ASBBS eJOURNAL

EDITOR: WALI I. MONDAL

VOLUME 11, NUMBER 1 **ISSN 1557-5004** **SUMMER 2015**

INDEX

ASBBS EJOURNAL IS A REFEREED PUBLICATION OF THE ASBBS AND PUBLISHED ANNUALLY. ALL PAPERS IN THIS ISSUE WERE COMPETITIVELY REVIEWED AS THE BEST PAPERS OF SELECTED TRACKS OF ASBBS 22ND ANNUAL CONFERENCE.

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American Society of Business and Behavioral Sciences

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2014-2015 Reviewers

ASBBS eJournal

ISSN: 1557-5004

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INTERCONNECTIVITY OF HEALTH INFORMATION EXCHANGES USING PATIENT ACCESS NUMBER (PAN)

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ABSTRACT: There has been a paradigm shift in the capturing and storage of medical records. Initially, they were stored in a paper-based format, but as time progresses, most medical facilities have migrated to using an electronic format. Both formats of storing medical records create a silo of patient data and limit the expedience of information sharing. There is a dire need for real-time availability of medical records, but this siloed approach dampens the horizon of sharing records. Various medical providers treat patients, and each provider creates a trail of information. Patient information sharing can be very beneficial and is a critical component in delivering continuous care. Health Information Exchanges (HIEs) are a possible solution to the siloed approach of medical records, and fosters information sharing among the various enrolled medical providers. HIEs can aid in a more effective capturing, storing and sharing of patient information. However, there is lack of a consistent design across HIEs: there are varying layouts and designs across organizations, which present barriers for the interconnectivity and ultimately the sharing of medical records. This paper proposes a solution to enhance the interconnectivity of HIEs using a Patient Access Number (PAN).

INTRODUCTION

According to the United States Census Bureau, as of July 2013 there were around 316 million people residing in the United States (United States Census Bureau, 2014). The number of people per state ranges from 580 thousand to 39 million (United States Census Bureau, 2014). With this growing population, medical facilities need to maintain accurate records while providing excellent healthcare. These providers are also catering to the needs of more patients, which ultimately creates more documentation about diagnoses and medical information.

For centuries, medical facilities in the United States (U.S.) have kept paper-based records of patient's medical information. Electronic Health Records (EHRs) have taken over and continue to evolve. EHRs consolidate patient information, such as diagnoses, medications, and test results in an electronic format (The American College of Obstetricians and Gynecologists, 2010). This allows providers to deliver more effective healthcare (The American College of Obstetricians and Gynecologists, 2010). However, a problem presents itself because patients see different medical providers for various reasons: out-of-town sickness, injuries, urgent care, among others. Each facility stores its own records and these are now siloed. This siloed approach of storing patient information prevents medical providers from seeing the holistic view of a patient's medical records.

Consequently, Health Information Exchanges (HIEs) are established to facilitate the centralization of patients' records. HIEs provide timely care in emergency situations and can potentially prolong one's life. The use of HIEs makes previously inaccessible data available, resulting in the availability of more complete clinical information. This could improve the quality of healthcare for the patient (Vest, 2009, p. 223).

PAPER BASED RECORDS (PBRS)

Since the 1920's, physicians have realized that documenting patients' medical visits and history would provide a tremendous value to the physician as well as the patient themselves (Van Fleet, 2010). Once created, these Paper Based Records (PBRs) are stored within the providers' facility. The problem with this approach is that in order for a patient to have their medical records transferred to or shared with a different facility, the requestor has to fill out a request form and wait a surmountable amount of time (Samsum Clinic, 2014). According to the Health Insurance Portability and Accountability Act (HIPAA), patients are entitled to receive medical records within 30 days of receipt of the request (Robert Wood Johnson Foundation, 2012). Some drawbacks of traditional PBRs are misplaced records, illegible handwriting, and slowness of information retrieval and transmission (Pourasghar, Malekafzali, Sabine, & Fors, 2008, p. 446).

ELECTRONIC HEALTH RECORDS (EHRS) AND ELECTRONIC MEDICAL RECORDS (EMRS)

Over the last several decades, medical facilities use EHRs to store patient records (Hoerbst, Ammenwerth, 2010). An EHR is an electronic collection of health information about individual patients (Gunter, Terry, 2005). Generally medical records consist of "daily charting, medication administration, physical assessment, admission nursing note, nursing, care plan, referral, present complaint (e.g. symptoms), past medical history, lifestyle, physical examination, diagnoses, tests, procedures, treatment, medication, discharge, history, diaries, problems, findings and immunization" (Hayrinen, Saranto, Nykanen, 2009).

