customer will not go easy on the foreign agent, but will treat the agent the same way as they would a Japanese agent. They seem to be evaluating the foreign agent on how closely they imagine a Japanese agent (with high expertise) would perform.

Finally, the act of 'going easy due to distance' of the offshore CSC agents, which was discovered in this paper, can play an important role in constructing a more detailed scale to measure the 'Japanese Customer Sentiment toward Offshored Call Service Centers'. Based on the findings of this study, it can be assumed that the Japanese customers are not a monolith. Rather, based on the degree to which Japanese customers are going easy on the CSC agents due to the distance, they may be divided into groups with different sentiments. Or, as the findings suggest, the same customer may feel differently depending on the issues at hand.

Future research could also examine the relationship between values and perceptions of offshored CSC outcomes. The similarities and differences between value-CSC outcomes for U.S. and Japanese subjects should be compared. Further, results from western samples besides the U.S. and non-western samples besides Japanese should be examined to provide added confidence to recommendations from this body of research.

There are also limitations to the methods used in this paper. Specifically, while the number of interview subjects was adequate for a qualitative study of this nature, future quantitative research should include research relying on large samples. This will be necessary to quantitatively test conceptual models and propositions derived from studies such as this.

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CYBERSECURITY INDICES AND CYBERCRIME ANNUAL LOSS AND ECONOMIC IMPACTS

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ABSTRACT

In recent years, cybersecurity and cybercrime have been the major issues and threats for financial institutions, governments, individuals, and other stakeholders globally. The threat comes in many ways, such as single acts or combination of discrete steps, software attacks, physical manipulations, and external or internal attacks inside and/or outside national digital network systems.

This paper uses the Information and Communications Technology (ICT) Development Index (IDI), the Global Cybersecurity Index (GCI), the National Cyber Security index (NCSI), and the ratio of the annual losses due to cybercrime for each country over the country's Gross National Income (ALDC) to explore the relationship between cyberattacks and the factors that can possibly be used to predict the impact of such attacks within supply chain domains. P-value results show the IDI as a relatively better predictor than GCI or NCSI. We provide recommendations and areas we are currently working on.

Key Words: Cybercrime, cybersecurity, economic losses, cybersecurity indexes

INTRODUCTION

According to the 2018 PwC's Global Economic Crime and Fraud Survey, the US organizations faced more financial losses in every category (from under \$50,000 to over \$100 million) due to fraud compared to their global counterparts (3).

Earlier studies on cybercrime and its economic impacts show isolated results on the main targets and victims. However, as the digital economy continues to grow with even higher emerging markets growth per year, it is imperative to look at cybersecurity as a supply chain concept and to assess the economic impact of cybercrime on larger number of stakeholders and affected elements within the supply chains. From the very beginning of the launch of the Internet, cybercrime and cybersecurity emerged as critical issues that seem to gain in importance and significance over time. Perhaps cybercrime can be defined broadly as any criminal activity in cyberspace. However, it's more specific definition remains evolving, due to ever-changing actions by cybercriminals. The 2017 Norton

Cyber Security Insights Report (1), indicates an increasing trend in cybercrime and resulting losses globally. According to the report and based on data from 20 countries with a total population of 3.2 billion, 978 million people were affected, and 44% of consumers were somehow impacted by cybercrime in 2017 alone. Moreover, 53% of consumers experienced cybercrime or knew someone who had. As stated in that report, consumers who were victims of cybercrime globally lost \$172 billion, which means, on average each victim lost \$142. Furthermore, the losses were not only financial.. The average cybercrime victim had to spend an average of 23.6 hours (or almost three full workdays) dealing with the aftermath.

The most common cybercrimes listed are hacking a device (53%), debit/credit card fraud (38%), compromised account passwords (34%), hacking email or social media accounts (34%), fraudulent online purchases (33%), and phishing scams (32%). The victims share certain attributes. They are usually early adopters of newer security techniques, such as security software, personal Virtual Private Network (VPN) technology and two-factor authentication, and are overconfident in their abilities to avoid becoming a cybercrime victim.

One puzzling finding of the 2017 Norton Cyber Security Insights Report (1) is that, while most consumers believe cybercrime is wrong and a criminal act, they also accept it to be a fact of life, and believe that stealing information online is not as bad as stealing 'real life' property. While these types of crimes appear to continuously affect consumers all over the world, an interesting and perhaps unexpected outcome of the report is that American consumers were in third place following China and Brazil in 2017 with a total loss of \$19.4 billion due to cybercrime. However, according to the 2018 PwC's Global Economic Crime and Fraud Survey, the US organizations faced more financial losses in every category (from under \$50,000 to over \$100 million) due to fraud compared to their global counterparts (3). The 2018 PwC's survey further states that in addition to the financial damage cybercrime caused to businesses other damages included: decline in employee morale, damaged business relations, and lost business reputation and brand strength usually following. Also, the survey indicated that US organizations lead in almost every type of fraud experienced compared to other global organizations (49% for US organizations versus 31% for other global organizations)

Moreover, another study in 2018 on Global Megatrends in Cybersecurity explored the cybersecurity ecosystem changes and trends identified by the senior information technology practitioners from the United States, that are likely to impact the security posture of their organizations (2). The study found that more IT administrators were pessimistic about their abilities to find the right type of personnel to protect their organization against cybercrime compared to 2015. The

biggest contributors to this negative trend were identified as lack of suitable technologies and inability to hire and retain expert staff.

The magnitude and significance of the economic impact of cybercrime and espionage was addressed in a 2013 report by the Center for Strategic and International Studies (4). It listed cybercrime as one of the malicious cyber activities that included loss of intellectual property, loss of sensitive business information, costs of service and employment disruptions, reduced trust for online activities, cost of securing and recovering information networks from cyber-attacks, and reputational damage. According to this report, the global cybercrime activities cost the global economy from \$300 billion to \$1 trillion, which is from 0.4% to 1.4% of the global GDP. For the US alone, criminal cybercrime activities costed from \$24 billion to \$120 billion or from 0.2% to 0.8% of the national GDP.

Today, US companies are spending a tremendous amount of money to protect themselves against cybercrime. The 2017 report on the Cost of Cybercrime by Accenture (5) shows that these organizations usually address nine security technologies, while overspending in five areas with negative value gap. The report criticizes the lack of enough investment in the breakthrough innovations with positive value gap. One of the security technologies identified by Accenture, is “Advanced Perimeter Control,” which has the highest percentage spend, and has one of the highest negative value gaps; whereas, in contrast, “Security Intelligence Systems and Advanced Identity and Access Governance” has the highest positive value gap and is receiving insufficient attention and funding. It turns out that, research areas such as: Cyber Analytics (CA), User and Entity Behavior Analytics (UEBA) and Automation, and Orchestration and Machine Learning, which have delivered the highest returns in generating effective cybercrime prevention innovations, are low investment areas for most organizations, indicating a misjudgment and misappropriation of funds to deal with cybercrimes.

The review of descriptive literature above clearly shows that cybercrime and security are global critical issues involving billions of dollars and with long-term effect on all organizations. The Ponemon Institute’s 2017 Cost of Data Breach Study showed it takes an average cost of \$2.4 million and an average of 50 days to address a typical malicious insider’s attack, and an average of 23 days to resolve a ransomware attack (6). It is important to recognize that cyberattacks are on the rise and cybersecurity is not simply a corporate concept any longer.

As the global digital networked economy continues to grow at an estimated 10% per year, with emerging markets growing between 12% and 25% per year, it is imperative to look at cybersecurity as an integral part of our ability to secure and protect our integrated value creating global supply chain networks (7). Simple basic solutions such as use of the complicated passwords, disabling access to data

when not needed, and not responding to phishing expeditions in short-term, and strategic initiatives such as training and hiring IT experts, expanding the CISO's role and responsibility, engaging in threat intelligence sharing, requiring frequent audits and assessments of security policies and procedures, hiring managed security service providers, and increasing investments in big data analytics and artificial intelligence are obviously needed. But more than ever, it is critical to develop predictive models that can help to explain and measure the relevance of specific factors and to forecast the level and the rise of cyberattacks. Consequently, this paper attempts to study and to identify the relationship between cyberattacks and the factors that can possibly be used to predict such attacks within supply chain domains.

METHODOLOGY AND RELEVANT VARIABLES

Cohen and Felson's "routine activity theory" suggests crimes can occur when three elements converge (8). They include a motivated offender, a suitable target, and an absence of a capable protector to prevent the commitment of the crime. Obviously, in a global context with complex digital networked integrated supply chains, there is no shortage of offenders given we have plenty of individuals and global organizations possessing valuable financial and informational assets that represent suitable targets. It seems very difficult, if not impossible, to address the first two elements contributing to cybercrime effectively i.e., (1) motivated offender, and (2) a suitable target.

Given the role complex digital networked integrated supply chains play in contributing to the wealth of national states and its citizens, there is therefore need for the coordination and cooperation among governmental, private entities, citizens, and all stakeholders to serve as capable custodians of national digital networks against cybercriminals. There is therefore a compelling national interest to address cybercrime and create a responsive, resilient digital network infrastructure when cybercrime occurs. According to the ITU Global Cybersecurity 2018 Publication, cooperation should span "law enforcement, justice departments, educational institutions, ministries, private sector operators, developers of technology, public private partnerships, and intra-state cooperation considering the long-term aim to increase efforts in the adoption and integration of cybersecurity on a global scale". (15)

Next, we discuss three main index indicators considered the most viable measuring mechanisms for facilitating the coordination and cooperation among all stakeholders. They are namely, the: (a) Global Cybersecurity Index (GCI), (b) Information and Communications Technology (ICT) Development Index (IDI), and (c) National Cyber Security index (NCSI).

THE GLOBAL CYBERSECURITY INDEX (GCI)

The International Telecommunication Union's (ITU) Global Cybersecurity Index (GCI) is a composite index of 25 indicators that monitor and compare the level of the cybersecurity commitment of countries with regard to the five pillars of the Global Cybersecurity Agenda (GCA) (9). ITU's mission is to create synergies between current and future concerns, and to encourage international cooperation among the stakeholders. GCA's five pillars form the basis of GCI and include legal, technical, organizational, capacity building and cooperation aspects of national cybersecurity cultures of different countries. The GCIs published annually in Switzerland for over 170 countries are perhaps, the most comprehensive measures of cybersecurity commitment of countries compared to many other measures that are published by corporations such as Dell, Microsoft, Accenture or the Kaspersky Lab. GCI, is perhaps the most comprehensive measure of how specific governmental institutions and private organizations create the required synergy to address cybercrime.

THE INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) DEVELOPMENT INDEX (IDI)

A search of research studies indicates that Information and Communications Technology (ICT) can contribute at least 4 percent GDP growth to G20 countries (10). Thus, Cyber insecurity can make significant dent to ICT's GDP contribution. ITU's ICT Development Index (IDI) could also be a relevant factor in studying cybercrime (11). It conceptually measures a country's evolution to becoming an information society by evaluating a nation's network infrastructure, level of ICT use in the society, and its ICT efficiency and effectiveness.

THE NATIONAL CYBER SECURITY INDEX (NCSI)

A third and relevant cybersecurity index is the National Cyber Security index (NCSI) which is published by E-Governance Academy on annual basis for 100 countries (12). NCSI relies on four aspects to measure the effectiveness of cybersecurity efforts. They include the legislation and regulations in place, existence of relevant organizations and departments, the format of the cooperation among the cybersecurity entities, and resulting outcomes such as new policies and technologies.

Every one of these indexes has certain advantages and disadvantages. The five pillars of GCI and the four aspects of NCSI exhibit some conceptual similarities, such as their emphasis on legal, organizational (established units), and inter-organizational cooperation, and exclusively concentrate on the cybersecurity capabilities of individual countries. IDI's measurements, on the other hand, are quite holistic and are concerned with the evolution of the information knowledge,

the level of information proficiency in public, and the effectiveness and efficiency of information technology in each country. While IDI is not exclusively measuring the effectiveness of cybersecurity efforts in specific countries, it takes into account the impact of human factors such as citizen skillsets and usage, which could represent a missed concern among the pillars of GCI and the aspects of NCSI.

Given the availability of these three metrics and many other relevant variables, the main question is whether any of them can explain the annual losses faced by victim countries due to cybercrime. In order to shed light on this concern, this study uses regression analysis to explore the relationship between IDI, NCSI, GCI, and the cybercrime losses.

The ratio of the annual losses due to cybercrime for each country over the country's GNI (Gross National Income), ALDC hereafter, is used as the dependent variable in this study. The data for the cybercrime losses for 2017 were collected from Statista (13). There are obviously many sources for the GNI data for each country. The 2017 GNI data were collected from UTI (14).

The main explanatory variables for this study were identified as GCI, IDI, and NCSI as mentioned previously. The source of data for these variables were the E-Governance Academy and ITU (12 and 13). The other relevant independent variables included mean years of schooling of the country population, and internet bandwidth per Internet user in each country. Data for these variables were also available on ITU site. The hypotheses for including these variables was that, the higher the level of population education, the lower the impact and losses due to cybercrime; while the higher the internet bandwidth, the higher the possibility of cybercrime and its associated losses.

FINDINGS AND CONCLUSIONS

This study performed multiple and simple regression analysis for the aforementioned dependent and independent variables. The results of studying the collective impact of all independent variables (GCI, IDI, and NCSI) on the dependent variable ALDC was not substantial due to the high level of multi-collinearity and auto-regression problems. However, the results of simple regressions assessing the impacts of each independent variable on the dependent variable were noticeable as shown in Table 1.

As expected, all three main independent variables affect ALDC negatively, meaning that higher the value of GCI, IDI, or NCSI, the lower would be the value of ALDC. The other independent variables were found to be insignificant and are not reported here. As shown in Table 1, and based on the R² and the P-value results, the second model is much better in explaining the ratio of the annual losses due to cybercrime for each country over the country's GNI, and the relationship

between ALDC and IDI is very significant (the P-Value for the significance of IDI is 0.002809).

Table 1 – Regression Models

Dependent Variable	Independent Variable	Coefficient/P-value	R²
ALDC	GCI	-0.01151/0.062107	0.189994
ALDC	IDI	-0.00134/0.002809	0.417301
ALDC	NCSI	-0.00011/0.013677	0.324029

The other two potential independent variables, the level of population education and the internet bandwidth did not show any significance influence over ALDC. Moreover, when these two variables were used in multiple regression models with either GCI, IDI, or NCSI, they did not prove to be significant or improve the adjusted R2 of the single regression models.

The results show that IDI has a significant relationship with ALDC and explains the changes in ALDC better than the other two variables. Even though only 42% of variations in ALDC can be due to variations in IDI, this percentage is higher than any other variable under consideration.

AREAS FOR FURTHER STUDY

It is interesting to see that empirical evidence suggests indices which are designed for measuring the impact of global or national cybersecurity efforts are not as significantly related to the losses due to cybercrime as is an index that measures the stage of deployment of information and communication technology in different countries.

The data for this study contains only 19 countries that are listed in Table 2. A more comprehensive study, which includes all countries, is needed to reexamine the results obtained here. Moreover, the results of this study suggest the need for further analysis and evaluation of GCI and NCSI in explaining changes in ALDC, and perhaps the need for some modification of these indices and their components. Additional contributing indices could also be investigated including the: Human Development Index, Global Talent Development Index, and the Global Network Readiness Index (16).

Moreover, it is also necessary to investigate the relationship between lower level sub-indices and ALDC. For example, in the IDI-skills sub-index may well contribute to a higher value gap to avoiding ALDC than the IDI-access sub-index or IDI usage-sub-index. Similarly, as shown in Table 2, the sub-indices of the five pillars of the GCI (legal, technical, organization, capacity building, and

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cooperation) could provide a higher value gap individually rather than when considered in aggregate.

Table 2 – GCI and IDI for Countries

Country	GCI	IDI	NCSI
Australia	0.824	8.24	55.84
Brazil	0.593	6.12	29.87
Canada	0.818	7.77	57.14
China	0.624	5.60	38.96
France	0.819	8.24	83.12
Germany	0.679	8.39	81.95
India	0.683	3.03	50.65
Indonesia	0.424	4.85	19.48
Italy	0.626	7.04	64.94
Japan	0.786	8.43	66.23
Mexico	0.660	5.16	36.36
Netherlands	0.760	8.49	66.23
New Zealand	0.718	8.33	51.95
Singapore	0.925	8.05	57.14
Spain	0.718	7.79	77.92
Sweden	0.733	8.41	61.04
UAE	0.566	7.21	---
UK	0.783	8.65	75.32
United States	0.919	8.18	64.94

Sources: (9), (11), and (12)

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DIGITAL MARKETING – A NOVEL SEQUENTIAL APPROACH USING KNOWLEDGE DIGRAPH CONTRIBUTION

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ABSTRACT

Internet access and globalization offers new opportunities for business and marketing. The worldwide growth of social media has been phenomenal. While such growth enables businesses to access new demographics, avail online marketing and e-commerce opportunities, it also invites challenges from competitors serving the same markets. It thus, minimizes the overall impact of digital opportunities. Moreover, there is a shifting opinion in literature insisting discernment of true underlying patterns when studying effects, which are better served in applying sophisticated analyses not addressed by the classical methods. Such novel methods adapt relevant dynamics in unravelling sequential patterns and offering new perspectives which are not easily available using classical methods. This article is to describe one such digital marketing effort by an organization based in the United States. The main objective was to identify what online formats would be best for digital marketing in order to better control and engage customers, while minimizing the influence of competing marketing messages. For this effort, three distinct and psychologically-valid online formats were developed to record sequential online behaviors. The online formats were meticulously designed based upon sound findings from the psychological and hypermedia domains of literature. The fine grained analyses using the sophisticated categorical time series model called, Knowledge Digraph Contribution (KDC), was conducted in unravelling dynamic online traversal and recall patterns. Although limited, however, finding highlights the appropriation of semantic-based online formats for digital marketing campaigns for better positioning and customer engagement in a highly competitive and platform rich e-world.

Keywords: Digital Marketing, Online Formats, Semantic based, Artificial Neural Network, Online Patterns, Knowledge Digraph Contribution

INTRODUCTION

With the evolution and wide access to internet, the organizations are not restricted to an area, market, country or demographics when marketing their products. With the growth of online or social media marketing, although the reach is broad, the marketing impact is abysmal. This is due to incessant marketing messages received from competitors competing for the limited

attention span of the target audience (Bauer et al., 2005; Rosengren, 2008). Moreover, given the competing and changing online dynamics associated with the digital marketing, organizations find themselves to be at the edge in finding new ways in quickly reaching customers, while also minimizing the potential reach of competitors (Ames, 2019; Teixeira, 2014; Hoch et al, 1986). Online behavior, user engagement and control, including certain online web presentation formats have shown promising results in knowledge transfer, learning and retaining the attention of online participants (Liu et al., 2012; Bodapati, 2008; Ismaili, 2012; Ismaili, 2015; Ismaili, 2017). Moreover, by necessity, there is an increased recognition in utilizing sophisticated tools accounting for complex interplay of behaviors, otherwise missed in classical analyses (Chandy et al. 2001; Ismaili & Golden, 2008a & 2008b; Golden, 1994). Hence, to accomplish goals for finding best online formats in effectively reaching the potential customers on one hand, while curbing the footprint of competing digital marketing strategies on the other, a niche organization with offshore presence, asked its home-based employees and offshore consultants to participate in the exercise discussed in this article. The main objective for such exercise, on one hand, was to discern best online formats for digital marketing in order to better manage, control and engage target demographics, while minimizing the competing marketing messages on the other. The findings based on the online sequential traversal and recall patterns using categorical time series modelling tool, KDC, are presented in this article.

LITERATURE REVIEW

An overview of literature from the domains of marketing, psychology and hypermedia, together with the application of KDC are discussed in this section.

Today, marketing is not limited to traditional or discrete forms of marketing. In their work, Kanuri, Chen & Sridhar (2018) cited impressive digital engagement numbers from various sources. According to them, in 2016, more than 1.8 billion users worldwide spent an average of 118 minutes a day on social media and 77% were actively engaged on social media platforms. This impressive trend and penetration rate continues to grow yearly. In 2019, the overall Internet user count leaped to 4.388 billion, while the total number of social media users swelled to 3.484 billion, up 9% from the previous year (Global Digital Report, 2019). With the removal of barriers, due to globalization and rapid implementation of technology infrastructure, businesses are easily able to extend their marketing arm in enticing global customers (Friedman, 2000; Porter 2008; Eddy 2014). Marketers are quick to realize the potential of digital marketing by developing persuasive messages, encouraging interactions and building two-way relationships across a wide spectrum of worldwide markets (Johansson, 2017; Bauer et al., 2005; Chu, 2011). In his interview with Nobel (2014), Misiek Piskorski, an author exploring

social media marketing tactics, highlighted the need for '*quid pro quo*' as the new core of social marketing strategy. According to Piskorski, the organization must first engage and facilitate customer interactions, and then ask them to return the favor, which may take different forms, such as, for e.g., active engagement with the brand and establishing positive relationships (Lipsman et al., 2012; Tenbult et al., 2008; Liu et al., 2012; Berger and Milkman 2012). Customers can be easily engaged by availing insights and analytics readily available on social media digital platforms. Online marketing messages can now be personalized in an effort to target potential market with customer-centric experiences, based on their lifestyles, attitude, preference and psychographics (Nairn & Berthon, 2003; Tenbult et al., 2008; Lin, 2002).

This ease of customer-centric and personalized digital experience is not without its costs, though. Given the afforded flexibility and penetrating power of digital advertising, the landscape of online marketing is overcrowded with a variety of competing products and messages (Al Shuaili, 2016; Teixeira, 2014; He et al, 2013). This multiplicity and ferocity of competing messages, all bombarded at a dizzying pace, creates an overwhelming sense of obfuscation in customer's mind, consequently leading to annoyance, ad-avoidance, distrust and lack of memory (Al Shuaili, 2016; Teixeira, 2014; Ha and McCann, 2008; Hasher, Lustig & Zacks, 2007). Moreover, for organizations, rapid deployments of technology with shifting user preferences of competing social media platforms is a grave concern. For e.g., Facebook, once prime and preferred platform to target potential customers, seems to be lagging behind Twitter due to shifting user preferences. On one hand, Facebook's popularity in certain demographics are declining, however, on the other hand, Snapchat and Instagram are showing significant growth in all demographics (Lipsman et al., 2012; Lin, 2002). Such shifting preferences requires not only flexibility within organizations to adapt, but it also necessitates high rolling budgets to quickly meet the changing needs, all while striving to maintain a healthy profit line. According to Teixeira (2014), the cost for retaining customer attention has been steadily rising and have surpassing the inflation rate. She states that in 2014, while the cost to reach customers was \$25 during prime time and \$30 during Super Bowl, the inflation rate was \$14, at least \$11 lower than marketing cost. To further exacerbate the issue of the organization's bottom line, while the cost and competition is high, the savvy customers naturally seek out cheaper and better options. Their demands are readily met by online businesses offering daily deals, coupons and rebates. In sum, the digital marketing in all interconnected e-world has been a struggle for organizations in maintaining a fine balance between being profitable and customer-centric.

Psychologically, when customers are bombarded with incessant digital advertising, they are bound to feel overwhelmed and will not be able to process intended messages due deficient working memory (Hasher et al, 2007). Interestingly, in this vein, Cho (2018) favors Dual-process theory, requiring both heuristic and systematic processing mechanism for better comprehension. Heuristic processing requires fewer cognitive resources while systematic

processing requires extensive use of cognitive resources for deeper reflections; both are needed for complete understanding of intended messages. Moreover, unlike traditional linear text, customers in online platforms have more control, flexibility to navigate, and engage in activities that better fit their lifestyles (Barua, 2001; Chen, 2002). However, given the limited availability of psychological resources, this added control and flexibility is known to result in a 'cognitive overhead' (Conklin, 1987) or 'cognitive overload' (Sweller et al, 1990). Researchers have argued that such overload can be mitigated by providing structural aid to the users, based on the semantic coherence embedded within the message. Along these lines, Eveland and Dunwoody (2001) and Dee-Lucas Larkin (1995) found that structural aids (presentation formats) were useful in reducing disorientation and in improving the comprehension of the messages. In addition, such presentation formats were also helpful in recalling key messages by the participants (Britt, Rouet & Perfetti, 1996). Furthermore, converging evidence from discourse literature indicates that readers form various semantic-based mental models while processing text which are later inferred for better comprehension of the text. Moreover, memory performance of recalled text or messages with multiple semantic connections in the mental-models are significantly higher than the ones with less or no semantic connections. Such mental models can be visualized graphically, depicting semantic interconnections between presented messages (or nodes) that guides the reader's overall comprehension process (for e.g., see, Graesser & Clark, 1985; Trabasso & van den Broek, 1985; Graesser et. al., 2001; Golden, 1994). In this vein, Ismaili (2008, 2012, 2015 & 2017) and, Ismaili and Golden (2008a) have shown that providing such graphical depiction of mental models (or presentation formats) can either distort or significantly boost overall comprehension process in online web environments.

In their above listed work, Ismaili and Golden (2008a) and Ismaili (2009a, 2009b, 2012, 2015 & 2017) applied the multinomial categorical time series analysis, an ANN (Artificial Neural Network) interpretation called KDC (Knowledge Digraph Contribution), for studying sequential online traversal and summary patterns. Their findings based on KDC offered new perspectives in observing the phenomenon, not available using classical analyses. True, in order to discern complex interactions between factors, there is an increased call to apply sophisticated tools that go beyond the static observations of classical findings (Kanuri et al, 2018; Ismaili & Golden, 2008a & 2008b; Jaynes & Golden, 2003). Christian (2018) in his effort to conduct fine grained comparative analyses in predicting registration of new businesses in Congo, found that the predictive patterns discerned by the ANN tool was comparatively better and closer to the recorded facts. Hence, signifying the value in applying novel methods for unravelling complex phenomena, as was the case reported in this article.

SITUATIONAL CONTEXT

For the sake of transparency and conflict of interest, this author declares that of this article describes analyses that were provided as a free service, for a US-based organization on voluntary basis. These services were performed under a non-disclosure agreement (NDA). In return, the organization allows the findings to be published under strict anonymity. The scope and discussed items in this article are within the agreement and provides full protection to the organization.

The host organization based in the United States has offshore presence. The author of this article was consulted with the content and meticulous design of the psychologically-valid online presentation formats. There were three separate online content: Content-1, Content-2 and the Control content for this particular exercise. Content-1 and Content-2 are the confidential marketing content of two niche products that the organization is planning to pilot. Control content, 'Psychology' was provided by this author as the control condition of the content design to organization for this exercise (for more, see, Ismaili, 2012; Ismaili & Golden, 2008b; Ismaili, 2009a & 2009b). Although discussion of the control condition is beyond the scope of this article, it has been included for comparative reasons.

This author was not involved in the implementation and the data collection process for this exercise. The traversal and recall data were collected from the workforce at one of the offshore location and the employees based in the United States. The author received de-identified data samples for analyses using KDC which are reported in this article.

The organization in question is ready to make a bold strategic move by stepping away from competing and cluttered social media space of digital marketing. Not only is the online marketing expensive to reach potential customers, but customers also fails to engage and receives distorted messages due to dizzying pace of competing advertising. In their effort to control and better understand how psychologically-valid online formats may help, the organization went through the discussed exercise in this article. Their ultimate goal was to find cognitively-friendly online formats that are best suited for transmitting direct messages without distortions due to psychological-overload.

METHODOLOGY

For this effort, employees from the home organization based in the United States and the workforce of one offshore location were invited to anonymously participate. Although English is considered a second language of the offshore workforce, the command of the English language is deemed adequate for this exercise.

An email was sent to all home and offshore personnel requesting their anonymous participating within 15 days. All participants were guaranteed complete confidentiality as they were not identified. An emailed link, once clicked,

generated a random User ID to access the online exercise within 24 hours. The participation rate was around 89%. No personal information was collected.

Once logged into the system, each participant were presented with all three content, i.e., Content-1 (Product 1 Marketing), Content-2 (Product 2 Marketing) and a Control Content (Psychology). All participants were also presented with three meticulously designed web presentation formats that were used as navigation pad for this exercise. The three presentation formats were, Semantic-based, Fully-Meshed and a static Linear-like control format (See Figure 1 & Table 1 for more). Semantic-based format allowed traversal between web-pages that were semantically connected. In contrast, Fully-Meshed environment offered full freedom in traversing as workforce wished. This exercise was counter-balanced, all participants saw all three content and all three online web presentation formats. Content-1 and Content-2 were presented either using Semantic-based format or Fully-Meshed presentation format. However, the Control content (Psychology) was always presented in the middle order and only using the static Linear-like navigation format. Each presentation format had a navigation map on the left hand side for navigating between web pages. The navigation pad for the control Psychology condition was not clickable, except for 'I am Done' button; participants can only navigate reading Psychology content organized in paragraphs by scrolling up and/or down.

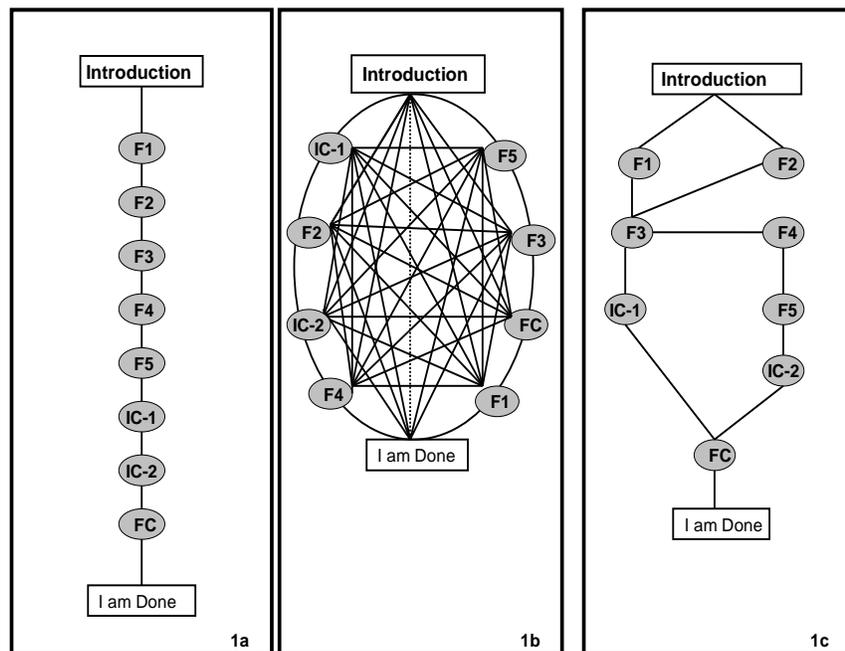


Figure 1. Three navigation maps of the web presentation format for the marketing exercise. Content node assignments (i.e., F1, IC-1, FC etc.) for each of the three web presentation formats are shown, but were not visible to the participants. In

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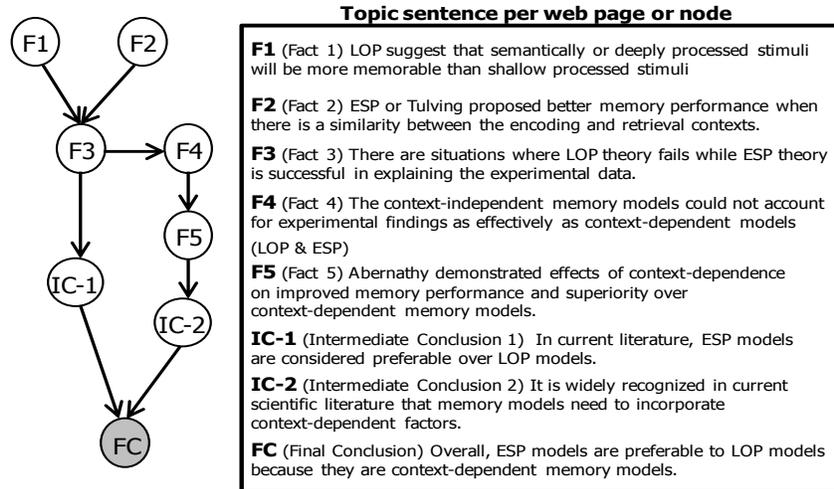
the Linear-like presentation format (Figure 1a), the navigation map was not clickable, except for the 'I am Done' button. Figure 1a depicts the top-down reading order from Fact node 1 (F1) to Final Conclusion (FC) node by scrolling up and/or down. For the Fully-Meshed web environment (Figure 1b), the nodes were arranged randomly, however in a way that the node arrangement did not follow the Linear-like or Semantic-based node structures, when the nodes were traversed either in the clockwise or counter-clockwise directions. Workforce had full freedom to change or traverse any path as they liked in the fully-mesh condition. Figure 1c depicts the node arrangement for the semantic-based online environment where only semantically related web pages are interconnected, according to the Semantic content design as shown in Table 1 and Figure 2. Notice that the participants only saw the 'Introduction' and 'I am Done' labels on the navigation map for all three web environments, and not the other node labels as shown as grey buttons in this depiction. Figure 1a, Figure 1b and Figure 1c are adapted from Ismaili, P.B. (2012) and, Ismaili, P. B. & Golden, R.M. (2008a). Conference proceedings, University of Cantabria, Santander, Spain. Can expertise be discerned from traversal behavior in a content designed hypertext (web) environment? In the Proceedings of *the 8th WSEAS International Conference on Distance Learning and Web Engineering*. Santander, Spain. 202-206.

All presentation formats began with instructions and ended when participant clicked the 'I am Done' button. Once the 'I am Done' button is clicked, the participants were asked to recall main ideas presented in the read content. The participant's memory recall were saved and the traversal patterns were recorded in the background for KDC sequential analyses.

Each web format consisted of ten web pages. Each website consisted of five fact topic nodes (discussing two distinct threads), two intermediate conclusions (each summarizing two threads), and a conclusion node (summarizing both intermediate conclusions) represented as separate web pages. The psychologically valid semantic-based presentation format was meticulously designed for this exercise.

See Figure 2 for the overview of overall semantic-based structure followed by table 1 for a sample of Semantic-based content design process for the control Psychology text. Figure 2 (below).The Semantic-based model specifying how the topic sentence associated with a web page (for eight distinct web pages) "logically supports" another topic sentence associated with another web page, all while being on the same web site (the beginning web page and ending web page are not shown in the depiction). The exercise attempted to maintain the same number of web nodes and the same semantic connectivity across all content, including the confidential marketing Content-1 and Content-2 for Product 1 and Product 2 respectively. The semantic relation between $A \rightarrow B$ implies that topic sentence 'A' provides logical semantic support for the topic sentence 'B'. All three web formats

contained 5 fact nodes, 2 intermediate conclusion nodes and a final conclusion node. The four key nodes (F3, IC-1, IC-2 & FC) are deemed semantically important due to greater number of semantic connections. Adapted from Ismaili, P. B. (2012). *Effects of Expertise and Hypertext Presentation Formats on Dynamic Mental Models Using Both Classical and Novel Statistical Sequential Analyses* (Unpublished doctoral dissertation). University of Texas at Dallas, TX USA.



Nodes	Psychology Web page Text	Preceding Semantic Associations	Topic Sentence
Fact 1 (F1)	Craik and Lockhart proposed that stimuli subjected to semantically processed stimuli (“deeply processed stimuli”) will be more memorable than perceptually processed stimuli (“shallow processed stimuli”). In other words, memory performance is dependent on the “levels of processing” (LOP): Stimuli processed at deeper levels are more effectively recalled.	N/A	LOP suggest that semantically or deeply processed stimuli will be more memorable than shallow processed stimuli
Fact 2 (F2)	Tulving proposed that memory performance increases as the similarity between encoding and retrieval contexts increases. This principle has been referred to as Tulving’s Encoding Specificity Principle (ESP) because it specifies how encoding conditions interact with retrieval conditions to influence memory performance.	Not Applicable	ESP/Tulving proposed better memory performance when there is a similarity between the encoding and retrieval contexts
Fact 3 (F3)	Although many scientific studies have reported experimental results supporting both LOP and ESP, some research has identified situations where LOP theory fails while ESP theory is successful. For example, “shallow” rhyming encoding strategies are highly effective learning strategies when retrieval cues are also rhyme-oriented.	Fact 1 and Fact 2	There are situations where LOP theory fails while ESP theory is successful in explaining the experimental data.

Intermediate Concept 1 (IC-1)	In the current scientific literature, many cognitive scientists tend to agree that the Encoding Specificity Principle (ESP) provides a more comprehensive explanation of experimental findings as well as a more theoretically satisfying model of memory phenomena relative to Levels of Processing (LOP) theory. Accordingly, ESP models are considered preferable over LOP models.	Fact 3	In current literature, ESP models are considered preferable over LOP models.
Intermediate Concept 2 (IC-2)	In the current scientific literature, many cognitive scientists now agree that it is important to include context-dependent factors in memory models in order to provide adequate explanations of empirical phenomena. It is now widely recognized that memory models need to incorporate context-dependent factors.	Fact 5	It is widely recognized in current scientific literature that memory models need to incorporate context-dependent factors.
Final Concept (FC)	In summary, ESP models are preferable to LOP models because they incorporate interactions between encoding and retrieval factors. Therefore, ESP models are context-dependent memory models which emphasize that memory performance is specific to the environment in which it is embedded.	IC-1 and IC-2	Overall, ESP models are preferable to LOP models because they are context-dependent memory models.

Table 1. A sample of Semantic-based content design for the Psychology text. Psychology content column is an adaptation of Table 1 from Ismaili, P.B. (2012) and Ismaili, P. B. (2009a). Conference proceedings, University of Cambridge, Cambridge, United Kingdom. Any Identifiable Structures from Traversal Behavior in Hypertext Environment? *Proceedings of the 8th WSEAS International Conference on Artificial Intelligence, Knowledge Engineering and Data Bases. Cambridge, UK. 429-434.*

RESULTS AND DISCUSSIONS

As stated only KDC categorical time-series analyses of collected traversal and recall data is considered within the scope of this article.

Recall that three KDC models, each representing one of the three formats were developed for analyses. The three associated beta weights β_{linear} , β_{semantic} and β_{Mesh} represented the Linear-like (control), Semantic-based and Fully-Meshed formats, respectively. Although interesting and depicted in the figures, however, Linear-like (control) condition is not discussed in this paper. All reported results reached significance at $p \leq 0.05$ or lower.

From KDC sequential analyses, it is evident that there are effects of web presentation formats. Interestingly, between the two experimented presentation formats (fully-meshed, semantic-based), the semantic-based format is best for both traversal and memory recall.

It is clear that the larger values of the KDC Fully-Meshed beta weight for traversal data indicates that participants are generating random navigation patterns. As expected, Figure 3a shows that the fully-meshed beta weight was largest in the mesh presentation format condition. Furthermore, both offshore and home employees exhibited highly random traversal behavior. Similarly, random recall pattern was also evident for the memory task for both offshore and home employees (see Figure 3b below).

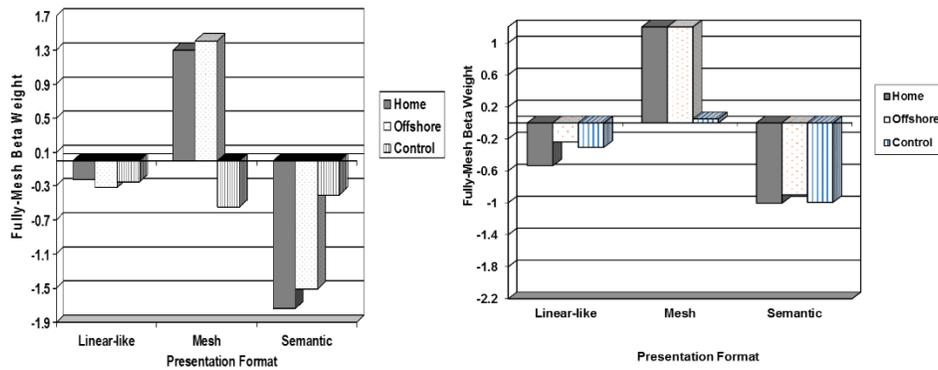


Figure 3a & 3b. Side by side KDC fully-meshed Digraph contribution for participants’ traversal and summary patterns. The traversal pattern depiction is on the left and recall pattern is depicted on the right. As expected there are qualitative similarities and effects of presentation format on memory recall patterns.

Similar to the fully-meshed condition, there are effects of presentation format on both traversal and recall patterns (See Figure 4a & 4b for traversal and recall patterns respectively). However, the large semantic-based beta weight indicates efficient traversal patterns, moving between the semantically connected nodes. Moreover, the memory recall pattern exhibit semantic-based node recall with no pronounced random patterns as they were evident in the fully-meshed condition.