EMRs are focused on the medical symptoms and issues of a patient rather than the psychological aspects. As a result, EMRs and EHRs are used interchangeably although EHRs are far more in-depth about describing the patient. EMRs typically have difficulty traversing outside of the organization that created the record, so in this way they are not much of an improvement over traditional PBRs (Garrett, Seidman, 2011). For the sake of this paper we will be using both of these terms interchangeably.

HEALTH INFORMATION EXCHANGES (HIES)

As technology continues to evolve in efficiency and reliability, the benefits of sharing information electronically becomes more evident. For instance, in the field of healthcare, data about a patient was previously shared between healthcare professionals via fax, telephone, or courier (Hill, 2014, pg. 13). With current technology, this information can be linked to a patient using the electronic record. Various healthcare professionals can interact with the patient and provide care based on the data contained within the record.

Figure 1 (CA. GOV, n.d.) illustrates how an HIE operates. Several providers are shown with the ability to read and/or write to a single source – the HIE. This is important, because a provider can retrieve the data written by others.

The implementation of HIEs presents several benefits to both healthcare providers and the patients they treat (Pevnick et al, 2009, pg. 604). For instance, without the use of an HIE, a healthcare provider must sometimes make decisions without a complete knowledge of the patient's medical background. Clinicians are of the belief this puts the patients' well-being at risk, while increasing time spent by the medical staff to obtain the patient's medical history (Vest, 2008, pg. 223). In one qualitative analysis, researchers collected stakeholders' responses of the perceived benefits of participating in an HIE. One benefit multiple organizations agreed upon the utilization of an HIE could reduce the redundancy of duplicate testing (Pevnick et al., 2012).

Figure 1: Health Information Exchange (CA.Gov, n.d.)

Besides benefitting caregivers, there is also evidence that consumers support the application of HIEs. In a study of 117 individuals, 76% of the participants supported the sharing of medical records between healthcare professionals, and 90% of the group believed that HIEs creates better communication between a patient and his or her doctor (Patel et al., 2012, pg 1046). With a positive patient outlook, HIEs present an interesting opportunity for medical providers to consider. For instance, medical providers that show an early interest in developing HIEs might appeal more to patients who desire the implementation of this technology. Four sample HIEs from around the U.S. will be discussed in this paper: Centex Systems Support Services (CSSS), Colorado Regional Health Information Organization (CORHIO), Inland Empire Health Information Exchange (IEHIE), and Idaho Health Data Exchange (IHDE).

CENTEX SYSTEMS SUPPORT SERVICES (CSSS)

CSSS is a non-profit HIE based in Austin, Texas that provides medical record storage and retrieval services for Austin and 14 counties in the Houston area (About Centex, 2012). As a 2012, the organization has a workforce of 47 employees (New Centex, 2012). CSSS has more than 100 medical health providers as a part of its network and this number continues to grow. These healthcare providers access approximately 1.5 million health records via the CSS network (Samuels, 2014).

INLAND EMPIRE HEALTH INFORMATION EXCHANGE (IEHIE)

Located in Riverside, California, IEHIE has health records for more than 5 million patients living in the Riverside, San Bernardino, and other California counties (Inland Empire Health Information Exchange, 2014). There are different levels of membership, each having their set requirements. To join with a level 1 membership, the fee is $500.00 per year, but the medical provider has no voting rights. For Level 2, a one-time fee can be paid and is dependent on the amount of doctors as well as the amount of hospital beds (Membership and Participation, 2014).

COLORADO REGIONAL HEALTH INFORMATION ORGANIZATION (CORHIO)

CORHIO is based in Denver, Colorado, and is a nonprofit business with more than 50 connected medical providers (CORHIO, 2014). Each of medical providers has different EHR vendors and as a result CORIHO must work closely with them to allow each system be able to communicate between each another (Bowman, 2014). To help build CORHIO, substantial grants of $10 million were given by The Colorado Health Foundation and ARRA HITECH. After these grants have been depleted, CORHIO will make use of a fee-based subscription model (About CORHIO, 2014).

IDAHO HEALTH DATA EXCHANGE (IHDE)

Started in Boise, Idaho in 2010, IHDE has grown to serve parts of Idaho along with parts of Eastern Washington and Eastern Oregon (History of IHDE, 2014; Get Connected, 2014). The number of patient records that were referenced during 2013 was approximately 3.7 million, which was 20% more than the previous year (Utilization records, 2014). During August and September of 2014, more than 1 million records were referenced meaning there is still potential growth for this HIE (Utilization records, 2014).