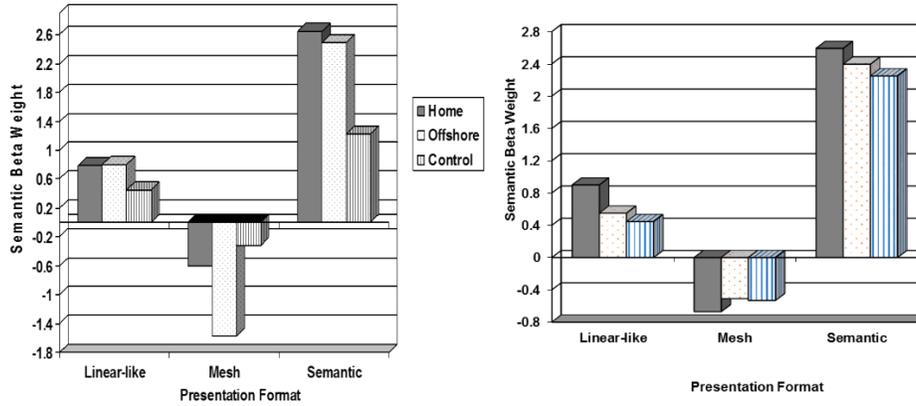


Figure 4a & 4b. Side by side KDC Semantic-based Digraph contribution for participants' traversal and summary patterns. The traversal pattern depiction is on the left and recall pattern is depicted on the right. As expected there are qualitative similarities and effects of presentation format on memory recall patterns. The order of recall and traversal behaviors are not random.

Finally, as expected the recalled memory of important nodes with most semantic-connections (IC-1, IC-2 and FC) are best in the semantic-based presentation format and worst in the fully-meshed web format. See Figure 5a & 5b for semantic-based and fully-meshed patterns, respectively.

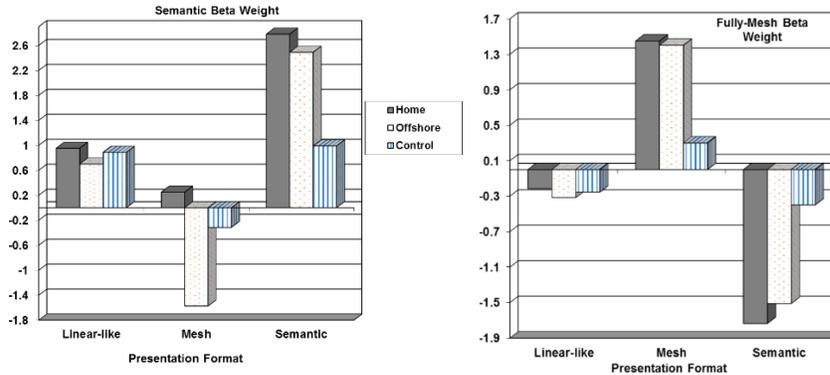


Figure 5a & 5b. Side by side comparison of semantic-based order recall versus fully-meshed recall patterns. Most important semantically-connected nodes are better recalled in the semantic-based condition compared with the fully-meshed condition. From the beta weight, the order of most important nodes is random for the fully-Mesh condition.

The Knowledge Digraph Contribution (KDC) analyses provided fine grained insights in discerning underlying online behavior patterns that may not be unraveled using classical analyses. First, the categorical time-series KDC analysis

indicated clear effects of presentation formats on traversal and recall patterns. Second, as expected, the traversal and recall patterns were efficient and semantically organized in the semantic-based format while random and erratic in the mesh presentation format condition. These findings are consistent with Ismaili (2009a & 2009b; 2012; 2015 & 2017), Ismaili & Golden (2008a & 2008b; also see, Graesser & Clark, 1985; Trabasso & Van den Broek, 1985; Rumelhart, 1977), indicating that messages that are semantically interconnected are remembered and better recalled. Moreover, while fully-meshed format exacerbates, the semantically designed web formats minimize cognitive overload, in contrast. As a result, it allows for better memory of important messages. In this vein, the concepts of dual-theory explored by Cho (2018) can plausibly be tested to verify whether deeper 'systematic' processing is possible in the presence of high cognitive overload while conducting 'heuristic' processing. Perhaps, the fully-meshed web format is exacting on cognitive resources for *heuristic* processing to not allow deeper *systematic* processing of marketing messages due to cognitive exhaustion.

Overall, the findings from this exercise are consistent with previous efforts by host in transferring knowledge, organizational e-policies and procedure to its offshore workforce. The successful organizational learning occurred when using the semantic-based web formats (Ismaili, 2015 & 2017). It seems reasonable to assume that semantic-based formats enhance memory performance while minimizing the perceived cognitive load associated with it. This author strongly recommended embedding key marketing messages within the framework of multiple semantic interconnections. Furthermore, development and appropriation of semantic-based web formats was recommended in order for the host organization to better engage, control and target potential demographics with direct marketing efforts. It is hoped that this exercise will strategically help organization in getting out of, what they refer to as "*the rat race!*"

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ANTIBIOTIC SUPPLY CHAIN DISRUPTION: RISK INSIGHTS FROM AN OUTSOURCING PERSPECTIVE

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ABSTRACT

The antibiotic supply chain (ASC)-dependent operational excellence is essential to human health. This paper first details the overview, impact, and underlying causes of a fragile ASC, and the generic ASC management from an outsourcing viewpoint. Empirical evidence reveals that the ASC is plagued by multiple issues such as cost pressure, maintaining profitability, rising and unforeseeable demands, intensified regulatory scrutiny, natural disasters, availability of raw materials and manufacturing challenges, reverse logistics (recall and expiration), growing counterfeits, technological crisis, geopolitical instability, heterogeneous segments, and global connectivity. These disruptive dimensions spread antibiotic resistance (AR) that threatens global health and safety. The literature suggests a multi-modal supply chain (SC) strategy centered on building culture, technology, education/awareness, supplier relationship management, and the concurrent integration of planning at the governance and individual ASC levels. In essence, we must create an accurate forecast of the entire ASC and integrate the varied and different segments in a structured and flexible way.

Keywords: Antibiotic Supply Chain (ASC), antibiotics shortage, culture, technology, education/awareness, governmental coordination

INTRODUCTION

Enhancing patient safety and transforming hospitals to be safer and smarter is crucial. Frontline healthcare providers, service line leaders, and hospital/supply chain administrators concur that an effective supply chain management (SCM) ensures better care quality and patient safety, and thus, the long-term survival and sustainability of the health organizations (Chopra & Meindl, 2000; Cardinal Health, 2017).

This paper sets out to discuss the antibiotics supply chain (ASC) issue with a focus on outsourcing. The rationale for discussing this issue is two-fold. First, hospital-acquired infections (HAIs) and the antimicrobial resistance significantly burdens healthcare worldwide. HAIs are one of the top 10 causes of death in the US (Agency for Healthcare Research and Quality, 2018). A CDC multistate public health prevalence survey showed that 4% of inpatients in 183 U.S. acute care

hospitals have at least one HAI (Magill et al., 2014). More importantly, a federal report estimated that the annual total economic burden including direct, indirect (lost to productivity), and nonmedical (societal) costs arising from HAIs could range at a colossal cost of around \$96 to \$147 billion (Marchetti & Rossiter, 2013). Second, antibiotics are one of the most prescribed drugs globally. Particularly, the US antibiotic consumption was about 3.3 billion defined daily doses (DDD) between the period 2000 and 2015.

AN OVERVIEW OF FRAGILE ANTIBIOTIC SUPPLY CHAIN AND WHAT IT MEANS

An inadequate and inappropriate production and supply of antibiotics or its active pharmaceutical ingredient (API) can impair the health system by treatment failure, delayed medical/interventional procedures, and an unsuitable and/or ineffective alternative substitution (trigger for medication errors, misuse, and proliferative usage). All these culminate in adverse drug reactions and protraction of infection (Issac, 2001; Stone, 2018). The associated treatment and economic burden may drive patients to lose trust in the system. Consequently, the patients drop out of their treatment course and endanger their own safety. A revealing study reported that over 20% of the systemic antibiotics marketed in the USA were in short supply on June 1, 2011. Manufacturing and raw materials-related issues accounted for 50% of those shortages (Balkhi et al., 2013).

COUNTERFEITING AND SHORTAGE – DEADLY DUO

Counterfeiting (that has no active ingredient plus or minus harmful ingredient, and/or plus or minus wrong drug/concentration) often intertwines with a shortage. An erratic antibiotic supply and shortage can provoke the entry of counterfeits into the market. Given their high probability to fail quality standards, the counterfeit meds can precipitate the shortage issue by being discovered in random quality checks. Figure 1 revealed an approximately twofold increase in the counterfeiting incidents in the last 5 years with about 10% being anti-infectives (The Pharmaceutical Security Institute [PSI], n.d. a & b). Antibiotics are the most counterfeited medicines. It accounted for 17% of global counterfeit medicines (Delepierre, Gayot, & Carpentier, 2012; World Health Organization, 2017). A lack of consistent, standardized, transnational and harmonized anti-counterfeiting pharmacovigilance fuels this further (Mackey, Liang, York, & Kubic, 2015).

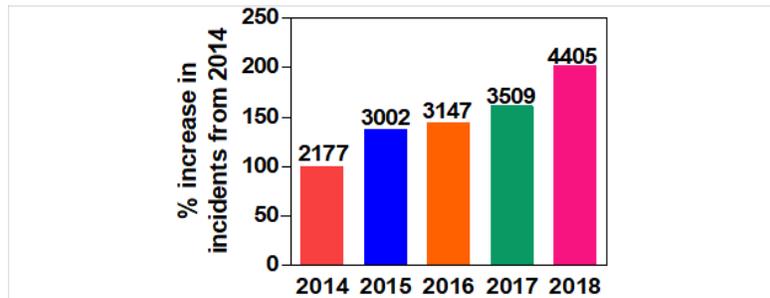


Figure 1. Pharmaceutical crime incidents between 2014 and 2018. Adapted from The Pharmaceutical Security Institute, a not-for-profit, membership organization dedicated to protecting the public health, sharing information on the counterfeiting of pharmaceuticals, and initiating enforcement actions through the appropriate authorities.

SHORTAGE AND DEVELOPMENT PATH OF NEW ANTIBIOTICS

The shortage and lacking quality of antibiotics or API can also complicate the process of antibiotics-related clinical trials that serve as cornerstones in assessing and asserting its efficacy and safety of use. This can result in delayed enrollment which forces the clinical trial promoters to change the protocols to possibly accommodate a substitute drug or altered dosing regimens. All these can generate erratic research evidence, bias, time-cost escalation, and loss of enthusiasm in trial continuation culminating in an unsettled path of development of new antibiotics and their release into the market.

THE RELEVANCE OF AN INTER-CONNECTED INDUSTRY (FOOD) IN THE SUPPLY CHAIN PROBLEM

Empirical results have established the importance and intricacies of nutrition-health nexus in optimizing the health outcomes of the society (Willett & Stampfer, 2013). Specifically, the augmented use of antibiotics in farming purposes beyond therapy and the released antibiotic (excretion into manure by antibiotic-ingested livestock) over a period can exert evolutionary to ecological implications (Cabello, 2006; Sarmah, Meyer, & Boxall, 2006; Couce & Blázquez, 2009; Martinez, 2009; Kraemer, Ramachandran, & Perron, 2019). In the US, the use of antibiotics for animal purposes used nearly 80% of the total tonnage of antimicrobial agents sold in 2012. The rampant use of antibiotics and the ASC challenge can distress all points in the typical ASC system as depicted in Figure 2. Consequently, every level of the healthcare system (care, quality, and cost) could be possibly be affected. Taken together, these compelling facts point out the inappropriate usage of antibiotics through the environment-nutrient interaction.

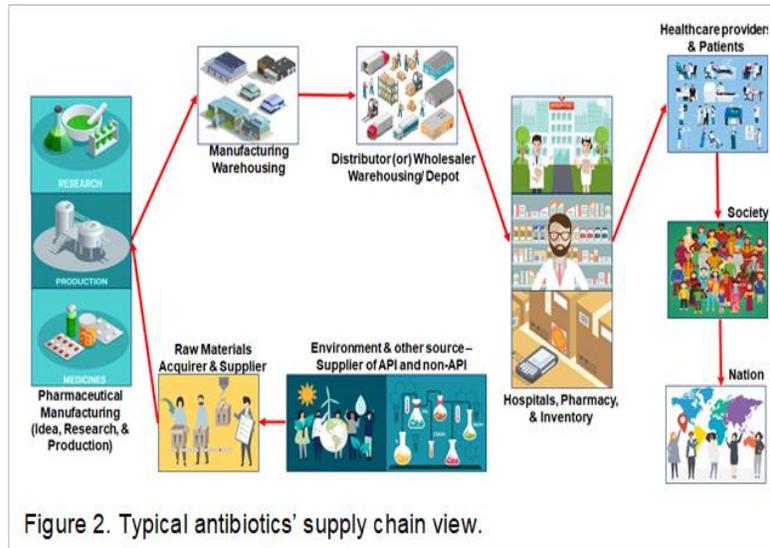


Figure 2. Typical antibiotics' supply chain view.

ANTIBIOTICS AND API SHORTAGES AND WHY IT OCCURS

Antibiotic shortages or supply instability, while endangering patients' lives also burdens healthcare costs. Figure 3 illustrates the possible underlying reasons for antibiotics and API shortages.

These include:

1. Unexpected natural disasters that cause damage to the units' geographical location and/or production facility (earthquake, hurricane, or flood zone) leading to shut down.

2. A natural disaster or an outbreak in the antibiotic or its API supplying outsourced country, in which case the priority will be to meet the domestic needs. This can create demand outside.

3. General climatic adversities can cut the crop yield of plants that are a source of raw materials and cause procurement delays.

4. Since antibiotics are used for short-term purposes and are usually curative, the net present value (NPV) for the former cannot match the NPV of the drugs used for chronic conditions (diabetes, cancer, cardiovascular problems, etc.) (Power, 2006). Inherent low returns may lead to shrunken antibiotics' raw material supply chain players.

5. For drugs like antibiotics, where the effectiveness changes with time because of resistance patterns, the FDA recommends a 10% increase in the statistical limit for equivalence studies (US Food and Drug Administration, Center for Drug Evaluation and Research, 2001; Shales & Moellering, 2002).

6. Political upheaval, diversity of regulatory requirements, trade disputes, patent delays, and government funding delays may also cause a stoppage of supplies.

7. Financial instability/uncertainty and not being able to fill the ever-changing technological and much required infrastructural gaps.

8. Poor knowledge of alternatives and the creative ability to deal with sudden shocks.

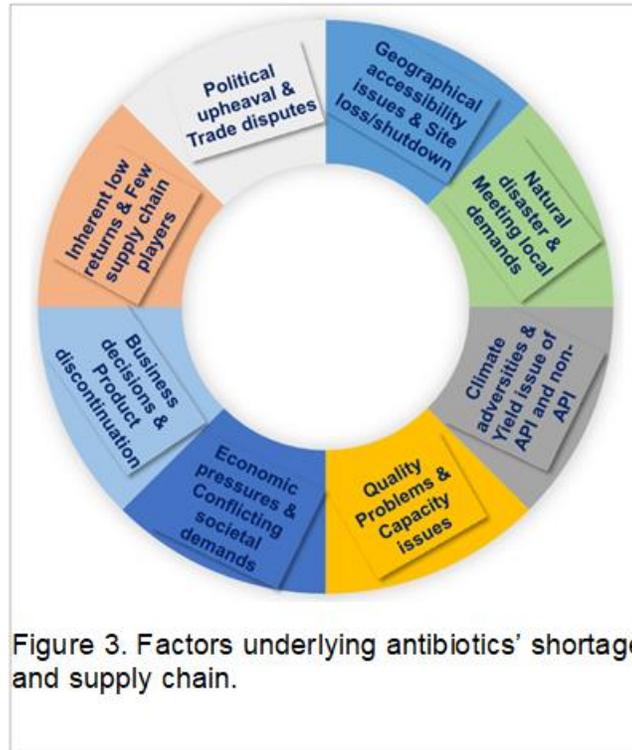


Figure 3. Factors underlying antibiotics' shortage and supply chain.

GENERIC SCM APPROACH FROM AN OUTSOURCING VIEWPOINT

Some generic approaches from an outsourcing view are to assess and know your outsourcing partner, build a supply chain map and enhance the visibility, invest in quality inspections, protect your idea and smartly use confidentiality agreements, and embrace flexible and adaptable outsourcing.

POTENTIAL SYSTEMIC MEASURES TO COPE WITH AND COUNTERACT THE ANTIBIOTIC SHORTAGE

Figure 4 summarizes the potential steps to negate the failing ASC.

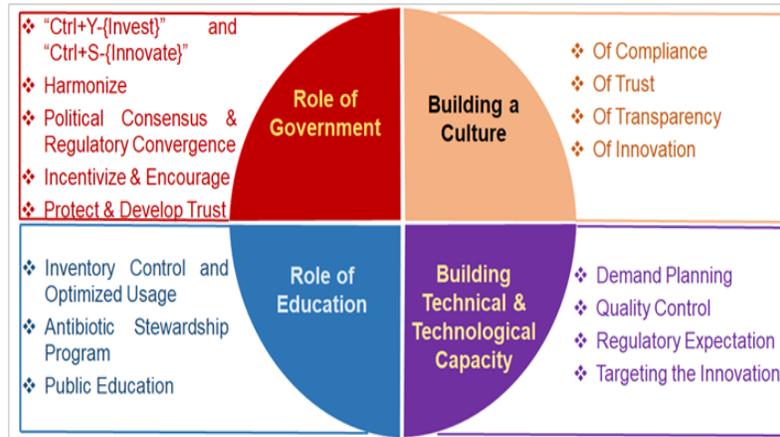


Figure 4. Potential steps forward to cope with and counteract the antibiotic supply chain disruption.

BUILDING A CULTURE

Culture facilitates adaptation to the highly competitive and ever-changing business landscape. It encapsulates the value of employees, customers, and owners. Fostering a culture comprised of the following tenets is a required mantra for a successful ASC to sustain itself and succeed:

1. Compliance: Follow the best practices and requirements to drive quality and customer satisfaction.
2. Trust: Data violations often result in drug recalls, bans, and delayed product release ultimately furthering the shortages. Data quality is a central part of the development, manufacturing, and testing. Because, all these together ensure safety, efficacy, and quality of antibiotics.
3. Transparency: Transparency can foster partnership development. Report the deviations and connect with the industry associates and drug reporting agency to fix it (data management).
4. Innovation: Feed the curiosity, openness for better or effective ways and prudent risk-taking to meet the new needs.

BUILDING TECHNICAL AND TECHNOLOGICAL CAPACITY (TTC)

Product and process understanding is vital for hazard analysis and crucial control points (HACCP). It analyzes the risk and its extent (hazard), identifies key control points, sets critical limits or ranks for control points, establishes corrective actions and record-keeping (Pramod, Tahir, Charoo, Ansari, & Ali, 2016). Further, it helps to integrate and enhance the efficiency of the process. In short, building TTC can ensure quality, reliability, efficiency, and manufacturing processes.

DEMAND PLANNING

A secured, updated, and linked technology determines the consumption pattern and the supply capacity (with a margin of deviation at both ends). This alerts and places the supply chain in the right position to respond accordingly towards quick changes and it helps to deal with a shortage crisis.

QUALITY CONTROL

Concerns about quality control of an antibiotic from a manufacturer could potentially mean a recall or a ban corresponding to a drug shortage. By coupling with the quality assessment and manufacturing workflow improvement algorithms (like lean and six sigma), technology can continuously monitor the quality-related events, enhance the visibility and predictability of the manufacturing quality defects, and rate it. Thus, prioritization of risk perception and risk management strategies' along with a continuous quality improvement process can steady the supply chain without disruptions. 3D printing may provide a possible solution to quality control issues and concerns. The revolutionary 3D drug printing (3DP) technology can improve the production and supply in an error-free and precise manner (Araújo, Sa-Barreto, Gratieri, Gelfuso, & Cunha-Filho, 2019).

REGULATORY EXPECTATIONS

Technology can meet regulatory expectations by integrating it into antibiotic clinical trials, a process that generates data to evaluate safety and efficacy. In this view, the blockchain technology that transfers data between multiple trusted parties based on a distributed ledger can connect different nodes from funding to design, development, a regulatory board, a research organization, publishers or personal and record every action from patient enrollment to validation and publication in a time-stamped manner (Maslove, Klein, Brohman, & Martin, 2018). Data entered cannot be infringed and/or manipulated. Thus, a robust, bias-free process, analysis, and data accrual are possible. Time-stamped and linked entries make the procedural, the trial operation, and data legitimacy transparent. In this way, blockchain-based clinical trial management stands a better chance of steering the shortage crisis by efficiently validating the quality aspect (clinical evidence) with the possibility of hastening antibiotic release into the market (regulatory approval process).

TARGETING INNOVATION

The current global antibiotics' development pipeline is only partial. Because the complete pipeline data from several countries are absent (Renwick, Simpkin, & Mossialos, 2016). Technology-driven analytics help gather and shares comprehensive antibiotic pipeline data. Thus, it may help the understanding of the issue and realistic assessment of the global demands. Further, 'Artificial Intelligence (AI)'-based technology like DeepARG and Feedback Generative adversarial networks (FBGANs) can track AR gene pollution and generate

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antimicrobial peptides, respectively (Arango-Argoty et al., 2018; Gupta & Zou, 2019).