CURRENT STATE OF HEALTH INFORMATION SHARING

"There is growing evidence that exchanging and sharing patient data can potentially reduce mortality and even reduce cost" (Miller & Tucker, 2011, p. 29). The need for sharing information is critical in healthcare. Improving access to pre-existing patient information could improve the quality, safety and efficiency of care that can be delivered (Finnel & Overhage, 2010, p. 222). This can also reduce the timeframe of treating a patient. If a patient goes to a different hospital (than his or her regular provider), the medical history

is siloed to their original treatment facility. This could cause a hindrance to the treatment of the patient at a different hospital.

PBRs have long been an issue. Dr. Emile Rwamasirabo, a urologist at King Faisal Hospital, Rwanda says "paperwork recordings copy used to take a long time to deal with because one nurse or doctor could spend hours treating one patient along with searching for the patient's file" (Paper-Based vs. Digital medical Records, 2014). The safety and security of PBRs also poses issues (Medical Devices & Surgical Technology Week, 2005). Gradually, PBRs have been transformed into EMRs/EHRs. Although PBRs have transformed into an electronic format, there are issues associated with the transition. With the sensitivity of medical records, people typically have significant concerns regarding the privacy of EMRs (Hwang, Han, Kuo, & Liu, 2012, pp. 3783-93).

Figure 2 illustrates how different medical providers and their facilities silo their patients' information from other providers. Problems can arise if a patient decides to go to a different facility, as the new provider will not be able to retrieve the patients' history (unless the patient brings their medical records themselves). Alternatively, a request could be made to have the medical records sent via fax or courier, which delays the delivery of care. Exchanges in patients' health information across organizational boundaries through the use of HIEs hold the promise of quality improvements for healthcare organizations (Vest, 2009).

Figure 2: The Local Silo Effect

OUTLOOK OF HIES AND INTERCONNECTIVITY

Considering the pace at which technology is changing, and the numerous benefits of using HIEs, the outlook for HIEs is rather promising. For example, in 2009, the U.S. Government passed The Health Information Technology for Economic and Clinical Health

Act (HITECH) (Miller, 2014, pg. 4). This act provided $19 Billion in incentives for the healthcare community to promote the adoption of EMRs in a manner that fulfilled the standards of meaningful use – essentially using technological standards that allow for the exchange of patient information (Miller, 2014, pg. 4). Due to these incentives, recent data from reporting healthcare providers shows an upward trend in use of HIEs. Results from a published study in the medical journal *Health Affairs* showed an increase of 61% in operational system use from organizations that reported back to the study from 2010 to 2011 (Adler-Milstein, Bates, & Jha, 2013, pg. 1488). While the outlook for HIE implementation is bright, there are several key challenges that will need to be addressed before HIEs can be fully interconnected throughout the U.S. These considerations will be covered in detail in the accompanying sections.

To obtain the maximum benefit from implementing HIEs, individual HIEs need to be interconnected. For systems to be interoperable, data must be exchanged by the different systems. Then and only then can medical providers can retrieve pertinent data about their patients. In the field of healthcare, The Healthcare Information and Management Systems Society (HIMSS), defines this as, "different systems and software applications to communicate, exchange data, and use the information that has been exchanged. Data exchange schema and standards should permit data to be shared across clinicians…pharmacy, and patient regardless of the application or application vendor" (HIMSS, 2014). While HIEs are currently in use, the interoperability of these systems face multiple challenges that need to be addressed. Such challenges are the technical constraints between different vendors, chosen key structures for the patient data, addressing the redundancy in information, and the standardizing of healthcare terms.

Possibly one of the greatest challenges to reaching interoperability of HIEs is the merging of data and utilization of different database schemas and platforms across HIE vendors (Bhansali & Gupta, 2014, pg. 31). One study compared the average query time of Oracle, dBXML, Xindice, and eXist databases of 100 records. The range of time was quite small, with a difference of 0.415 seconds from the quickest to slowest times; conversely, in a search of 5,000 records, the range grows substantially to 9.412 seconds (De et al., 2012, pg. 921). Table 1 shows the complete results of the study. Considering the substantial number of files that would need to be uploaded and shared daily, the correct equipment configuration is critical to manage thousands of queries, provide optimal speed, and ensure security concerns are met.

Number of records	Average Query Time Oracle 10g (s)	Average Query Time dBXML (s)	Average Query Time Xindice (s)	Average Query Time eXist (s)
100	0.065	0.226	0.476	0.061
800	0.069	1.696	1.879	0.066
1000	0.074	2.121	2.541	0.072
5000	0.377	8.617	9.789	0.299

Table 1: Query time comparison between different databases (De et al., 2012, pg. 921)

Another concern of connecting HIEs is the interoperability of different systems that define information differently (Dobalian, 2012, pg. 938). For instance, a private practice

may assign patient numbers starting at number 1 (and then incrementally), while a hospital may use social security numbers or other unique identifiers for patient records. This could lead to information linked to the wrong patient if there is an overlap of 'unique' identifiers across HIEs. To confront and implement sharing of records through HIEs, this must be addressed and standardized (Dobalian, 2012, pg. 938). Equally important to defining standardized keys for the databases is the standardization of how medical information is entered into the systems. For example, different physicians will use different medical terms to explain the same ailment (Liu, 2007, pg. 17). With this variance, an interconnected system would need to accommodate each of these considerations when returning results to a single query. To effectively develop a system that is efficient and viable, a unified system will need to be implemented.

A study was done in two New Mexico emergency departments, before and after an HIE was installed. The results showed that the rate of redundant chest x-ray testing dropped from 37% to 7% (Parsons, Gunter, Kroth, Fillmore, 2012). This amount significantly reduces the amount of unnecessary usage of hospital resources. The amount of time that a patient has to wait is also reduced, and this can potentially increase the speed that the medical professionals can diagnose an issue. This can be attributed to the fact that an HIE would be able to display the results of a lab that was recently done, and prevents the patient from having to undergo the same test. Issues with the accuracy of patient's information could occur from their date of birth being entered incorrectly resulting in the creation of a separate record thus compromising the integrity of the HIE. Since there is not a "standard for patient identity integrity" the medical history of the patient becomes compromised (Just, Fabian, Webb, Hjort, 2009). With more attention to patient identification, this can make regional and eventually national HIEs connectivity more feasible (Just, et al, 2009).

Organizations will have to find a way to consolidate data that has been created for a patient and to delete the duplicate record. For instance, if a patient was part of an HIE in city A, and then moves to city B (where the HIEs is different), this would result in the creation of a new health record. If in the future these two HIEs were to be connected, there would be two records for the same patient, unless there was a system in place to merge duplicate patient information. It is the responsibility of the healthcare provider to catch these redundancies.

Standards for all HIEs across the U.S. need to be developed including a unique naming system as well as having a specific transmission format to avoid errors when attempting to utilize the patient records from one HIE to another (Just, et al, 2009). Redundancy is a necessity for an HIE to function, but having duplicate records is counter productive. The impact of avoiding repeat testing throughout the U.S. could result in 80 billion dollars a year being saved on healthcare costs (Just, et al, 2009). With redundancy backup systems in place, the HIE is always accessible should an issue arise with the method that is used to retrieve information from the HIE. Research was conducted to examine what a few HIEs are doing to achieve regional/limited interconnectivity.

Due to the wide variety of HIEs in the U.S., each HIE has its own method for connecting a patient to a record. For instance, the Indiana Health Information Exchange (IHIE), shares information through the Docs4Docs service. Within the Docs4Docs service, medical providers

share information in two ways; either pushing the data to another provider, or by using a search function of records sent in the last two years. When conducting a search for patient records, medical providers search by patient's name, report type, hospital Medical Record Number (MRN), provider, or by specifying specific dates (Indiana Health Information Exchange, n.d.). Conversely, Maine's state designated HIE HealthInfoNet is searched slightly different, by using the facility MRN, last name and date of birth, or first and last name (HealthInfoNet, 2014).

The Great Lakes Health Connect (GLHC) is the result of a merger of two different organizations: Michigan Health Connect and the Great Lakes Health Information Exchange (GLHIE) (Michigan Health Information Network, nd). GLHC is one of the providers that fall underneath the Michigan Health Information Network (MiHIN). With this combination, the exchange allows for secure exchange of over 5 million records (Michigan Health Information Network, nd). In this exchange MiHIN provides services through the Health Information Services Cloud (HISC), which allows for sharing of information across the entire state of Michigan (Michigan Health Information Network, nd). This network does not use a national patient identifier. Instead they use patient information, such as name, social security number and address (Michigan Health Information Network, nd).

PROPOSED SOLUTION

As early as the 1990's, the Federal Government began encouraging the medical industry to digitize patients' PBRs to EHRs and EMRs. As digital records become common practice, the next logical step is to find a way to share the information between providers through the implementation of HIEs. Unfortunately, the government has relied heavily on the private sector to develop and define the standards of health information technology instead of regulating the growth (Blumenthal, 2011, pg. 2430). Allowing the private sector to establish its own set of policies and guidelines has led to different HIEs, with varying implementation standards and format of operation. However, the recent passing of the Affordable Care Act provides an opportunity for the Federal Government to control standardization of health information technology and an opportunity to move toward interoperability of HIEs.