TRACK-TRACE OPTIMIZATION

Similar to the MediLedger project, the blockchain strategy in the serialization format (unique drug identification numbers or machine-readable 2-dimensional QR (Quick Response) codes) can effectively leverage the tracking and managing of data and the flow of antibiotics across the chain from the manufacturing/outsourcing facility to the destinations. Scarcity can create room for poor-quality antibiotics to crowd. Respectively, through continuous monitoring, a visible and reliable reporting trail of the unregistered product's entry and registered product's exit into and out of the chain can be observed. Thus, track-trace optimization appears to serve as a useful blocker of this noxious and a vicious cycle.

ROLE OF EDUCATION

Owing to multiple players' involvement from several destinations, it is difficult to know the entire network. In general, everyone must know the "How's", "Why's", and "What's" of drug shortages and its bearing on the supply chain, health, and safety. By linking the traditional (print, television, radio) and emerging (the web, social media) platforms, education and advocacy enrich learning and understanding.

INVENTORY CONTROL AND OPTIMIZED USAGE

Education kindles curiosity and awareness. It teaches the nuances to prescribe diligently, review on hand stock, allocate resources, and effectively analyze the usage data. All of these are key to preventing over-usage and over-purchasing. Educational intervention (antibiotic stewardship program) also prepares the professionals to take better clinical decision toward optimal antibiotic prescribing and use (Ohl & Luther, 2014).

PUBLIC EDUCATION

Public education is also a target for improvement. One or a combination of educational methods such as interactive seminars, videos, mailing campaigns, outreach programs, leaflets, and nationwide media campaign such as "Get Set Colorado," can emphasize the awareness and knowledge about antibiotics use-misuse, AR development, and the societal impact (Gonzales et al., 2008; Hemo et al., 2009).

ROLE OF GOVERNMENT

Drug shortages require greater government intervention. To guarantee a free and safe ASC operation within and outside the nation, a conducive political

(international-national-regional-city-community collaboration and consensus), legal (policy and guidelines), business or trade (price control, tax, and reimbursements), and an encouraging (funding for research & development) environment is essential.

“CTRL+Y- $\{$ INVEST $\}$ ” AND “CTRL+S- $\{$ INNOVATE $\}$ ”

Fuel for drug innovation comes from basic research & development (R&D). Financial solutions and flexibility also support innovative activities. Lack of sufficient funding together with rising costs can dry up innovative R&D ventures and delay antibiotic availability. In short, funding is required for antibiotic R&D, and investment in antibiotic development projects that provide new drugs for those patients who need them most must be a primary concern.

HARMONIZE

The drug application to the approval process is complex. The varied structure and control of drug authority agencies from each respective country contribute to different lead times, and thus, to antibiotic market failure. It requires a collaborative in- and foreign-country government regulatory reform to harmonize policies for jointly addressing the regulatory to environmental threats (pollution-quality indicator). This re-establishes the ASC in their respective countries. Governments can direct the regulatory agencies and help establish the standards of antibiotic production to distribution that can prevent delays or shortages.

POLITICAL CONSENSUS AND REGULATORY CONVERGENCE

Since multiple players at both the national and global level are involved in an ASC network, quality failures and issues related to pricing, ethics, compliance, data breaches, and other factors are intrinsic. Besides understanding and trust, all these require legal enforcement and a solid role for law and justice. Attaining the regulatory convergence and modifications at the legislative level is not possible without political consensus. The result of political unrest and conflict could mean trade interruption, consequent delay, or shortage.

INCENTIVIZE AND ENCOURAGE

Governments can offer subsidies and conditional funding for potential suppliers to innovate and produce antibiotics and its API as a push strategy. Potential suppliers can be encouraged by a pull strategy-driven tax benefit (trade), providing monetary awards, innovation funding, and reinforcing advance purchasing/supply commitment model to buy a defined value of the antibiotic for a definite period with the support of suitable anti-trust law on an outcome-basis.

PROTECT AND DEVELOP TRUST

Establish long-term contracts to buy the medications at fixed prices, despite competitor's temptation of price cuts. Implementation of governance

structures similar to product development partnerships can facilitate the sharing of supply chain risks-rewards. Besides, relaxing antitrust law to a reasonable extent such that abuse of market power does not surface, which protects the manufacturers, develops a long-term commitment, earns their trust, and sets the stage for a stable business.

SUMMARY

Irresponsible antibiotics use and inevitable AR development dry up the antibiotic pharmaceutical pipeline. This compromises public, animal, and environmental health safety globally. Adding to this gloomy picture, an unstable and fragile ASC causes acute antibiotic shortages. There are multiple causes for the ASC disruption. They include, but are not limited to, natural disasters, less profit proposition, diversity and complexity of the regulatory and legal framework, economic pressures, and sudden demand shocks. To make matters worse, there is a lack of coordinated efforts from nations or sectors that do not create opportunities to mitigate these risks. In Toto, this analysis help understands the ASC field's complexity. In order to mitigate the risks, and stabilize the end-to-end ASC pipeline, it is suggested to sound the alarm through education and awareness, a well-defined and transparent culture, technological transformation, and governmental coordination.

CONCLUSIONS

Antibiotics and its supply chain issues, if unaddressed, can evolve as a serious threat to public health and safety globally. Grasping the current circumstances on antibiotics and apart from diverting efforts on new antibiotics' development, it is a *sine qua non* to think what would occur if there are no back-up suppliers, over relying on risky outsourcing partners, liability of using substandard antibiotics, and lack of ASC visibility and coordination. To this end, we should leverage and combine the potential of technology, smartness of education, and the power of governance to build a culture of responsibility, conformity, and trust. We assess that further research regarding the prevalence of antibiotic shortages, quality, testing, distribution, and the global impact on patient health and safety is needed in order to reduce the potentially disastrous impact on the world's antibiotic supply chain. We hope that this study encourages further research into viable and operational solutions to remedy future antibiotic shortages not only in United States, but globally as well.

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THE RELATIONSHIP BETWEEN GOAL ORIENTATION, ANXIETY, SELF-EFFICACY, AND LOGICAL DECISION MAKING

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ABSTRACT

This research extends goal orientation research by examining the role of a four-factor model of dispositional goal orientation on self-regulatory processes and decision-making. 479 business students completed a survey assessing their pattern of goal orientation, state anxiety, self-efficacy, as well as their decision making style. Results from the LISREL mediational model indicated that four goal orientation variables differentially influenced anxiety and self-efficacy, which in turn influenced logical decision making. Overall, the results from this study add to the literature by exploring the role of goal orientation in the self-regulatory and decision making processes of business students.

Key Words: Goal Orientation; Anxiety, Self-Efficacy, Self-Regulatory Processes, Decision-Making

INTRODUCTION

The purpose of this study was to provide an initial test of the direct influence of goal orientation on key self-regulatory processes and indirect effect on logical decision making styles. The importance of making logical decisions is a business necessity; yet, little research has examined the role of goal orientation and motivational variables on the degree to which individuals make common work decisions. There has been a wide array of literature examining the different styles of decision making processes. For example, Thagard (2001) described how individuals typically make these choices based on their experienced emotions or logical facts.

Goal orientation has been one of the most widely studied and evolving constructs among motivational researchers over the past three decades. In fact, a large body of research on achievement motivation has focused on identifying how different types of goal orientations influence various motivational processes. Goal orientation theory posits that individuals have goals they implicitly pursue while attaining performance outcomes (Dweck & Leggett, 1988). Research has supported the central principle of goal orientation theory that individuals adopting

various goal orientations utilize different affective, cognitive, and behavioral patterns during task engagement and performance (Ames & Archer, 1987, 1988; Butler, 1992; Duda & Nicholls, 1992; Day, Radosevich, & Chasteen, 2003; Dweck & Leggett, 1988). This study contributes to the literature by exploring the unique relationships of the four goal orientation dimensions, on self-efficacy, state anxiety, and logical decision making.

LITERATURE REVIEW

Goal Orientation Framework

Elliot and McGregor (2001) derived the four factors from the definition of competence (mastery/performance) and valence of competence (approach/avoid). Mastery goals focus on an absolute, intrapersonal standard whereas performance goals focus on a normative standard. The mastery/performance distinction has been implicitly theorized in the classic definition of need for achievement, where individuals want to do well relative to others as well as relative to the task requirements (McClelland, Atkinson, Clark, & Lowell, 1953; Murray, 1938). Similarly, the approach/avoid distinction has been prevalent in several motivational theories and suggests individuals adopt approach or avoid tendencies across situations, especially those that are related to competence (e.g., Atkinson, 1957; Bandura, 1986; Carver & Scheier, 1981, Higgins, 1996, Murray, 1938). Thus, Elliot and McGregor's (2001) 2 X 2 goal framework yields four goal orientations: mastery-avoid (MVGO), mastery-approach (MPGO), and performance-avoid (PVGO), performance-approach (PPGO).

The first orientation, MVGO, involves a mastery standard with a tendency to avoid failure or making any mistakes. Thus, absolute competence is necessary for success and any level of incompetence is the focal point of self-regulation (Elliot & McGregor, 2001). In their original study that examined mastery-avoid goals, Elliot and McGregor (2001) hypothesized that the relationship mastery-avoid has with various approach motivational variables would be negative. They found that mastery-avoid goals were operating among students in the classroom and positively predicted disorganized studying, levels of worry, and emotionality. In terms of resourcefulness, individuals with high levels mastery-avoid goals focus on failure relative to absolute intrapersonal mastery standards, which may lower their self-efficacy and increase their anxiety since they may put too much focus on evaluative concerns rather than appropriately applying limited resources towards task demands (Ackerman, Kanfer, & Goff, 1995; Kanfer & Ackerman, 1989).

Second, MPGO is characterized with an absolute intrapersonal competence standard with a predilection to approach success. It involves a focus on enhancing one's task competence by developing new skills and is associated with adaptive learning styles, such as deeper processing of task-related information, monitoring of performance, and persistence. Past research has compellingly demonstrated that mastery goal orientation, which is assumed to be conceptually similar to mastery-

approach goals, led to particular response patterns, such as higher self-efficacy and personal goals (Phillips & Gully, 1997), as well as expended more effort to reach these goals (Radosevich et al., 2004; VandeWalle et al., 1999). Individuals with higher levels of MPGO may value the process of learning and are self-referential as they seek to develop task skills and knowledge relative to the task and one's own past performance. Given their focus on development of personal mastery, individuals with high levels of MPGO should demonstrate more self-efficacy and lower levels of state anxiety that leads to more logical decision making.

Third, PPGO, involves a normative, interpersonal success standard with a tendency to approach success. Thus, it has both an appetitive component (i.e., approach success) and an aversive component (i.e., normative performance) (McGregor & Elliot, 2002). It serves to focus the individual's attention on the positive outcome of attaining favorable competency judgments relative to others. Due to the approach component, individuals with high levels of PPGO are expected to self-regulate in ways similar to individuals with high levels of MPGO, albeit to a lesser extent as PPGO individuals are inherently interested in attaining positive judgments of ability. A basic conceptual difference is that MPGO should be associated with an incremental view of ability (i.e., belief that individual characteristics are malleable) while PPGO should be associated with an entity theory of ability (i.e., belief that individual characteristics are fixed). VandeWalle et al., (2001) suggest that since individuals with high levels of PPGO believe that ability is difficult to develop, they will focus more effort on impression management rather than competency development. In terms of the cognitive processes individuals engage in, performance-approach goals should be positively related to self-efficacy and less state anxiety because they should enhance the probability that individuals will actually attain their goal and subsequently look favorable relative to others by using limited resources in an appropriate manner.

Finally, PVGO involves a normative, interpersonal competence standard with a preference to avoid failure. Individuals engage in tasks with the strategy of avoiding demonstrations of incompetence and negative judgments relative to others (Elliot, 1997; Elliot & McGregor, 1999; Elliot & Thrash, 2001). Consequently, PVGO is considered to be an avoidance form of motivation as it orients one towards the negative outcomes of avoiding negative judgments and demonstrating a lack of ability (Elliot, 1997; Elliot, McGregor, Holly, & Gable, 1999). Such avoidance forms of regulation are likely to elicit self-protective processes, such as enhanced sensitivity to failure information or anxiety during task engagement (Elliot, 1997; Elliot et al., 1999). Radosevich et al. (2004) found that PVGO was negatively related to deep processing in students. Similarly, Elliot and McGregor (2001) found that PVGO exhibited positive relationships with surface strategies, disorganization, test anxiety, and worry. Additionally, high PVGO has negative effects on self-set goals and actual performance (Elliot & McGregor, 2001). It is expected that cognitive processes such as self-efficacy should be negatively related to mastery-avoid goals since these individuals adopt maladaptive strategies stemming from their focus on avoiding negative judgments

relative to others. Elliot and McGregor (2001) found that performance-avoid goals exhibited positive relationships with disorganization, test anxiety, and worry as they are primarily motivated by fear of failure.

Goal Orientation and Self-Efficacy

Task specific self-efficacy is an individual's belief that he or she has the capability to perform well on a task (Bandura, 1986). The relationship should vary between self-efficacy and the four goal orientation dimensions. Our understanding of how the two components (i.e., absolute/avoid) of MVGO combine to exert influence on various self-regulatory processes is limited. Individuals with higher MVGO may have lower levels of self-efficacy given that they focus on failure relative to absolute mastery standards. Entering a task episode with the belief that any mistake is less than desirable should make individuals more likely to question their performance capabilities. Second, research has consistently shown that MPGO leads to higher self-efficacy given its emphasis on absolute mastery and tendency to approach success (Payne et al., 2007; Phillips & Gully, 1997, Radosevich et al., 2004). Next, high PVGO individuals engage in tasks with the strategy of avoiding demonstrations of incompetence and negative judgments, relative to others. Prior research has shown that PVGO leads to maladaptive motivational patterns, such as lower self-efficacy (Elliot, 1997; Elliot & McGregor, 1999; Elliot & Thrash, 2001). Finally, research has show that PPGO is positively related to self-efficacy because it should enhance the probability that individuals will actually attain their goal and subsequently look favorable relative to others (Payne et al., 2007). Thus, the following hypotheses are formed:

Hypothesis 1: Mastery-avoid goal orientation will be negatively related to self-efficacy.

Hypothesis 2: Mastery-approach goal orientation will be positively related to self-efficacy.

Hypothesis 3: Performance-avoid goal orientation will be negatively related to self-efficacy.

Hypothesis 4: Performance-approach goal orientation will be positively related to self-efficacy.

Goal Orientation and State Anxiety

State anxiety, which is typically defined as test anxiety in academic settings, is an aversive emotional state of distress or evaluation apprehension during an exam (Spielberger & Vagg, 1995). State anxiety stems from individuals' fear of failure (Covington, 1985), and beginning with the pioneering study of Yerkes and Dodson (1908), research has demonstrated that arousal and anxiety influences cognitive processes and performance (Ashcraft & Kirk, 2001; Eysenck, 1997; Hopko, McNeil, Zvolensky, & Eifert, 2001). Both state anxiety and MVGO share the

generalized need to avoid failure. In terms of MPGO, research has consistently shown that it leads to adaptive motivational strategies such as higher self-efficacy, goal establishment, and effort allocation (Payne et al., 2007; Phillips & Gully, 1997, Radosevich et al., 2004) given its focus on development of personal mastery. Similarly, the appetitive component (i.e., approach) of PPGO may be attenuated by its aversive component (i.e., normative), but state anxiety should be negatively related to PPGO because it focuses individual's attention on the positive outcome of attaining favorable competency judgments relative to others. Finally, research has shown that PVGO is associated with surface cognitive processes and anxiety (Elliot & McGregor, 2001; Payne et al., 2007). Thus, the following hypotheses are formed:

Hypothesis 5: Mastery-avoid goal orientation will be positively related to state anxiety.

Hypothesis 6: Mastery-approach goal orientation will be negatively related to state anxiety.

Hypothesis 7: Performance-avoid goal orientation will be positively related to state anxiety.

Hypothesis 8: Performance-approach goal orientation will be negatively related to state anxiety.

Self-Efficacy, State Anxiety, and Decision-Making

To further explore the nomological network of the goal orientation and motivational processes, this study explored the role of decision-making, a critical organizational behavior that contributes to effectiveness across several performance situations. For example, it is common for organizations to use programmed decisions that provide objectively correct answers based on numerical computations or standard policies. That said, it may be more common for people in organizations to use non-programmed decisions that are often made in real-time with no proven answers (Bateman & Snell, 2007). Consequently, it is important for individuals to demonstrate rational decision making by using rules and goal driven logic to reach their decision. Rationale decision making is often contrasted with emotional decision making, where individuals let their emotions and feelings regarding the situation they are facing factor into their decision making process. If individuals do not properly identify the problem or evaluate alternatives, they are less likely to make decisions that will lead to positive outcomes for the business. Radosevich, Levine, and Kong (2009) indicate researchers must consider various pitfalls to effective decision-making, such as time pressures and psychological biases.

This study hopes to expand on the literature that has found anxiety to negatively influence decision-making. Past research has demonstrated that arousal and anxiety influence cognitive processes and performance (Ashcraft & Kirk, 2001; Eysenck, 1997; Hopko, McNeil, Zvolensky, & Eifert, 2001). That said, there is

less research examining how self-efficacy and anxiety mediate the relationship between goal orientation and decision-making. Therefore, this study hypothesizes:

Hypothesis 9: Self-efficacy will be positively related to rational decision making.

Hypothesis 10: State anxiety will be negatively related to rational decision making.

METHOD

Participants and Procedures

Participants for the study were 479 business students enrolled in organizational behavior and human resource management business courses. The average age of the participants was 21.65 and there were 251 females (52.4%) and males (47.6%) Participants were recruited in-class on a voluntary basis and completed an online survey assessing each of the variables. Participants were provided with an internet link to access the survey and completed the survey outside of the classroom.

Measures

Goal orientation. Goal orientation was assessed with the Achievement Goal Questionnaire (Elliot & McGregor, 2001) that included each of the four goal orientation constructs: (a) mastery-approach (e.g., “I want to learn as much as possible from this class”), (b) mastery-avoid (e.g., “I worry that I may not learn all that I possibly could in this class”), (c) performance-approach (e.g., “It is important for me to do better than the other students”), and (d) performance-avoid (“I just want to avoid doing poorly in this class”). Elliot and McGregor (2001) reported adequate internal consistency estimates for each scale. Coefficient alpha in this study was .81 for mastery-approach, .76 for mastery-avoid, .85 for performance-approach, and .82 for performance-avoid.

Self-efficacy. Self-efficacy was assessed using a 10-item scale developed by Phillips and Gully (1997) who wrote the items to reflect Bandura’s (1991) definition of self-efficacy. The items (e.g., “I feel confident in my ability to perform well on the upcoming exam.”) were similar in content to other self-efficacy scales used in academic settings (e.g., Mone, 1994). Responses were made on a seven-point scale ranging from strongly disagree (1) to strongly agree (7). Coefficient alpha for this scale was .79.

State anxiety. State anxiety was assessed using the 20-item STAI developed by Spielberger, Gorsuch, Lushene, Vagg, and Jacobs (1983), which includes 20 items (e.g., “I feel worried”). Responses to all items in each scale were made on a seven-point scale (1= strongly disagree; 7 = strongly agree). Coefficient alpha for this scale was .90.

Logical decision-making. Logical decision-making was assessed with 10 items using the International Personality Item Pool (IPIP). The IPIP is a public domain, "A scientific collaboratory for the development of advanced measures of personality and other individual differences" (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, & Gough, 2006). Responses to all items in each scale were made on a seven-point scale (1 = strongly disagree; 7 = strongly agree). Coefficient alpha was .72.

RESULTS

Descriptive Statistics

Table 1 provides the means, standard deviations, and intercorrelations among the major variables of interest.