One major obstacle toward interoperability of HIEs is defining a standard for identifying patients within the interconnected systems. A viable option that has worked in other countries is the development of a unique identification code for each citizen. For example, Taiwanese citizens are each given an identification number that is printed on their National Health Insurance cards (Huang, Tseng, Chang, Pan, & Liou, 2010, pg. 30). In Italy, data registers were created that used information such as the citizen's tax code within the system (Barbarito, 2012). Under the new Affordable Care Act, the U.S. is requiring each citizen to obtain medical insurance. This presents an opportunity to issue a unique identification number to each citizen in the U.S.

The proposed number displayed in Figure 3, referred to as the Patient Access Number (PAN), will comprise of two identifying codes concatenated together to create a unique 11 digit number. The first two digits represent the patient's state of origin in which the initial request for a PAN occurred. Each state code corresponds to the year the state received statehood as shown in Table 2 (United States Census Bureau, 2013). This convention allows the addition of any new state or territory to the U.S. (to be easily

integrated with a coding system that sequentially grows). The subsequent nine unique digit portion is auto generated by a central database each time the database is queried for a new patient identifier. With nine digits utilized, the potential number combinations would amount to 999,999,999 per state, making it highly unlikely that any state would ever exhaust all of its unique number combinations.

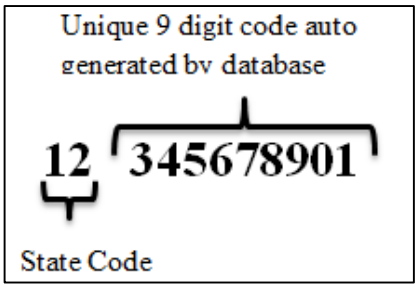

Figure 3: Sample PAN

State Codes					
Code	State	**Code**	State	**Code**	State
01	Delaware	**18**	Louisiana	**35**	West Virginia
02	Pennsylvania	**19**	Indiana	**36**	Nevada
03	New Jersey	**20**	Mississippi	**37**	Nebraska
04	Georgia	**21**	Illinois	**38**	Colorado
05	Connecticut	**22**	Alabama	**39**	North Dakota
06	Massachusetts	**23**	Maine	**40**	South Dakota
07	Maryland	**24**	Missouri	**41**	Montana
08	South Carolina	**25**	Arkansas	**42**	Washington
09	New Hampshire	**26**	Michigan	**43**	Idaho
10	Virginia	**27**	Florida	**44**	Wyoming
11	New York	**28**	Texas	**45**	Utah
12	North Carolina	**29**	Iowa	**46**	Oklahoma
13	Rhode Island	**30**	Wisconsin	**47**	New Mexico
14	Vermont	**31**	California	**48**	Arizona
15	Kentucky	**32**	Minnesota	**49**	Alaska
16	Tennessee	**33**	Oregon	**50**	Hawaii
17	Ohio	**34**	Kansas	**51**	Washington D.C.

Table 2: State Codes (United States Census Bureau, 2012)

For the PAN implementation to work, several systems will need to be updated. The proposal is that every number will be generated by a database housed at the Department of Health and Human Services (HHS). HHS will manage the database to enforce data integrity so that no person can receive a duplicate number from his or her insurance provider. Table 3 shows what the database will be comprised of, although not exhaustive. Each PAN record in the database will have information associated with it such as SSN, name, address and insurance code. In order for the insurance providers to login to the database, they will need to request a unique login from HHS. Once the login is received, the insurance providers can then request PANs for their customers. Once the request is

made by the insurance provider and is approved, the PAN is transmitted back. When the insurance providers receive the PAN, it can now be printed on the new insurance card of the patient. The insurance provider will now issue new insurance cards to each customer via mail. Adding the PAN to the card, the patient will simply need to present the card during his or her next visit. When the medical provider receives this card, the staff can then update the existing electronic records with the new unique PAN. This will allow for patients data to be exchanged in conjunction with the unique PAN.

PAN	Ins Code	SSN	DOB	Name	Address	City	State	Zip
12-345678901	345	***-**-****	1/2/2000	John Doe	111 Circle Dr.	Raleigh	NC	27699
01-987654321	422	***-**-****	1/1/2000	Jane Doe	222 Lone Dr.	Wilmington	DE	19805

Table 3: Proposed Department of Health and Human Services PAN Database

In the United States there is a specific window of time when a person can obtain health insurance, known as the Open Enrollment period. For example, healthcare coverage starting in 2015 this period starts November 15th 2014 and ends February 15th 2015. These dates may change from year to year (Important Marketplace deadlines, 2014). If an individual changes insurance provider and had a preexisting PAN, the new insurance provider must issue a card with the same PAN. The reason for this is that the patient may have changed insurance providers but their PAN stays the same. To retrieve a PAN that has been lost a patient will need to contact HHS either through phone or email and provide their SSN and other pertinent information to prove their identity.