Table 1. Means, Standard Deviations, and Intercorrelations Among Variables

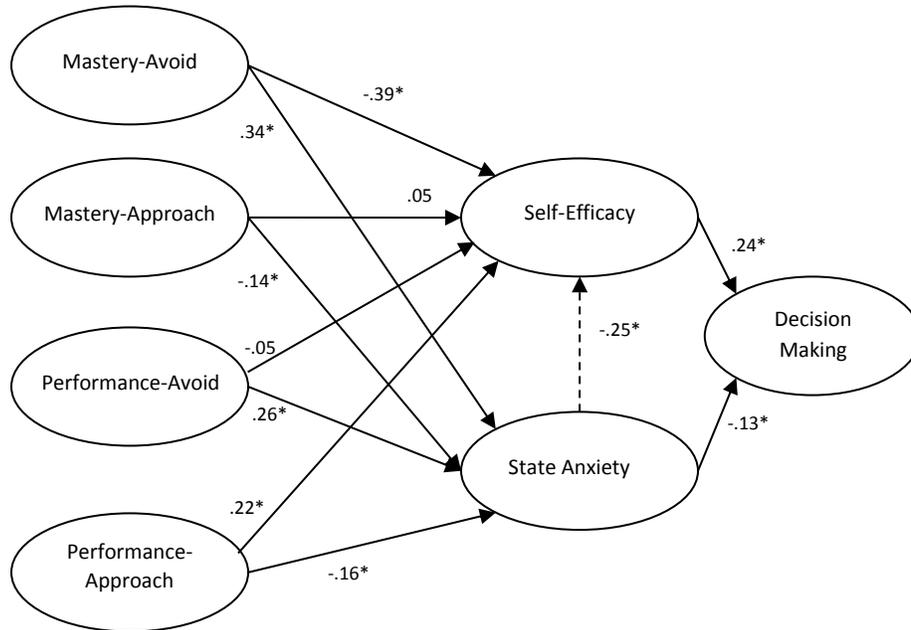
Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Mastery-avoid	3.52	1.38	--						
2. Mastery-approach	6.11	0.99	.03	--					
3. Performance-avoid	4.78	1.48	.16*	-.07	--				
4. Performance-approach	5.11	1.35	.11*	.27**	.04	--			
5. State anxiety	2.32	0.57	.39*	-.04	.27*	-.10*	--		
6. Self-efficacy	5.29	0.71	-.32*	.19*	-.21**	.19*	-.41*	--	
7. Decision making	5.32	1.52	-.09*	.21*	-.01	.28*	-.16*	.24*	--

Note. *N* = 479. * denotes a correlation that is significant at the .05 level.

Test of Hypotheses

To assess the hypothesized model presented in Figure 1 LISREL 8.7 was used (Jöreskog & Sörbom, 1993). Following the suggestion of Williams and Anderson (1994), we used randomly chosen parcels of individual scale items to create indicators of self-efficacy and state anxiety and used individual items for the goal orientation constructs. This left three indicator measures for each predictor variable. The fit of the hypothesized model fit the data well: $\chi^2(198) = 551.27$; CFI = .95; RMSEA = .06; SRMR = .08 and offer support for our expected relationships. Turning to the modification indices, there were not anymore latent paths that could be freed to improve model fit.

Figure 1. Path Estimates of Final Structural Model



Note. * < .05

As shown in Figure 1, path estimates in the accepted model also support our hypotheses. First, the four goal orientation constructs, mastery-avoid had the largest relationships with self-efficacy and state-anxiety. Mastery-approach was significantly related to state-anxiety. Performance-avoid was significantly and positively related state-anxiety. Performance-approach was significantly and positively related to self-efficacy and negatively to state-anxiety. Further identified that self-efficacy was significantly and negatively predicted by state-anxiety, which was also significantly and negatively predicted decision making. In turn, self-efficacy predicted decision making in a positive direction.

DISCUSSION

Overall, the results from this study contribute to the literature by providing empirical evidence that four-factor model of goal orientation has utility in predicting self-efficacy, state anxiety, and indirectly influencing rational decision making. In general, the results from our analyses were consistent with previous literature that suggests the four goal orientation constructs are related in meaningful ways to motivational and cognitive processes.

While each of the goal orientation dimensions was in the hypothesized direction, an interesting highlight from was that the strongest influence was coming from MVGO, above and beyond the other three dimensions. This particular finding

gives support for the important role in predicting individuals' decision making indirectly through self-efficacy and state anxiety. While many of these relationships have been replicated in previous studies, this research offered a unique impact by highlighting the role of the less researched fourth factor of goal orientation has on decision making, directly and indirectly. These results indicate just how important the often overlooked and under-researched fourth facet of goal orientation is to motivation and performance: it was the strongest direct predictor of self-efficacy and state anxiety and thus the strongest indirect predictor of rational decision making.

Similar to previous research (e.g., Phillips & Gully, 1997; Radosevich et al., 2004; VandeWalle, 1997), mastery-approach goal orientation influenced motivational processes. Specifically, individuals high in MPGO had a negative influence on state anxiety. MPGO did not have a significant effect on self-efficacy, but was in the positive direction. Nonetheless, the results for both mastery constructs (MPGO and MVGO) are theoretically important contributions to the four-factor model (Elliot & McGregor, 2001; Pintrich, 2000).

Performance-approach goals positively predicted self-efficacy negatively predicted state anxiety. These findings are similar to mastery-approach goals and add to the extant literature that has demonstrated the adaptive patterns of self-regulatory behavior employed by individuals with high performance-approach goals. That is, they reported higher levels of confidence in their abilities to reach their goal and reported less anxiety as a strategy to motivate themselves for higher performance outcomes. The benefits of PPGO may be greater in those environments where an emphasis on performance outcomes relative to others is emphasized (Radosevich et al., 2004). Performance-avoid goals exhibited a positive effect on state anxiety and nonsignificant negative effect on self-efficacy. The negative impact of PVGO in this study is consistent with prior research that has shown that individuals oriented toward avoiding demonstrations of incompetence and negative judgments, relative to others, elicit self-protective processes of setting lower goals when provided negative feedback (Elliot, 1997; Elliot et al., 1999; Radosevich et al., 2004; VandeWalle, 1997). That is, individuals who are motivated by fear of failure consistently adopt maladaptive self-regulatory strategies aimed at managing evaluative perceptions rather than improving their performance.

Taken as a whole, the findings from this 2 X 2 goal orientation framework gain merit since the approach/avoidance distinction has been prevalent in several motivational theories (e.g., Bandura, 1986; Carver & Scheier, 1981, Higgins, 1996; Nicholls, 1984). In particular, this study lends support to the approach/avoidance distinction in terms of its important implications for motivational processes and decision making. Given that the four-factor goal orientation model demonstrated different, meaningful relationships with self-efficacy and state anxiety, not only is the approach/avoid distinction meaningful,

but its combination with the mastery/performance distinction is useful for predicting how individuals will engage in self-regulatory behavior aimed at making effective decisions.

There are some limitations of this study. First, future research needs to examine the robustness of these findings using additional operationalizations of self-regulation. It is also important to note that the generalizability of our results may be limited to a student population and achievement tasks. College students were a convenient sample that provided the ability to standardize the criteria (i.e., performance). Based on the extant literature, these goal orientation findings should also generalize to other populations such as younger school-age students.

Several theoretical implications result from this study. First, researchers should examine how goal orientation can be best integrated into a theoretical model of self-regulation. Second, other variables (e.g., Big Five, attributions for performance) that may explain self-regulatory behavior should be examined since they may have incremental explanatory power over goal orientation. Third, given the prevalence of two- and three-factor scales, researchers should be mindful in their scale selection knowing that these results are consistent with the extant literature that has begun to find more support for the four-factor model of goal orientation (e.g., Elliot & McGregor, 2001). There are several applied implications from this study. In particular, managers, coaches, and teachers may use these results to help individuals develop more adaptive goal orientations. For example, future research should examine whether it may be beneficial for individuals to adopt different goal orientations at different phases of their performance. A high mastery-approach orientation may be beneficial at the onset of learning a new task, but a performance-approach orientation may be beneficial when task behaviors and cognitions are more automatic. It may also be the case that individuals have different goal orientation profiles, such as striving to improve their skills (mastery-approach) while also trying to perform well relative to others (performance-approach) or avoiding looking incompetent (performance-avoid) (Button et al., 1996).

In sum, our research study found that goal orientation played an important role in understanding self-efficacy, state anxiety, and decision making. Although goal orientation has had a lot of research supporting it, more research is needed to integrate it into more comprehensive motivational theories.

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INCREASING VALUE IN HEALTHCARE THROUGH RADIOLOGY UTILIZATION OPTIMIZATION

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(Editor's note: The paper contained an Appendix which is not included here. Interested readers may contact the author for the Appendix).

ABSTRACT

Physician utilization of various high-end radiology procedures have been shown to increase costs, reduce quality, and expose patients to unwarranted radiation. Despite spending greater than 17% of GDP on healthcare, less than 60% of recommended care (preventative, acute, and chronic) is provided. In our current environment of vertically integrated ACO (Accountable Care Organization) structures and value-based purchasing concerns, healthcare facilities must seek to increase the value received through value chain transparency and analysis. This objective has been studied and attempted, but remains elusive in healthcare, due to the complexity and uniqueness of the healthcare market where physician dual agency must be deftly addressed and managed. Creating a mechanism to identify, educate, and modify utilization of physician directed resources (specifically high-end radiology exams) through implementation of EBP (Evidence Based Protocols), CDS (Clinical Decision Support), and peer review has been shown to positively align physician ordering behaviors, organizational goals, regulatory standards, and increase value for all stakeholders. In review of public performance metrics, it was found that our hospital example has multiple opportunities to reduce cost, increase patient satisfaction, and improve outcomes through implementation of utilization committee focused on increasing value in radiology resource use.

Keywords: increase value, radiology exam utilization, utilization committee

INTRODUCTION

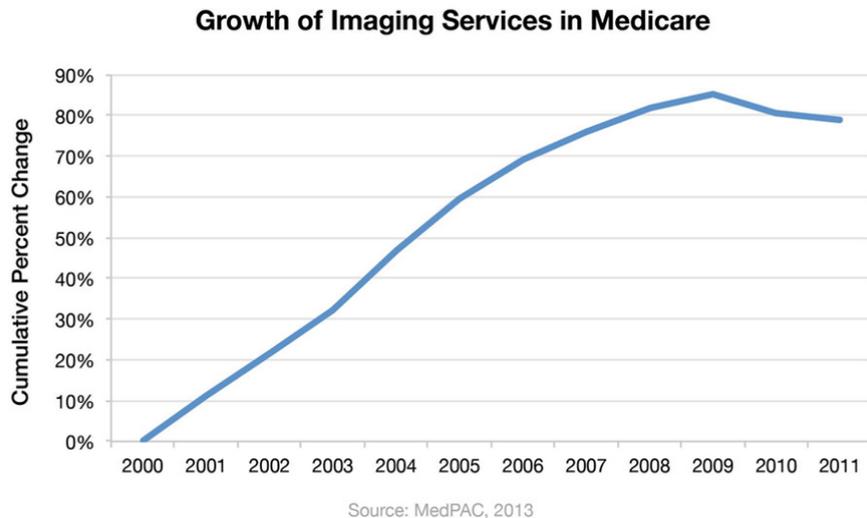
In the current dynamic healthcare environment where market forces, regulations, and public opinion are creating challenges across the industry due to cost concerns over spending 17% GDP to achieve underperforming outcomes, increasing value is paramount in key activities. In order to meet the Institute for Healthcare Improvement aims for healthcare (Improving the patient experience of care, Improving the health of populations; and Reducing the per capita cost of health care), leaders must define key products and processes in order to align

strategic focus and activities to maximize value for all stakeholders. The healthcare business model is unique in its form that consumers are not the payers and decision makers have dual agency issues that create inherently inefficient transactions that lead to increase cost, lower quality, and less than optimal outcomes. A 2010 peer reviewed article agreed when they reported, “Overutilization of imaging services for diagnostic and image-guided therapeutic purposes adds unjustifiable costs to health care, exposes individuals and the general population to unnecessary radiation doses”(Hendee, et al., 2010). Large variations of utilization for high end radiology procedures without associated evidenced based outcome benefits, demonstrates that an opportunity for increased value exists for all healthcare stakeholders in developing evidence-based utilization criteria and peer review of practice applications by providers. Through creation of a peer utilization review committee for high-end radiology services and implementation of clinical decision support (CDS) mechanisms, physician ordering practices can be aligned with evidence-based protocols to promote best outcomes and increase value, (Blackmore & Mecklenburg, 2012).

LITERATURE REVIEW

Radiology services utilization have grown exponentially and unproportionally in the US as reported in a 2013 Medicare Payment Advisory Commission report to congress showing nearly a 90% cumulative increase in radiology services utilization summarized in the graph below.

Figure 1. Exponential growth of imaging 2000-2011



The growth rate has slowed and decreased in some areas since, but the amount of volume is still exponentially above the levels seen 20 years ago.

When we consider the exponential rise in healthcare spending now exceeds \$3 Trillion dollars annually, the need for interventions becomes obvious, (Fred, 2016). A 2014 peer reviewed study found that the U.S. "...performed the second highest number of imaging exams..., and especially so for high-end imaging modalities such as CT and MRI, (Rohman , 2014). Increases were also reported for CT and MRI studies ordered from emergency departments of 493% for CT's and 2,475% for MRI's from 1993 to 2008, (Raja et al., 2014).

If this utilization and cost structure resulted in increased desirable outcomes for the patient, an argument could be made that sufficient value existed, but the literature exposes the contrary that as many as 50% of imaging exams do not provide information that can be used to improve the patient's well-being. The literature also notes that perhaps harm is being done with extraneous radiation exposures, (Fred, 2016). When we understand that, "...the average patient receives only about 54.9 percent of recommended care, with little difference among the respective proportions of preventive, acute, or chronic care" (Balas & Chapman, 2018), we can see an opportunity exists. Taken together it becomes clear why radiology utilization growth and associated costs have been characterized as unsustainable by industry leaders. Calls from public and professional sector for change have resulted in various cost containment efforts that endeavor to correct the negative impacts over utilization of radiology exams and innovate new ways to foster "appropriate use", (Litkowski, Smetana, Zeidel, & Blanchard, 2016).

US healthcare is unique in the scope of its fragmented autonomy and third-party payer system, which along with other factors have fueled the exponential growth seen in radiology services. In addition to being fragmented, the quality is variable, and variation of services is tremendous, (Blackmore & Mecklenburg, 2012). To illustrate this effect, we can use the analogy of an automotive assembly operation, where each individual vehicle was assembled by a professional with autonomy to use various parts in various quantities (without knowledge or regards to their costs or benefits) with wide variations in the outputs produced and no feedback linkages for the managers of the plant. The literature is clear on the prevalence of physician variation and the reduced outcomes in radiology utilization.

In addition to physician practice variations, other historical factors have contributed to the barriers for physicians with respect to radiology exams. Technology explosion and information overload outpacing information diffusion for physicians is an industry concern as reported as, "keeping up with research and systematically incorporating it into the daily practice of medicine is a general problem for physicians", (Kendall & Quill, 2014). Physicians would need to read 50 or more articles a day to stay up with the amount of information being produced.

This is especially true inside radiology departments where capabilities, techniques, and testing options evolve dynamically. In the past, ordering physicians never had to know what study or how to order it. It may come as a surprise to many patients, but based on my 25 years’ experience as a radiology staff member and leader, a well understood issue within radiology departments is that though an ordering physician may know they want a diagnostic study to evaluate a particular condition their knowledge of which and what to order is limited. Historically this was not an issue as radiologist or radiology department personnel would set imaging protocols and direct exam types then “translate” or change a requesting order to match ordering physician requests and patient’s condition. Due to abuses, where testing facilities were doing unnecessary exams, new regulations prohibiting this practice were instituted and the issue was further exacerbated with the introduction of the Affordable Care Act (ACA) which fostered the almost universal adoption of computerized physician order entry (CPOE) where ordering physicians are now asked to select the correct exam from radiology exam lists. Radiology exam lists were built from the Centers for Medicare & Medicaid Services (CMS) current procedural terminology (CPT) billing codes and are still today largely unknown outside of radiology departments, especially by ordering physicians. In the past an ordering physician would write an order for an “MRI of the foot” and the testing facility would translate this into MRI of lower extremity joint without contrast, unbeknownst to the ordering physician based on that testing facility’s imaging protocols for the patient diagnosis, constructed by the local radiologist and again without ordering physicians knowledge or understanding of their content.

For an example of how difficult a task it is for ordering physicians, the list below is a subset of possible CT exams of the Abdomen:

Abdomen and Pelvis CT W and W/O Contrast	Angiography Abdomen CT W and W/O Contrast W/ 3D Reconstruction	Angiography Abd and Pel CT W and W/O Contrast W/ 3D Reconstruction
Gated TAVI (if in conjunction with Heart CT W Contrast (Morphology)	Abdomen and Pelvis CT W/O Contrast W/ 3D Reconstruction	Abdomen and Pelvis CT W Contrast
Abdomen and Pelvis CT W and W/O Contrast W/ 3D Reconstruction	Abdomen, and Pelvis CT W/O Contrast W/ 3D Reconstruction	Urogram CT Abdomen and Pelvis W and W/O Contrast W/ 3D Reconstruction
Abdomen CT W/O Contrast	Abdomen CT W Contrast	Abdomen and Pelvis CT W/O Contrast
Abdomen and Pelvis CT W Contrast		

Radiology exam variations and pairing for various patient conditions have huge cost and outcome variances that range in the 100’s within the

same radiology modality type (CT,MRI, US, etc.), exam type (anatomical region, contrast, therapy, etc.), and in the 1000's in radiology as a whole.

The table above does not contain an exhaustive list even for this one modality and one anatomical region. Each selection has vast cost and output variations that are dynamic and largely unknown to ordering physicians. An example that demonstrates the cost and quality impact these variations can have is MRI of brain is commonly utilized in post-acute evaluation of stroke patients. With no other comorbidities, non-contrast MRI is the gold standard, but routinely MRI with contrast is ordered. This reduces value by increasing examination time, increasing risk to the patients by exposing them to contrast material, and increasing cost for the organization. Using just the tangible cost increase to the institution where a single use vial of contrast has a \$100 cost and then sorting historical data of one site to identify MRI brain scans ordered with contrast that list stroke as the only exam indication. If we then find 3,000 of these exams there is a potential cost savings of \$300,000 while increasing quality, patient satisfaction, and overall outcomes. This is one example of one small intervention in the vast numbers of possible exam pairings that are available and the effect on one facility. The opportunity for multiple site systems with large radiology volumes for increasing value in addressing radiology utilization has huge implications. The advent of CPOE now asks ordering physicians to select the appropriate exam from a list they have never seen before, have no knowledge as to what the orders actually mean for protocol content of the various options, no educational component for alternative exams, and no feedback loop mechanism for improving performance. This situation requires a mechanism where ordering physicians can access peer reviewed, evidence-based ordering information that has a recognizable reputation of high validity, timely (available at the time of placing an order to ensure the correct pathway is sought for maximum value of the intervention can be gained), and a peer forum to review performance, suggest new protocols or innovations, and address outlier behaviors that do not increase value for stakeholders.

As a response to spiraling utilization, variation, and costs associated with radiology exams, there have been several market and regulatory interventions by commercial and government payers in an attempt to address physician ordering behavior that have largely not been successful in increasing value. Preauthorization and precertification programs were placed by commercial and government payers; where permission and/or notifications from/to a third party is required before the study can be performed. Preauthorization is cumbersome, time consuming and a patient/physician dissatisfier as it is seen as focused on cost containment rather than clinical efficacy as noted in 2012 as, "Preauthorization systems are not efficient, as both the provider and the payer must hire staff to engage in the discussion of whether the imaging is appropriate and provide the necessary documentation", (Blackmore & Mecklenburg, 2012). A new regulation from the Centers for Medicare & Medicaid Services (CMS) aimed at curbing radiology

costs will go into effect January 1, 2021 where all high-end outpatient radiology exams will be required to report an appropriateness score when submitting for payment (appendix #4). The regulation requires that an independent and CMS approved clinical decision support (CDS) system must be consulted in order to receive an appropriateness score (1-9) prior to performing these exams. Low scores require justification and documentation in order to receive payment. Each facility or system must create their process for meeting these standards and as a universal regulation industry vendor have responded in creating IT platforms to accomplish this goal. Also, large evidence-based libraries have been created and approved by CMS that link patient condition types with various radiology exam options and overall appropriateness score. These libraries will be integrated into electronic health record (EHR) systems and imbedded within the CPOE module. When a physician places a radiology exam order, it will link to a third-party library resource where recommendations and appropriateness scores will be displayed. The physician can choose to continue with original order or change to a suggested more appropriate choice if applicable (see example Appendix #3). Each facility must choose an IT platform interface type for their particular EHR as well as the specific third-party library resource that it will use. Facilities will be tasked with development and communication of this implementation to their ordering physicians. Since emergency room patients are categorized as outpatients this regulation effects all testing facilities types. This will necessitate hospitals to implement this ordering process for in-patients as well to avoid having separate processes within their own EHR for ordering radiology exams.

IDENTIFICATION AND DISCUSSION OF SOLUTIONS

To respond to the challenges outlined in the literature (radiology utilization, physician variation, CDS requirements) the healthcare industry must seek innovative intervention strategies that address the unique characteristics of the various stakeholders, as a Becker's Hospital Review (2015) article stated, "The recent push for increasing value, lowering costs and improving population health management is driving those parallel silos together, and the systems that most effectively align the interests of all three will be most successful." This vertical integration of systems aimed at accomplishing the triple aims has resulted in the advent of accountable care organizations (ACO's) which reward physicians and facilities for lowering a populations Medicare costs while maintaining quality standards. In order to facilitate and realize these benefits, structures and tools for utilization management, evaluating outcomes, cost reduction opportunities, and increasing overall value must be implemented. As outlined above, radiology utilization provides an opportunity of high impact to accomplish these goals. Implementing a dual focused approach of peer reviewed radiology utilization management (Radiology Value Committee), coupled with an evidence-based medicine clinical decision support platform as required, is suggested as the preferred method to increase value for our example hospital stakeholders.