CONCLUSION AND SUGGESTION FOR FUTURE RESEARCH

Patients rely on medical facilities to provide them with efficient healthcare. They need to be assured that when they walk into a facility, the medical staff can provide them with the proper treatment they deserve. HIEs will help facilities provide that type of care by having access to a holistic view of patient information. The adoption of HIEs will reduce misinformation and minimize errors in healthcare facilities. Allowing a patient to walk into any hospital and receive ongoing and emergency care is not only beneficial to the patient but to the medical providers as well.

In this paper we proposed the idea of introducing PANs that would be printed on insurance cards. These PANS would be associated with each patient's social security number in the HHS's database to insure data integrity. HIEs that are not connected are no better than PBRs in their inability to share information in a timely manner (almost real-time). Without an HIE, a patient might have been treated with a fatal procedure. Finally, this is why it is imperative that we have a nationwide HIE system in place to enable all HIEs to be connected to facilitate information sharing.

Once HIE interoperability is achieved, connection between the medical providers and the patient needs to be considered. One solution to explore is creating Personal Health Records (PHRs). A PHR is a personal record that can include patients' records of medical progress, along with records from each of their healthcare providers (Stead, Kelly, & Kolodner, 2005, pg. 114). In Italy, this implementation is already in existence with the development of life-long PHRs that depicts all medical activity for a patient. With these records, patients can manage their own records, including who can access them. If an emergency occurs, the record can be retrieved with a complete medical history for the patient (Barbarito, 2012, pg. 737). PHRs provide even greater opportunity for medical care in America that needs to be explored once HIE interoperability is accomplished.

Additionally, work needs to be done in order to standardize the language that is used in HIEs to enter information. Unified Medical Language Systems (UMLS) would be able to solve this issue by being able to "understand the language of biomedical and health" (Liu, 2007). The UMLS Metathesaurus would allow for various names and relationships between health related concepts to be displayed, thus solving the issue of information being indecipherable to an individual who uses a different naming standard. However, to implement UMLS, all preexisting infrastructures in HIEs would have to be conformed to this standard, and thus starting from square one of interconnectivity and communication. Further research would need to be done in order to determine if there a better solution to solve the naming convention issue as well as a standard language.

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APPLYING COMPUTER SOFTWARE IN RESEARCH MISCONDUCT ANALYTICS

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ABSTRACT

Research misconduct is a convoluted circumstance. There are many constituent stakeholders, beside the author. The stakeholders bring multi-faceted forces to these circumstances which severely blur the lines among stakeholder expectations. Self-plagiarism, if it actual exists, has no legal consequence and is one of the most difficult types of research misconduct to evaluate uncontroversially. This research project examines the application of computer software programs that produce analytics for assessing the duplicate content of research-stream works, which may be construed as self-plagiarism. *iThenticate* and *PlagiarismA Similarity Checker* are applied in evaluating research works where allegations of research misconduct occurred and did not occur. Analytic results demonstrate the one-to-one comparison of *PlagiarismA* provides a more robust evaluation than the one-to-many comparison of *iThenticate*. The results reveal there is no difference between the instances where allegations of research misconduct occurred and they did not occur. This is important as it demonstrates an underlying difficulty in which allegations of research misconduct are brought by various university stakeholders. Meticulous duplicate content checking needs to be conducted prior to bring allegations of research misconduct.

INTRODUCTION

Research misconduct is a messy and complex situation. There are many different stakeholders that include, but are not limited to, the author, the publisher, the publication editor, the reviewers, professional academic organizations, other faculty members, university administrations, organized labor representation, consultants, government organizations, federal laws, and software program providers. Each stakeholder has its particular view of research misconduct.

There are more than 300,000 active serial publications (Ulrich's, 2014) with their various publication and review guidelines. A guideline is just that. It is general guidance and is not a law of publication. Guidelines vary by publication and are open to diverse interpretations by stakeholders. This wide diversity affords some stakeholders to bring charges and conduct investigations of research misconduct with extreme powers in the interpretation and application of policies and guidelines. Whereas misuse of funds and plagiarism are more straightforward research misconduct allegations, the fabrication of data and self-plagiarism are more difficult to assess. Self-plagiarism seems to be the most difficult of these to determine. Of course, self-plagiarism is self-contradictory and an oxymoron. It is impossible for one to steal one's own work. Various publication and style manuals have mixed views of self-plagiarism. This assists university administration stakeholders in reaching a finding of self-plagiarism which appears to be their *perfect storm* for taking disciplinary action against faculty. An investigating committee can play on this

lack of definition and use broad unproven powers of determining the occurrence of self-plagiarism.