Knowledge and transparency for leaders around utilization oversight of key resources is a common and known technique for business and healthcare administrators alike. To go back to the automotive plant analogy, every decision maker in a Ford assembly plant knows the key products/processes, costs, inventory, and the outcomes they produce. In healthcare, administrators and physicians (decision makers) are largely blinded to this basic business knowledge so that this sound technique has not been brought to bear in many key services that drive revenues, cost, quality, and overall outcomes. Any administrative efforts to curb or address physician practice choices, especially for cost containment focused efforts, is a delicate subject. Physicians are highly educated professionals who value autonomy and resist any comment or control of their professional opinion, especially by non-physicians. Physicians can view cost containment focused efforts as a force opposed to quality health and possibly as unethical, (Sulmasy, 1992). As such, utilization management is often fiercely resisted by physicians and avoided by administrators who are dependent on physician utilization of their facilities. Physicians have great power and influence over who and how much healthcare gets consumed. Organizations are constantly recruiting and wooing physicians to use their facilities as their fiscal success depends on them. Any process perceived as negative by referring physicians is shunned and avoided at all costs. A balanced partnership approach is needed to accomplish organizational and industry goals that is not solely cost containment focused, but has a strong evidence base, and includes physician leadership in decision making. Including physicians would mean improved utilization as stated by (Hass et. al., 2015), "...providers lose out on significant opportunities for benchmarking and standardizing medical practices in ways that could both lower costs and improve care". Increases in value through vertical integration cannot be realized without utilization transparency and knowledge, a means to affect changes, a process to incorporate innovative cost friendly patient care with high quality outcomes, and a forum where physician and administrative leadership can evaluate and utilize these tools together constructively, (Schneider, 2015). Furthermore, since healthcare provider facilities must not only address utilization of costly diagnostic radiology technology, but also must meet new regulatory demands to implement radiology CDS support platforms, a committee of administrators and physician leaders able to navigate, coordinate, communicate, and effectively direct hospital resources is needed.

The business of healthcare is a local one, where each community and population have a myriad of various needs and organizations have various resources available (facilities, medical staff composition, etc.), (Lee, Lee, Kaplan, & Porter, 2015). To coordinate and respond to these local needs a facility "Radiology Value" committee who could provide the needed mechanism for creation of key performance indicators that are aligned with organizational utilization goals and to lead implementation of radiology CDS. These two organizational needs (utilization oversight, CDS implementation) compliment and foster one another. Introducing evidence-based medicine (EBM) protocols can have profound effects on increasing value through reducing costs and improving

quality as a 2011 peer reviewed study reported a 35% reduction in annual costs with similar outcomes, (Kolodziej, 2011). This study further illustrates that physician care decisions and ordering of resources are a main driver and opportunity for increasing value. Due to the CMS mandated requirement for CDS to be used for outpatient radiology exams starting in 2021, the libraries for evidenced based, best practice protocols already exist. This is a crucial advantage that removes a huge barrier towards utilization review. The information physicians need to adhere to best practice protocols can be accessed quickly and efficiently in real time at the time of placing the order through technology interfaces. Additionally, the impetus for implementation (meeting government requirements) is a well expected rationale that can be used to encourage leadership and physician participation. Effective implementing and meeting CDS requirements alone will not maximize benefit to stakeholders, since CDS does not address overall volume and currently does not specifically include in-patient populations, (Doyle, et al., 2019). In addition, a committee of influential transformational leaders is needed to develop key performance and utilization measures. The committee would also create a mechanism for innovative value increasing clinical issues to be heard, debated, implemented, monitored, and facility physician utilization data for organizational reviewed for understanding and value chain opportunities. Healthcare leaders must understand the producers of cost within their facility and a lever to effect needed changes to the structure. Creation of a forum where accountability to facility adopted evidence-based protocols can be used to align best care outcomes, resources, strategic goals, and physician performance is a salient need for a hospital to increase stakeholder value and foster a competitive advantage.

IMPLEMENTATION OF PLAN

The following steps are suggested to address radiology utilization and implementation of required CDS processes outlined above, through the creation of a radiology value committee to utilize data analytical products and processes for future organizational oversight and decision making that would be instrumental to successfully implement best practices. Review of the current state at Methodist hospital reveals these key aspects:

- No current facility utilization review
- No current radiology CDS committee or centralized control for implementation
- Employed physician hospitalist group
- Participation in an ACO, but not achieving cost containment goals (see appendix #2).
- Performance on imaging HCAPS scores demonstrates large opportunity (see appendix #2).

Implementation is suggested to occur in four stages with a one-year time frame since CDS is required by Jan 1 2021. In stage one, high level education and

acceptance by organizational leadership (C-suite-including Chief Medical Officer) will be sought. Once obtained, initial committee mission priorities and initial goals will be formulated. Stage two will be concerned with committee formation and begin with the selection of committee leadership. Committee leaders will then identify and invite organizational members (physicians and administrations) that will need to participate. The second stage will end with committee leadership and committee members validating initial committee mission priorities and goals. Making corrections, adding or subtracting items, and then reporting these outcomes. Stage three will be concerned with operationalization requirements for the committee to be successful in its stated purpose and mission. Evaluation of current personnel, data, and IT capabilities will occur and requests for additional resources as needed as well as selection of those resources will occur. Selection of a radiology CDS platform, radiology utilization software, use or not of third-party radiology management systems, and forming initial key process indicators. Stage four will mark the go live date for the committee into a functioning organizational entity. Establishment of feedback loops, accountability to goal metrics, and year to date effectiveness of committee begin to be gathered and adjustments made as needed. Greater detail and discussion of each stage implementation is outlined below.

Stage one-Acceptance (0-3 months). The first step in implementation of a facility wide project affecting all levels of the organization is education and buy-in of C-suite. Utilization review and standardizing processes are familiar aims in the c-suites of a majority of industries and especially in healthcare in the post ACA environment. On those merits the suggested intervention is expected to find general support here. The merits of these aims are less familiar to physicians who are not normally schooled in business acumen and who are skeptical of outside interference with their methods of practicing medicine. Since the proposed initiative involves interventions that will affect and are aimed at physician behaviors, special attention must be given to obtaining CMO support. Improving care needs to be the focus when approaching physicians who want to provide high quality care, but who are typically opposed to administrative cost controls dictating the practice of medicine. In the setting of this proposal, there are key advantages that must be utilized to gain physician leadership support and eventually the entire physician group as a whole. At our example hospital the hospitalists are employed physicians under the direction of the Chief Medical Officer, so that a measure of engagement already exists. Vertical integration in the established ACO provides the environment for administrative and physician partnership to increase value through triple aim goal attainment strategies. Efforts to gain initial CMO support should focus on respected industry physician groups broad acceptance of the opportunity where imaging is concerned and the educational support aspect. Peer reviewed articles where the American College of Physicians and the American association of Internal Medicine (AAIM) support these efforts and found that, "...computerized clinical decision support systems effectively improved testing behavior and reduced ordering of unnecessary diagnostic tests", (Litkowski,

Smetana, Zeidel, & Blanchard, 2016), should be referenced. Informing physician groups that the, “AAIM endorses the importance of broadly educating clinicians, future clinicians, and consumers of medical care about the dangers of excessive testing and to set expectations that minimize patient dissatisfaction”, (Litkowski, Smetana, Zeidel, & Blanchard, 2016). Respected physician peer group validation of the purpose, need, and positive effects on quality and patient satisfaction will have the greatest impact for physician engagement. These aspects should be strongly promoted during this phase. Since the initiative is designed to promote learning and best-practice evidenced-based medicine; physicians should be integral in making decisions that are aimed at improving quality care. Finally, some variation of a CDS platform must be introduced, so it would behoove physician’s participation in the selection and implementation program. Further advantages previously mentioned include existing digital libraries and IT interfaces for use of evidence-based protocols within current EHR platforms.

Once acceptance and agreement of the initiative has been achieved, the next step is to outline the initial mission and goals for the project in collaboration with and approval from the C-suite as described below.

Mission: To increase value for hospital stakeholders by improving quality, increasing patient satisfaction, and reducing costs.

Goals:

- 1) 100% CDS implementation by January, 1, 2021
- 2) Identification of radiology utilization and appropriateness key performance indicators
- 3) Creation of radiology business intelligence dashboard
- 4) Creation of educational, accountability, and feedback channels to foster communication of best practices in an innovative forum environment.

Stage 2-Forming (3-6 months). The next phase will consist of committee formation, beginning with selection of committee leaders. A well-respected senior physician with transformational leadership attributes/experience/education should be recruited per recommendation by Harrison (2016), “...able to communicate the mission and vision of the organization, examine new perspectives, solve problems creatively, and develop and mentor employees”. The physician champion will act as the most senior physician decision maker for the project and a key leader. If no other viable candidates exist, the CMO may need to initially participate in this capacity until the project becomes operational and can be handed off. Next, a senior administrator respected by the physician’s hospitalist group with an operational background and the capability and authority to organize meetings of director level staff. A senior director of operations, COO, CFO, or even the director of radiology could participate in this leadership project management role depending on leadership competencies they each may possess. These leaders

should embody and foster a collaborative partnership “...which includes focusing on leadership, joint decision-making and aligning strategy between physicians and administrators.” (2016), to define the needed organizational roles that will need to be represented. Both leadership and frontline staff for radiology, IT, billing and coding, marketing, physician relationship management, and the emergency department will need to participate from the administration side. Physicians from internal group by service line (emergency, internal medicine, neurology, etc.), as well as representatives/physicians from high referral external physician offices will be invited and recruited. Initial tasks for the group will be to validate the mission and initial goals as a group and make recommendations/edits accordingly. Next the group will need to set initial policies and procedures of when and how often they will convene, what data and information needs to be gathered and come to an agreement on prioritization and initial steps to meet stated goals.

Stage 3-Operationalizing (6-11 months). In view of the stated goals and timelines, the committee must make determinations on several fronts after evaluation of current state data and capabilities available. Since meeting CDS implementation deadline is the most tangible goal it should be initially prioritized. This will allow committee roles and their communication channels to become familiar organizationally on a less volatile subject than physician performance and behavior surrounding utilization concerns. Focusing on creating a working forum built on trust around CDS implementation, with an eye to larger future needs and goals of the committee would be suggested. Examples of the types of determinations the committee will need to initially undertake include the following:

1. Selection of CDS platform-
 - a. The committee will need to review and select which CDS platform and CDS library to interface with. Vendor specialist from current EHR platform should present options with associated costs, functionalities, and timelines for committee review.
 - b. Determination of hard stop or informational functionality. Will system allow non-appropriate orders to be placed?
2. Selection of initial key performance indicators (KPI) for CDS
 - a. Timeline goals for implementation stages of CDS per vendor selected
 - b. Timeline goals for communication and education of CDS per vendor selected.
 - c. Determination of organization appropriateness score acceptance.
 - d. Determination of % compliance of physicians with determined appropriateness score.
 - e. Determination of accountability communication channels for CDS KPI compliance.

3. Existing IT or outsourced radiology utilization products?
 - a. Reporting capabilities of CDS systems per vendor must be determined and evaluated as they are developed since they are currently unknown.
 - a. Review of organizational capabilities for data gathering and reporting.
 - b. Evaluation to determine if outsourced radiology business intelligence products are needed.

Radiology CDS reporting capabilities are still evolving. Their reporting structure and accountability aspects have not been well defined as the current push is to create needed functionality to meet regulatory requirements. What capabilities these platforms will have for aggregating appropriateness scores, revealing per provider ordering patterns, and highlighting opportunities are unknown and to address this industry need, several vendors are constructing products to do exactly those tasks. Historically, administrative personnel who often have clinical backgrounds, attempt compiling key metrics from copious amounts of data across several differing applications for review on static spreadsheets or simple histograms or on the high end to sophisticated dash boards able to be manipulated for dive down specific details. Though much can be gleaned from having a concerted effort as opposed to nothing, much value is lost without an automated well-tailored IT solution. Radiology utilization products are now emerging as their own industry where outsourced resources not only digest and display requested data, but also analyze and make recommendations. In view of the long-term goals of this committee, making an investment in a third-party product from the beginning, in lieu of spending valuable time attempting to create their own would be suggested, (Dorr, Cohen, & Adler-Milstein, 2018). A further benefit of this type of outsourcing would be the external benchmark data that third-party neutral vendors possess, as well as the expertise and industry trend insights they offer. These tools will be valuable as the committee shifts focus from CDS implementation towards global radiology utilization post CDS go live. In this way, as the committee becomes a functioning body around CDS implementation, the understanding of and methods for per provider performance data gathering and their benefits can organically gain momentum. Communication aimed at fostering physician engagement throughout this process to familiarize providers with these tools as well as the larger goals for utilization oversight is paramount. Much attention must be given to physician concerns and feedback during this phase. When approached in this manner, wide acceptance is expected in physicians who are keen to improve care, expand access and safety, and reduce nonbeneficial high cost treatments, (Tilburt et al.,2013). The final step of this stage, once selected platforms and reporting data are in place, is to test run for functionality of CDS and use historical data to test reporting capabilities of performance within selected product. Recommendations and learning should be reported for C-suite approval. Once approved, larger cohort of organizational leaders and staff physicians should be invited to view these products for understanding and feedback prior to go live.

Stage 4 -CDS go live (11-12 months- ongoing). Preparations for system wide used of CDS product will have included communication and education in preparation for go live date on the specific functionality of the CDS product. Various communication channels through physician groups and meeting agendas as well as multiple one on one training labs for all employed physicians prior to go live to foster acceptance and understanding will be implemented. Initial focus will be on seamless transition to new functionality, evaluation of CDS system performance and follow up with vendors for IT support as needed. The amount of time and attention the CDS implementation go live will necessitate will depend on system performance and feedback needs presented. Once system functionality is stabilized, committee can shift CDS into a monitoring focus and shift committee priorities towards utilization aims. Examples of interventions that are suggested for this stage include:

1. Monitoring and reporting of all established CDS KPI's
2. Development of pre/post implementation data for project effectiveness reporting
3. Development of post CDS, utilization focused, KPI's
4. Re-validation of mission and introduction of new goals post CDS
5. % compliance with agreed upon appropriateness level (i.e. at least 85% compliance with an aggregate appropriateness score of 7 or higher, etc.)
6. % compliance goal per provider or % of improvement year over year per provider.
7. Overall utilization within % range of internal benchmark of physicians in same service line.
8. Identification of targeted interventions needed by area specialist

The establishment of the committee as a partnership focused, institutional forum for administrators and physician leaders to strategically address radiology best practice interventions and utilizations should be sought and stated openly at this stage. Organizational stakeholders should understand that, "In order to explore the nature of a process, one needs a dynamic perspective to explain the causes and sequences of events over time", (Rogers, 2003, p. 196). Failing to collaboratively address the forces that are limiting value in healthcare will hamper development of the processes that will create efficient linkages for effective outcomes, (Mehrabian, 2017).

CONCLUSION

The dynamic environment of healthcare changes and challenges currently occurring, require innovative and cooperative interventions between industry stakeholders to address increased cost and lower outcomes. Huge opportunities exist to remove wasteful administrative and unwarranted medical interventions that could save an estimated \$800 billion, (Mehrabian, 2017). Review of the current literature reveals variation in radiology utilization as one main driver of

increased costs and lower outcomes. As in many other areas of healthcare, wonderful advances in radiology technology have provided the industry with the ability to improve care for patients. Processes for incorporating best practices, where cost reduction is not the ultimate aim, but giving the right care, at the right time, to the right patient every time must be created, implemented, and evaluated. These processes are ultimately aimed at increasing value for physicians, facilities, payers, and especially the patient. The need to maximize transactions along the value chain in healthcare is accelerating and increasing per the high cost investments made, (Fred, 2016). High-end radiology utilization has been identified as a main factor in increasing costs of U.S. healthcare services. Controlling rising costs and utilization has been elusive and difficult to achieve. Recent interventions utilizing CDS and utilization oversight have had promising results as reported in 2012, “At Virginia Mason, there was not simply a decrease in the rate of growth, but rather a sustained 20% to 25% decrease in imaging rates in the target conditions”, (Blackmore & Mecklenburg, 2012). Changing current utilization practice approaches by modifying physician behavior while increasing quality and reducing cost is needed. Our example hospitals’ current performance metrics in Medicare beneficiary spending and imaging HCAPS metrics reveal opportunities that require improvement. In addition, hospitals are required to implement new CMC radiology CDS standards by 2021. To accomplish these tasks, an integrated, multidisciplinary committee of physician and administrative leaders (Radiology Value Committee) has been proposed. This committee can present internal performance data of employed physicians, coupled with filtering ordering patterns through CDS support software for comparison with best in industry practice guidelines and appropriateness scores. The committee will also foster a physician peer forum for accountability and innovations leading to increased value and improved patient outcomes.

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BRAND LOYALTY, BRAND TRUST, PEER INFLUENCE AND PRICE SENSITIVITY AS INFLUENCERS IN STUDENT COMPUTER PURCHASE

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ABSTRACT

Theories indicate that price and peer influence are important factors that impact purchase decisions. Brand trust is another key factor for consideration when looking at why individuals purchase certain products. This empirical study tested nine hypotheses focusing on how brand trust, brand loyalty, peer influence and price sensitivity affected computer brand choice among university students. The purpose of this empirical research was to investigate the association between price sensitivity, brand trust, brand loyalty and peer influence on a purchase decision. Companies have to stay competitive by maintaining relationships with customers. Research reveals that it costs more to acquire new customers rather than to maintain existing ones. Therefore, it is crucial for companies to build brand relationships by developing trust with their customers. In addition, social groups may influence individual purchase decisions. The results revealed that students' choice of a higher-end and more expensive computer brand were influenced by the computer brands used by their peers as well as brand trust and brand loyalty. Price sensitivity was negatively influenced by peer influence and brand trust. These results revealed that it is essential to build brand trust to ensure brand loyalty and that brand loyalty is an important factor in student choice of more expensive computer brands.

Key Words: Brand trust, peer influence, price sensitivity, brand loyalty, brand choice

INTRODUCTION

Trust is defined as “a willingness to rely on an exchange partner in whom one has confidence” (Moorman, Zaltman, & Deshpande, 1992, pg 315). Moorman demonstrated trust as an outcome of relationship quality along with satisfaction and opportunism, stating that trust reduces the perceived uncertainty and the level of customer vulnerability. Hence, trust helps consumers gain confidence to consume a particular brand or product (Ulusua, 2011). Delgado-Ballester and Munuera-Alemén (2001) explained that brand trust is earned by customers

observing the brand values that marketers try to create, which go beyond customer satisfaction. Brand value acts as a bridge between customers and the company's objective. Positive brand value can open the gate for a customer to trust the brand. For example, some companies donate to help fight viral disease. The customers witness the action and feel positive emotions because they share the same underlying values with the brand mission for fighting disease. As a result, it creates a positive brand image and customers are more motivated to support and trust the brand.

Brand trust includes the functional and emotional values that customers experience from consuming services or products. Functional value is the physical promise that companies offer to customers. This can include quality of the products, consistency delivering promises, reliability, innovation, firm size and clarity. These factors ensure the functionality and capability of the company to deliver the goods and services promised to customers. On the other hand, emotional value is another consideration that customers perceive toward brands. Long-term customers share similar objectives and motives towards brands. Consumers tend to observe the value that the brand has with a common set of principles that they find acceptable. Such values can include effective communication, ethical behaviour, consistency of past actions (like social responsibility) and other actions consistent with the brand's promise (Delgado-Ballester and Munuera-Alemén, 2001; BAI). Literature reveals that functional value and emotional value influence brand trust (Song, Hur, & Kim, 2015).

Delgado-Ballester and Munuera-Alemén (2001) demonstrated that customer satisfaction and brand trust create a strong relationship which encourages customer commitment to the final purchase decision. Therefore, it's crucial for the companies to adjust and adapt to the welfare and interests of customers' perceptions. This way, customers can feel more secure about the brand and trust it. Delgado-Ballester and Munuera-Alemén (2001) stated in their discussion "honest communication and information about the brand, shared values, brand reputation and non-opportunistic behaviour from the part of the brand company may enhance brand trust" (Delgado-Ballester and Munuera-Alemén, 2001, p. 1254). Their research indicated that brand trust has a stronger influence than satisfaction on customer commitment. Story & Hess (2006) stated that satisfaction is a weak predictor of brand loyalty and current brand trust isn't a reliable predictor of future brand loyalty (Story, & Hess, 2006). Therefore, companies need to build relationships between the brand and customers in order to capture long-term customer loyalty. It's crucial to understand the role of brand relationship to maintain long term brand trust.

Dan Hill (2007) described customer relationship as brand strategy. Building and sustaining strong emotions with customers helps to create a strong bond between the company and customer, or brand relationship. Hill depicted that positive passion, emotion and feeling are forces that lead to brand trust and brand loyalty. The emotional values and beliefs from the customer are as important as brand

equity. Brand equity is shaped by experiences and perceptions of the brand that the consumer gains over time (Norskov, Chrysochou, Milenkova, 2015). Customers perceive the value of product brand rather than the product itself. The importance of loyalty in business is to have consistent support from customers. Brand loyalty is conceptualized as a positive relationship between the buyer and the seller (Shirin & Puth, 2011). Buyers who are brand loyal may voluntarily promote the seller's product or service to friends or family. Buyers may consistently repurchase the brand's product or service (Shirin & Puth, 2011). Therefore, companies should build brand loyalty in order to retain customers and boost profits.

Makgosa and Mohube (2007) define peer influence as the extent to which peers exert influence on the attitudes, thoughts, and actions of an individual. Their theory reveals that social groups have strong influence on consumers' decisions. Informational influence is the perception that enhances individual thinking of the environment or the ability to cope with an aspect of the environment. Informational influence affects the individual who accepts information from a social group and then desires to make informed decisions influenced by others. The literature reveals that individuals tend to observe the behavior of others and then actively search for any information to fit into the social group. If the information the individual perceived is reliable and trustworthy, they are likely to be influenced (Makgosa & Mohube, 2007). With utilitarian influence, individuals seek to obtain social approval or to avoid social disapproval from peers. This theory explains that individuals tend to perceive that others in his or her social group have the ability to arbitrate rewards or punishments. Literature also reveals that the individual's behaviour is motivated to earn rewards or avoid punishment within his or her social group or from their significant other (Makgosa & Mohube, 2007). Value expressive influence is the concept that individuals feel that specific brands create a positive view that enhances the image others have of him or her.

A brand community is a group of consumers who have social relationships with each other based on consumption or interest in a product (Habibi, Laroche, & Richard, 2014). Brand communities create physical and/or virtual environments where people join in activities that are related to the brand or product. Researchers have discovered that people who participate in brand communities often feel positive about the products because participants share a similar set of emotional values and perceptions. Marketers understand this opportunity and they create a community in order to build brand trust (Habibi, Laroche, & Richard, 2014).

Price sensitivity is a major concern when companies create a pricing strategy. According the Zeng, Yang, Li & Fam (2011), price sensitivity is the degree to which consumers hesitate about the price point of certain products in terms of economic and psychological gains. It is difficult to predict customer price sensitivity because of the complexities of customer perceptions (Zeng, Yang, Li, & Fam, 2011). Literature reveals that customer price sensitivity is focused on price elasticity from an economic point of view, but other variables such as demographic, psychographic, product category, product life cycle or customer

perceptions, that should also be considered. Theory suggests that customers initially assess what is a fair price for certain products based on their perceptions of perceived quality and perceived cost. Susan Gunelius (n.d.) stated in her blog that “The fundamental rule of pricing tells us that the price charged for a product must match the value consumers perceive that they get when they purchase that product. That’s where effective branding can allow “premium” branded products to sell at a premium price. The market will bear that price and consumers willingly pay it because they perceive the value the high-end brand delivers to be worth the high price tag” (Gunelius, n.d.).

In order to understand consumer price perception, one must first look at perceived quality as compared to the price. The price-perceived quality relationship is also related to the concept of reservation prices. When consumers buy a product they bear in mind a reservation price. This price actually creates a cost-benefit analysis which acts as a basis for the comparison between the benefit that is related with the consumption of the product with the cost resulting from its purchase (Hamilton, & Chernev, 2013). Besides monetary cost, customers perceive other costs: time cost, which is the time consumers spend to get the product or service; psychic cost, which is the time consumers think or stress about the product; energy cost, which is the energy consumers expend to obtain the product. (Zeng, Yang, Li, & Fam, 2011).

There are several factors to consider when determining price. These factors included the superior quality of the products, high production costs or long distribution channel. For example, Rolex’s watch is handmade and assembled by specialized artisans. Therefore, it is more expensive than a regular watch that may be produced in third world countries. These factors increase the likelihood of a higher price tag. Overall, buyers of luxury goods often aren’t as price-sensitive as bargain buyers.

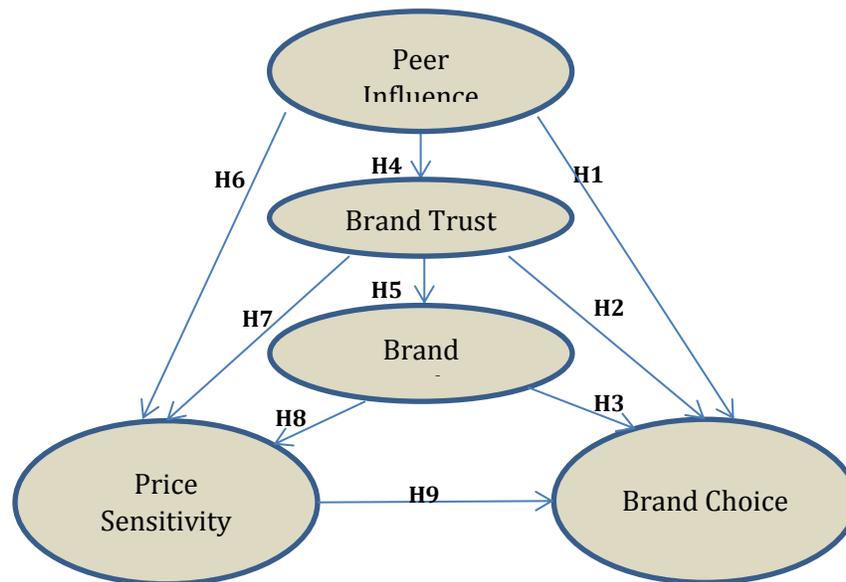
RESEARCH GOALS AND METHODOLOGY

This analysis explored the association between brand trust, brand loyalty, peer pressure and price sensitivity on students’ purchasing decisions. Based on the literature review, research questions were created to guide the study and a conceptual model was developed. The conceptual model appears in Figure 1. The conceptual model then led to the development of nine hypotheses to be empirically tested.

- H1: When peers own a particular brand (peer influence) students are more likely to purchase that brand (brand choice)
- H2: If brand trust is high for a brand, students are more likely to purchase that brand (brand choice)
- H3: If students have owned the same brand before (brand loyalty), they are more likely to purchase that brand again (brand choice)
- H4: High degree of peer influence will increase brand trust for a particular brand.

- H5: Positive brand trust will increase brand loyalty
- H6: Strong peer influence will reduce price sensitivity
- H7: Positive brand trust reduces price sensitivity
- H8: Strong brand loyalty will reduce price sensitivity
- H9: When price sensitivity is high, consumers do not choose high-end brands (Brand choice)

Figure 1: Conceptual Research Model for Computer Purchase Decision



This research study tested the hypotheses by exploring the differences in students' computer purchases. Due to the fact that consumer behavior is affected by large number of variables this research focused on computer purchases with respect to Apple computer users and non-Apple computer users. Apple was considered a high-end brand, while other computer brands like Lenovo, Asus, Acer, HP, Samsung, Toshiba, Microsoft, or Sony, were considered low to moderate level brand names.

A campus-wide survey of 89 students was designed to collect the information needed to address hypotheses guiding this research. The survey was cleared by the University Research Ethics Board. Survey questions were constructed to capture the constructs in the model: brand trust, brand loyalty, peer influence and price sensitivity. Brand trust measures captured aspects of emotional and functional values. Scales were created to measure brand trust, brand loyalty and peer influence. Each scale was constructed using confirmatory factor analysis and

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reliability analysis. Demographic information was collected to get a profile of students who responded. This demographic information included gender, age, ethnicity and program of study.

The Peer Influence Scale consisted of four items that captured various kinds of peer influence including informational, utilitarian and value expressive. Informational peer influence occurs when individuals seek advice from trustworthy people to make informed decisions in order to fit into a social group. Utilitarian peer influence occurs when an individual seeks for acceptance in his/her social group and he/she tries to avoid punishments in the social group by practicing similar behaviors to peers. Value expressive peer influence is when an individual wants to satisfy a specific group's expectations towards him/her. The scale items were measured using a Likert Scale ranging from 1) Strongly Disagree to 5) Strongly Agree. The final Peer Influence Scale was reduced to three out of four items following reliability analysis.

The Brand Trust Scale consisted of five items that captured both emotional and functional values of the computer brands. Functional value is the perception that customers observe through brand performance and promise. Emotional value is the perception that customers share with the brand on social responsibility. Each statement was measured on a five-point Likert Scale ranging from 1) Strongly disagree to 5) Strongly Agree.

A Brand Loyalty Scale was created using dummy coding in order to categorize loyal (1) and non-loyal (0) customers. Respondents who responded "Yes" to questions about repurchasing and recommending a brand were categorized as brand loyal. Those who answered "No" or "Don't know" to questions about repurchasing and recommending a brand were categorized as brand non-loyal. Confirmatory factor analysis and reliability analysis showed that these two items, repurchasing the computer brand and recommending the brand to others, were suitable for inclusion in an additive scale.

The brand name of the computer chosen by the student was measured as Apple/non-Apple, with Brand Choice dummy coded as zero for non-Apple users and one for Apple users. Dummy coding was also used to analyze price sensitivity. Respondents who thought that a brand was more important than price were coded as zero (not price sensitive) and respondents who thought price was more important than brand were coded as one (price sensitive).

Results were analyzed via SPSS software. In addition to descriptive statistics, various significance tests were conducted based on the level of data measurement used. These tests included factor analysis and reliability analysis for scale development, the creation of profiles to capture some constructs and regression analysis to test the hypotheses. The proposed model was ideal for using multiple regression. However, multiple regression could not be used due to multicollinearity among predictor variables so bivariate regressions were

conducted with each predictor variable using computer brand choice as the criterion.

RESULTS AND DISCUSSION

A sample of 89 university students completed survey. The research revealed that 45.5% participants were male and 54.5% participants were female. Nearly 68.6% of those were between 18 to 25 years old, 23.3% were between 26 to 35 years old and 8.1% were above 36 years old. The results showed that 82.5% of the students were Canadian and 17.5% were from other ethnic groups including Arabic and Chinese. About 52.9% of the participants were Business Administration students, 22.4% were Public Relations students and the rest were enrolled in other programs. The results are summarized in Table 1.

Table 1: Sample Demographics

	Number	Percentage
Male	40	45.5
Female	48	54.5
Total	88	100
18 to 25	59	68.6
26 to 35	20	23.3
36 or over	7	8.1
Total	86	100
Canadian	66	82.5
Other Ethnic	14	17.5
Total	80	100
Bachelor of Business Administration	45	52.9
Bachelor of Public Relation	19	22.4
Bachelor of Arts and Science	10	11.8
Bachelor of Tourism and Hospitality and Management	5	5.9
Other programs	6	7.1
Total	85	100

The research revealed that 48.2% of students utilized Apple computers and 51.8% of students utilized other computers, such as Samsung, Acer, Toshiba, HP, Asus, Dell, Surface or Lenovo. Therefore, the results show that the Apple brand is very significant because as a single brand it almost equaled the other brands in product adoption.

A scale to measure Peer Influence was created from the four peer influence measures. After conducting confirmatory factor and reliability analyses the results showed that the fourth peer influence item was not suitable for inclusion in the scale because the factor loading was below 0.7. Therefore, this question was

removed in order to produce a valid scale for peer influence. Each item was measured on Likert Scale ranging from 1) Strongly Disagree to 5) Strongly Agree. For the final scale, which consisted of the three statements measuring peer influence, the Cronbach’s alpha was very close to 0.60 which is considered acceptable for an additive scale.

The Peer Influence Scale score ranged from five to of 15 with a mean of 10.89 and standard deviation of 2.57. The statement, “Most of my friends use the same computer brand as I do,” had an average scale rating of 3.31, which is almost in the middle of Likert Scale measure with a slightly positive slant that students followed the same computer purchase as their peers. “I got advice from my friends before buying this computer,” had a similar result with an average of Likert rating 3.34. It showed a slightly positive result that students seek advice from their friends before making computer purchase decision. The statement, “I feel comfortable using this brand of computer when I am with my friends,” had an average scale value of 4.25 showing that that both Non-Apple users and Apple users were comfortable using their personal computers near their friends.

Table 2: Peer Influence Measures and Scale*

Peer Influence Items and Scale	Number	Min	Max	Mean	Std. Deviation	Factor Loading
Q2-1: Friends who use the same computer brand	88	1	5	3.31	1.37	0.804
Q2-2: Seeking advice from friends before purchase computer	88	1	5	3.34	1.22	0.720
Q2-3: Comfortably using computer brand among friends	88	1	5	4.25	0.82	0.700
Q2-4: Others think highly of individuals owning specific brand	88	1	5	2.9	1.13	N/A
Peer influence scale (Q2-1, 2-2 & 2-3)	88	5	15	10.89	2.57	Sum=959
<i>*Cronbach's Alpha= 0.581</i>						
<i>Scale: 1) Strongly disagree, 2) Disagree, 3) Neither agree nor disagree, 4) Agree, 5) Strongly agree</i>						

The statement, “I think owning this brand of computer makes others think more highly of me,” had an average scale rating of 2.90 indicating that Apple users and non-Apple users were not concerned about what they believed others thought about brands when they were using their computers. The results are summarized in the Table 2 above.

The research showed that 47.2% of respondents thought that their computer brands were expensive brands, 44.9% of respondents thought that their computer brands were reasonably priced and 7.9% of respondents thought that their computer brands were lower priced. The results showed that 11.4% of students were willing to pay \$2,500 or more for their computer. Twenty-eight percent were willing pay between \$1,500 to under \$2,500, 30.7% were willing to pay \$1,000 to under \$1,500, 14.8% were willing to pay \$750 to under \$1,000, and under 15% were willing to pay \$750 for their personal computers. The results also show that 27.3% of the students were willing to pay even more for their next purchase, 40.9% of the students did not want to pay more than what they had paid and 31.8% of the students did not know if they were willing to pay more. The results are summarized in Table 3.

Table 3: Price Sensitivity and Brand Perception

	Number	Percentage
Generally an expensive brand	42	47%
Generally a reasonably brand	40	45%
Generally a lower price brand	7	8%
Total	89	100%
\$2,500 or more	10	11%
\$1,500 to under \$2,500	25	28%
\$1,000 to under \$1,500	27	31%
\$750 to under \$1,000	13	15%
Under \$750	13	15%
Total	88	100%

The results for Brand Trust Scale revealed that the mean Likert rating for emotional value was 10.66 out of 15 and the mean rating for functional value was 7.51 out of 10. Confirmatory factor analysis and reliability analysis were used to ensure that the Brand Trust Scale was an effective measure. The results showed that most of the factor scores were high, and the Cronbach’s alpha was 0.792. Therefore, these five questions were suitable for inclusion in an additive scale to measure brand trust. The results showed that brand trust scale had the total score ranging from 8 to 25 with an average of 18.15 and a standard deviation of 3.18. The results are shown in table 4.

Table 4: Brand Trust Scale*

Scale items	Number	Min	Max	Mean	Std. Deviation	Factor Loading
Q6-1:Brand contributes to community	87	1	5	3.37	0.68	0.577

(<i>Emotional Value</i>)						
Q6-2: Social Responsible brand (<i>Emotional Value</i>)	87	1	5	3.55	0.66	0.686
Q6-3: Honesty to customers (<i>Emotional Value</i>)	87	1	5	3.75	0.82	0.73
Q6-4: High Quality brand (<i>Functional Value</i>)	87	1	5	3.76	1.07	0.848
Q6-5: Reliable computer brand (<i>Functional Value</i>)	87	1	5	3.72	0.99	0.831
Brand trust scale	87	8	25	18.15	3.18	Sum= 1579
*Cronbach's Alpha= 0.792						
Scale: 1) Strongly disagree, 2) Disagree, 3) Neither agree nor disagree, 4) Agree, 5) Strongly agree						

Results showed that 67.8% of respondent were happy with their computer brand and they were likely to repurchase the same computer brands. On the other hand, 32.2% of respondents were not satisfied with their current computers and they were likely to change their computer brands in the future. About seventy-six percent of students would recommend the same brand they use to their friends and 23.3% of students would not recommend it. The results are summarized in Table 5.

Table 5: Brand Loyalty

	Number	Percentage
Would repurchase the same brand		
Non-Loyal	28	32.2
Loyal	59	67.8
Total	87	100
Would recommend the same brand to others		
Non-Loyal	20	23.3
Loyal	66	76.7
Total	86	100

Using the factor analysis and reliability test on SPSS to measure brand trust scale, the results showed a Cronbach’s alpha is 0.713 and a factor score above 0.7. Therefore, Brand Trust Scale was reliable. The item rating for “Repurchase the computer brand” had a scale average of 0.67 on the dummy coded variable (Std. D=0.47, N=86) and the item rating for “Recommend the brand to others” had a scale average of 0.76 on the dummy coded variable (Std. D=0.42, N=86). The results from 86 respondents showed the Brand Loyalty scale ranged from 0 to 2 with an average mean of 1.44 and standard deviation of 0.79. The results are summarized in Table 6.

Table 6: Brand Loyalty Scale*

Scale items	Number	Min	Max	Mean	Std. D	Factor Loading
Q7: Repurchase the computer brand (Dummy coded)	86	0	1	0.67	0.47	0.882
Q8: Recommend the brand to others (Dummy coded)	86	0	1	0.76	0.42	0.882
Brand Loyalty Scale	86	0	2	1.44	0.79	Sum=124
*Cronbach's Alpha= 0.713						
Scale: 1) Loyal, 0) Non Loyal,						

The research showed that price sensitivity was a factor for the majority of students. The research showed that 42.4% of students thought that brand was more important than price and 57.6% thought that price was more important than brand. The results are summarized in the Table 7 below.

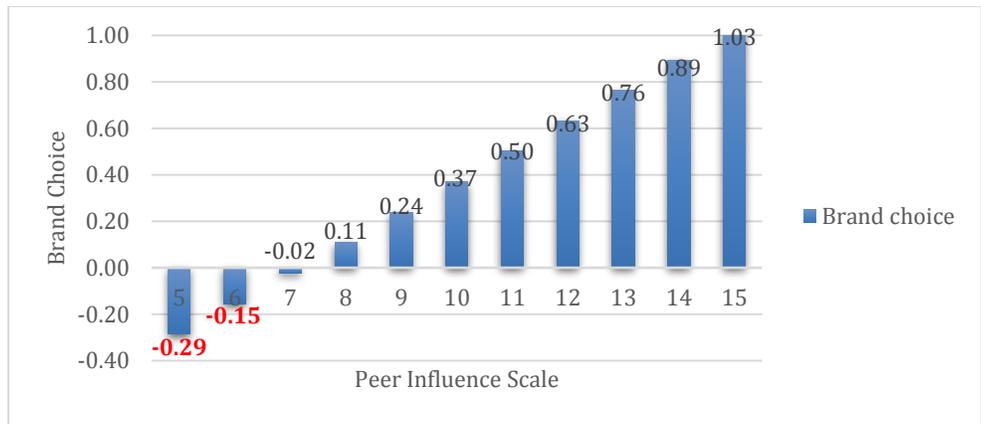
Table 7: Price Sensitivity

	Number	Percentage
Not Price Sensitive	36	42.4
Price Sensitive	49	57.6
Total	85	100

Nine hypotheses were created to explore the statistical relationships within the conceptual model designed in this research. A regression analysis confirmed Hypothesis 1, demonstrating that Peer Influence affects Brand Choice. The null hypothesis was rejected. Peer Influence explained 46.5% of the variation in Brand

Choice ($F=69.655$, $df=84$, $p=0.000$), with a y-intercept of -0.94 and a regression coefficient of 0.131 . The positive association showed that the Brand Choice increased as the Peer Influence Scale increased. The results are shown in Figure 1. Given that Apple computer brand was coded as one and Non-Apple computer brands were coded as zero those who chose Apple computers reported more peer influence than those who bought non-Apple computers. The results showed that peers play key a role influencing others' purchasing decisions. The results supported the theory that proposed by Makgosa and Mohube (2007) that social groups have strong influence on consumers' decisions.