There are several different style guides (APA, 2001: APA, 2010; MLA, 2008) containing that publication's view of actions that might be questionable including self-plagiarism. Some are specific to professional organizations while others are more general with various levels of acceptances and application of these style guides. "Guide" is the key operative word as they are only a recommendation of style and it is not an absolute law or requirement for publication. Identifying self-plagiarism is often difficult because limited re-use of material is accepted both legally (as fair use) and ethically (Samuelson, 1994). Kelly McBride is a faculty member of The Poynter Institute and one of the country's leading voices when it comes to media ethics. She reinforces the interpretation of Samuelson, describing how, "It is okay to use the same data and its analysis in more than one publication." For these reasons, self-plagiarism appears as the most esoteric kind of research misconduct that sets it apart from other generally accepted practice that encompass research misconduct.

Similarity checking and duplicate content detection software has evolved to provide a measurement of content duplication or plagiarism in research papers. Examples of this software include Grammerly, iThenticate, Turinitin, PlagiarismA, and SafeAssign (a component of the Blackboard course management software). Interestingly, duplicate content is usually acceptable if it is appropriately referenced, but is unacceptable if it is not "appropriately referenced" and is confounded when content is from the same author. Detection software programs do not distinguish between an author's duplicate content and that of other authors. Duplicate content detection software work in different ways. This research effort considers and evaluates two very different ways of checking duplicate content with software programs. It provides one answer to the question of which type of duplicate content checker appears to provide a stronger comparison between two subject papers.

Research stakeholders may argue that an author's paper should be a complete reference to all of an author's prior work on a topic so the reader could easily follow the research-stream of that work. Other research authors may argue this is not necessary because a stakeholder interested in an author's prior works can easily look them up in one of today's online index databases. Referencing one's own work is also problematic in that it is known as self-citation (Clarke, 2009; Martin, 2013). One could argue the author of a work is the single best stakeholder to determine which citations are required for the reader to understand the research being presented. All of this confounds the views of self-plagiarism. These arguments, however, are outside the scope of this research. Authors do have an alternative to individual referencing of all their prior works. This is to use a general citation to their research stream with this reference: "Author. (Year). [Research-stream topic]. Raw research data." This referencing appears consistent with APA guidelines (2010).

Given differences in allegations, the key research question is: what is the ability of duplicate content checking or similarly matching software programs to assist in ascertaining and investigating actual allegations of research misconduct? The purpose here is not to engage in the examination of these various perspectives of all the different stakeholders. Rather this research presents data analytics on actual works where duplicate checking software programs are deployed in assessing the occurrence of research misconduct through self-plagiarism. The research is a unique analysis based on known

cases of research misconduct allegation that are compared to known cases without any allegations of research misconduct. This investigation presents (1) a review of important underlying laws, regulations, and conditions, (2) an organization and selection of duplication content checking software programs employed, and (3) the results of comparing the application of two different types of software to evaluate subject works of allegations of research misconduct. This research is important because it establishes the efficacy of software programs in situations of alleged research misconduct founded on duplicate content checking.

BACKGROUND

Stakeholder may have a different view of duplicate content checking of research papers or works. A Google search for "self-plagiarism" produced about 7.3 million hits (Google, 2014). This indicates clearly that self-plagiarism is a topic included frequently within Internet web pages and in which there appears to be considerable interest. On the other hand, a search of *ABI INFORM Global: 1923-Present* for the past 20 years revealed only four journal articles written in English on the topic or with keywords of "self-plagiarism." This is an overwhelming indication that self-plagiarism is not a topic of concern among research stakeholders, especially authors, journal editors, or reviewers.

Two of the mostly widely recognized defining documents come from a government organization and federal law. These are from the U.S. Department of Health and Human Services (DHHS) and the U.S. *Copyright Law* (USCL) (U.S. Copyright Office, 2011). Within the U.S. Department of Health and Human Services, the National Institutes of Health has set forth its requirements through the *Federal Register* (2005) as the Code of Federal Regulations (CFR), Title 42, Part 50 and Part 93, also referenced as CFR 42, Part 93. A more detailed foundation for research misconduct comes from these policies that most universities follow. The policies usually include the prerequisites that must be followed to meet the requirements for funded projects from the National Institutes of Health (NIH) and the National Science Foundation (NSF).