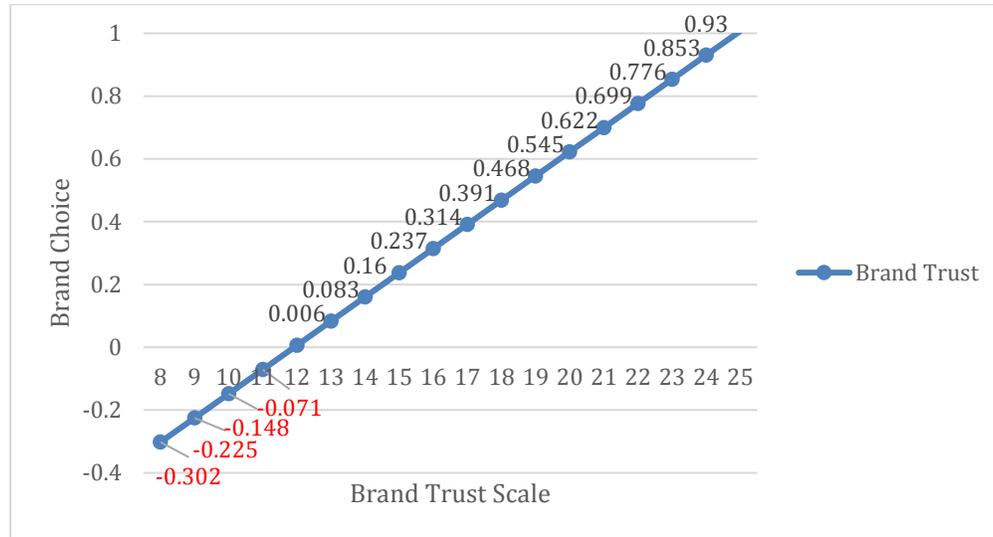
Figure 1: The Effect of Peer Influence on Brand Choice



Total Sample: 85

A regression analysis confirmed Hypothesis 2 that Brand Trust affects Brand Choice. The null hypothesis was rejected. The results revealed a statistically significant association between Brand Trust and Brand Choice. Brand Trust explained 22.4% of the variation in Brand Choice ($F=23.437$, $df=82$, $p=0.000$), with a y-intercept of -0.918 and a regression coefficient of 0.077 . The positive slope showed that Brand Choice increased as the Brand Trust scale increased. The results are shown in Figure 2. Given that Apple computer brand was coded as one and non-Apple computer brands were coded as zero those who chose Apple computers would trust their brand more than those who bought non-Apple computers. The results displayed that students who trusted the Apple brand were more willing to repurchase their brand than those who owned Non-Apple computers. Many researchers also supported that the functional value and emotional value really influence consumers' purchasing decisions. Dan Hill explained in his research that companies that successfully built and sustained strong emotions with customers usually remained in business with existing customers (Hill, 2007). The results from this research have shown promising evidence that Brand Trust should be a major consideration for companies to focus on for their marketing strategies.

Figure 2: The Effect of Brand Trust on Brand Choice



Total Sample: 83

Figure 3: The Effect of Brand Loyalty on Brand Choice



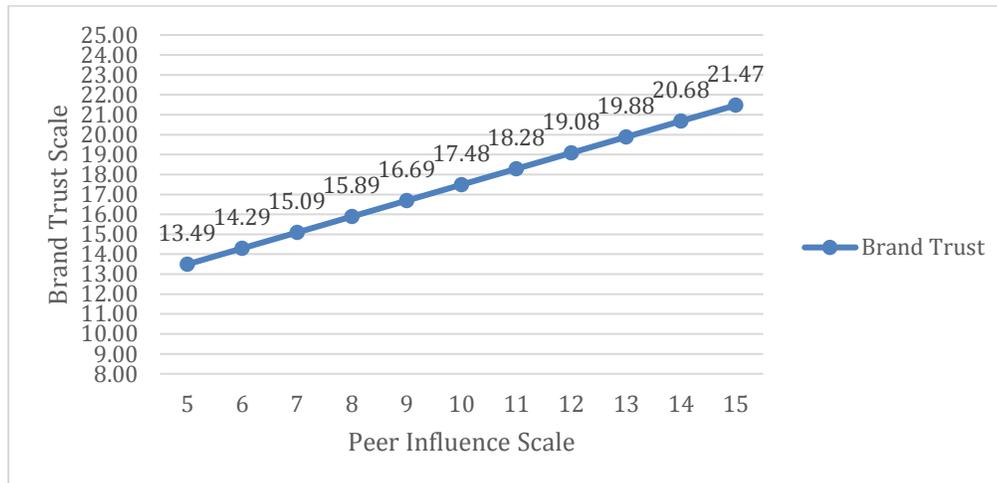
Total Sample: 82

A regression analysis confirmed Hypothesis 3 that Brand Loyalty affects Brand Choice. The null hypothesis was rejected. The results revealed a statistically significant association between Brand Loyalty and Brand Choice. Brand Loyalty explained 24.8% of the variation in Brand Choice ($F=26.358$, $df=81$, $p=0.000$), with a y-intercept of 0.035 and a regression coefficient of 0.318. The positive slope shows that Brand Choice increased as Brand Loyalty Scale increased. The results are shown in Figure 3 above. Given that Apple computer brand was coded as one

and Non-Apple computer brands were coded as zero those who chose Apple computers were more loyal to their brand than those who bought non-Apple computers.

A regression analysis confirmed Hypothesis 4 that Peer influence affects Brand Trust. The null hypothesis was rejected. The results revealed a statistically significant association between Peer Influence and Brand Trust. Peer influence explained 46.5% of the variation in Brand Trust ($F=63.246$, $df=85$, $p=0.000$), with a y-intercept of 9.503 and a regression coefficient of 0.798. The positive slope shows that Brand Trust Scale increased as Peer Influence Scale increased. The results are shown in Figure 4. Therefore, students who owned Apple computers were more heavily influenced by their peers than those who owned Non-Apple computers. Habibi, Laroche & Richard (2014) stated that brand community creates similar interests between peers. Using Apple as an example, Apple Stores offer group sessions for people to learn about Apple products. Moreover, Apple Stores also came up with the idea to allow people to play with Apple products before purchasing. This research explored peer influence in a student environment. Using the concept of brand community within the student environment the results show a strong positive indication that peer pressure does influence brand trust. The results appear in Figure 4.

Figure 4. The Effect of Peer Influence on Brand Trust

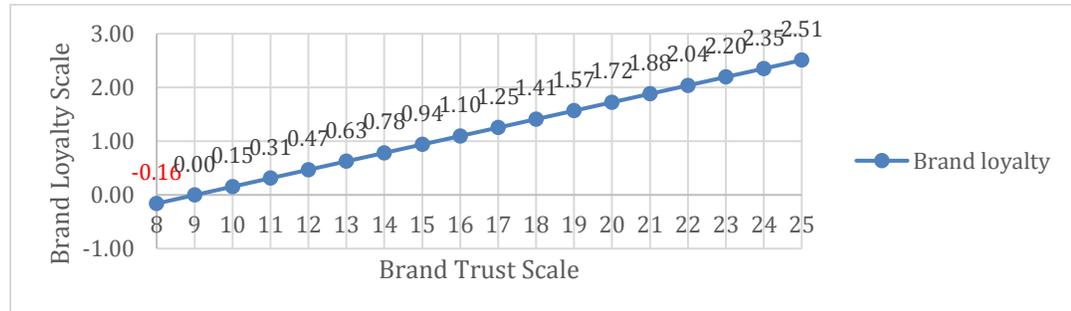


Total Sample: 86

A regression analysis confirmed Hypothesis 5 that Brand Trust affects Brand Loyalty. The null hypothesis was rejected. The results revealed a statistically significant association between Brand Trust and Brand Loyalty. Brand Trust explained 39.6% of the variation in Brand Loyalty ($F=54.399$, $df=84$, $p=0.000$), with a y-intercept of -1.416 and a regression coefficient of 0.157. The positive slope shows that the Brand Loyalty Scale increased as the Brand Trust Scale increased. Students who owned Apple computers were more loyal to their brand

than those who owned Non-Apple computers. The literature showed that the results were mixed, but brand trust may help to increase brand loyalty. The results from this research are positive. This is particularly true for Apple computer users because they appear to be more loyal to Apple than non-Apple computer users were to their brands. Apple computer users had higher trust for their brand than did those who owned Non-Apple computers. The results are shown in Figure 5.

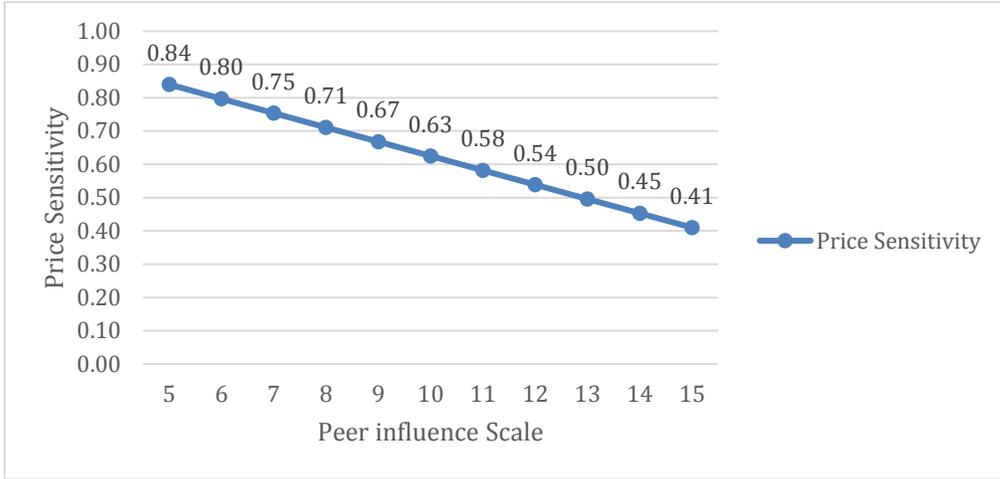
Figure 5: The Effect of Brand Trust on Brand Loyalty



Total Sample: 85

A regression analysis confirmed Hypothesis 6 that Peer Influence affects Price Sensitivity. The null hypothesis was rejected. The results revealed a statistically significant association between the Peer Influence Scale and Price Sensitivity. The Peer Influence Scale explained 46.5% of the variation in Price Sensitivity ($F=4.250$, $df=83$, $p=0.042$), with a y-intercept of 1.055 and a regression coefficient of -0.43. The negative slope shows that the Price Sensitivity decreased as the Peer Influence Scale increased. The results are shown in Figure 6. This shows that Apple computer users were less price sensitive than those who were Non-Apple computer users. Based on the results from the research it appears that when peer influence increased, price sensitivity decreased. Students who were influenced by their peers were not as price sensitive as those who were not influenced by their peers. This may explain why Apple computer users were not as price-sensitive as Non-Apple computer users.

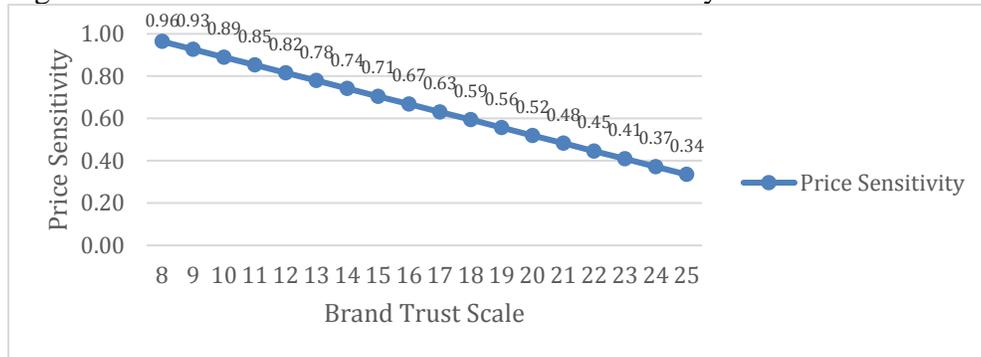
Figure 6: The Effect of Peer Influence on Price Sensitivity



Total Sample: 84

A regression analysis confirmed Hypothesis 7 that Brand Trust affects Price Sensitivity. The null hypothesis was rejected. The results revealed a statistically significant association between Brand Trust and Price Sensitivity. Brand Trust explained 5.8% of the variation in Price Sensitivity ($F=5.089$, $df=83$, $p=0.027$), with a y-intercept 1.260 and a regression coefficient of -0.037 . The negative slope shows that the Price Sensitivity decreased as the Brand Trust Scale increased. It appears that Apple computer users were less price sensitive than those who were Non-Apple computer users. The results showed a significant decrease in price sensitivity when students engaged with a brand. As brand trust increased. The results are shown in Figure 7.

Figure 7. The Effect of Brand Trust on Price Sensitivity

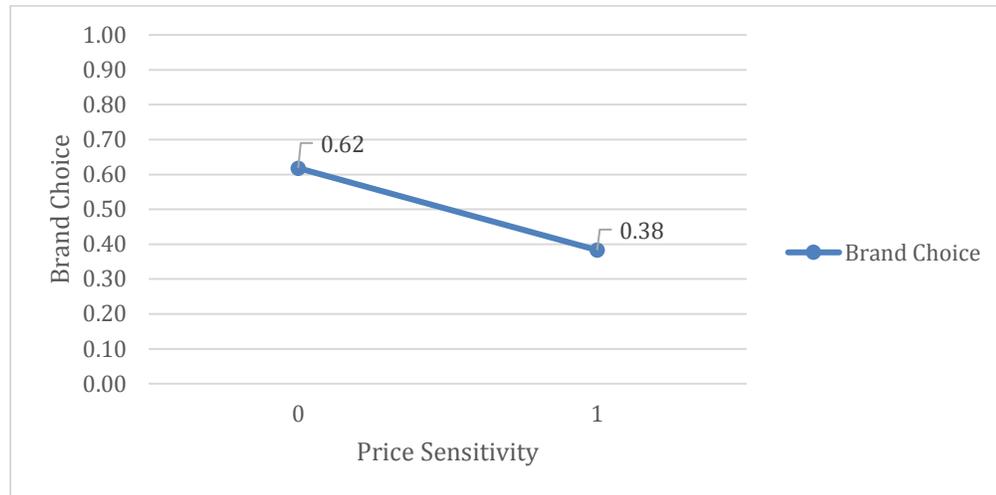


Total Sample: 84

A regression analysis confirmed Hypothesis 9 that Price Sensitivity affects Brand Choice. The null hypothesis was rejected. The results revealed a statistically

significant association between Price Sensitivity and Brand Choice. Price Sensitivity explained 4.2% of the variation in Brand Choice ($F=4.485$, $df=80$, $p=0.037$), with a y-intercept of 0.618 and a regression coefficient of -0.235. The negative slope shows that the Brand Choice decreased as the Price Sensitivity Scale increased. The results are shown in Figure 8. Given that Price Sensitive students were coded as one and non-price sensitive students were coded as zero, those who purchased Apple computers were less price sensitive than those who purchased Non-Apple computers. Price sensitivity impacted brand choice. Results showed that price sensitive students tended to choose Non-Apple computers because most non-Apple computers cost less than Apple computers.

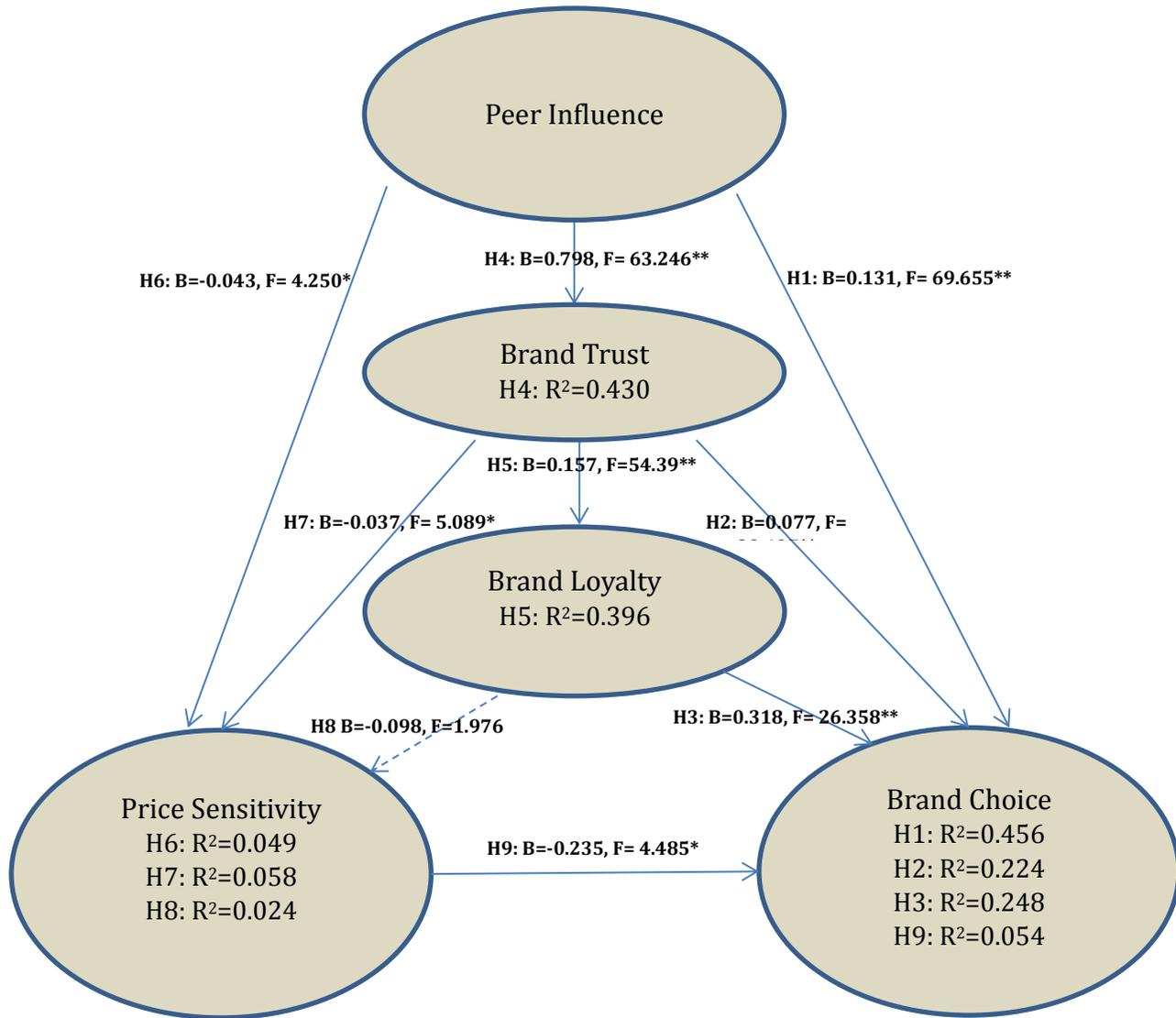
Figure 8. The Effect of Price Sensitivity on Brand Choice



Total Sample: 81

A regression analysis of Hypothesis 8 revealed that Brand Loyalty did not have a statistically significant effect on Price Sensitivity. The null hypothesis could not be rejected ($F=1.976$, $df=82$, $p=0.164$). The results of the hypotheses tests are shown in the Conceptual Model in Figure 9.

Figure 9. Research Results in Conceptual Model



CONCLUSIONS AND RECOMMENDATIONS

Many studies have been done to analyze the students’ purchasing behaviors. Most of the studies focused on price, brand, or peer influence. This research looked at multiple variables to explore influences from peer influence, brand trust and price sensitivity on choosing a brand. Using Apple and non-Apple computers as a product to test the hypotheses this research captured statistically significant results based on students’ perceptions. The results are interesting given that almost half

of the respondents owned Apple computers. The results showed that the Apple computer brand is very strong in term of peer influence, brand trust (quality, reliability, consistency) and brand loyalty. Quite simply this means that within the student community, if one student owns an Apple computer, he/she likely influences his/her friends to purchase Apple computers, too. The results also showed that Apple users have strong faith in the Apple brand in terms of reliability, consistency and quality. Surprisingly, the results showed that price was not an obstacle for students who owned Apple computers.

There were some limitations with this research. First, the sample size was small so the results should be considered exploratory. Also, two of the independent variables in the conceptual model slightly violated the normal distribution assumption behind linear regression. Brand Loyalty slightly skewed to the right and the kurtosis of the Price Sensitivity curve was too peaked. After trying several different variable transformations the variables could not be transformed to a normal distribution and the original variables were used in the analysis. These limitations may have affected the significance testing of Hypothesis 8 that asserted an influence on price sensitivity on brand loyalty.

Further research is recommended to better understand the relationships between peer influence, brand trust, brand loyalty and price sensitivity on consumer brand choice. More robust multivariate methods could minimize the chance of a Type I error in the analysis. A larger sample size would enable more sophisticated research methodologies. Also, studies of different populations from university students, or of products other than computers, may result in different outcomes.

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