CFR 42, Part 93 provides a more detailed descriptive definition relative to duplicate content. The core of this detail emanates from two paragraphs which are as follows:

§ 93.103 Research misconduct.

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

(a) *Fabrication* is making up data or results and recording or reporting them.

(b) *Falsification* is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

(c) *Plagiarism* is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

(d) Research misconduct does not include honest error or differences of opinion.

§ 93.104 Requirements for findings of research misconduct.

A finding of research misconduct made under this part requires

that—

(a) There be a significant departure from accepted practices of the relevant research community; and.
(b) The misconduct be committed intentionally, knowingly, or recklessly; and.
(c) The allegation be proven by a preponderance of the evidence.

From this code or policy of the DHHS, there are two points that are most important in the evaluation of duplicate content checking software programs. These are plagiarism and a significant departure from accepted practices of the relevant research community. The software programs focus only on the duplicate content checking or similarity. They leave the determination of the accepted practice to the users of this software and ultimately the stakeholder of research publication. Self-plagiarism is not a concern of DHHS which increases stakeholder confusion. Whereas, the DHHS and professional organizations fail to set forth measures of the departure from expected practices.

The USCL provides information from which two important definitions are framed. These are descriptions of a work or research paper or article and of an original work. The definitions are as follows:

> "**Work**" *means* a material object, such as a manuscript, from which its content can be read or visually perceived. Under USCL, the "same work" means a reproduction of a work. The author, as the copyright owner, has the exclusive right to reproduce the work as an exact copy. Rights are extended to the copyright owner to create derivative works.
>
> "**Original work**" *means* the work (USCL) was done by a particular person and this indicates the work was **not** done by someone else. The papers of this investigation were **not** produced by someone else.

The DHHS definition of plagiarism and its relationship to the USCL has been expanded by various stakeholders to include self-plagiarism. First, it is impossible for authors to steal or misuse one's own work. Second, the USCL is clear in assigning ownership of a literary work. Only if the creating author has assigned the copyright to another party has a change in ownership of that specific presentation occurred. Third, self-citation is a problem when authors cite their own works and becomes a delicate balance in research citations. Fourth, an author may create a number of different versions of a research work and store them in a readable form, including computer files. Under the USCL each of these is a different work. It is uncertain of the extent to which all these versions need to be cited, or the manner in which they should be cited. This research effort sets out to specifically examine the use of duplicate content checking software applied to situations of self-plagiarism.

FRAMEWORK

The framework for duplicate content checking encompasses the procedures used by the software programs. The software is evaluated utilizing a generally accepted matching method and two different approaches for conducting a comparison. Text string matching is the primary manner in which computer programs search for duplicate content to compare a subject paper to one or more other papers. The Levenshtein Method Match (Wikipedia, 2014), also known as the Levenshtein Distance, is a fundamental and generally accepted text matching procedure. This is not merely a count of the same number of words

appearing in the papers under consideration, but involves much longer and more complex text strings. Authors unfamiliar with text string comparisons may incorrectly believe that text strings comparisons involve the count of individual matching words within papers.

Duplicate content checking or plagiarism checking software programs can be divided into two different categories of one-to-many (1:M) and one-to-one (1:1). With 1:M, the software programs compare a single research paper to a large and dynamic database of papers. With 1:1, the software programs represent a steady-state and repeatable comparison. *iThenticate* (2014) is a leading software program that performs a 1:M comparison. The *PlagiarismA Similarity Checker* (2014) is a leading software program that carries out a 1:1 comparison. As leading duplicate content checking programs, they are the ones applied in this research investigation.

A direct, 1:1 comparison is more robust than comparing a subject paper to a large database of literally millions of papers and Internet content. Collberg and Kobourov (2005) recommend a 1:1 comparison as a future direction for duplicate content checking that is now implemented with the *PlagiarismA Similarity Checker*. For the two different similarity checkers, this is a direct comparison (*PlagiarismA*) versus a more indirect large repository search (*iThenticate*). These limitation differences need to be considered in the interpretation of their analytics.

METHOD

A group of 21 research papers or works was investigated. The topic of each of these papers was related to one or more other papers as research-stream papers (Hayen, 2014). The least number was a set of two papers with the most being a set of four papers. This presents 20 pairs of related papers. The papers in each set are identified by the same letter while the individual paper within the set is numbered. For example, G3 is the third paper in set G. This coding preserves author confidentiality. It is expected that some similarity would exist among the papers in a research stream based on topic relationships. None of the papers in a set contained a reference to another paper in the set. This established the condition that self-plagiarism may have occurred within the paper set. The data of this study include actual known instances of allegations of research misconducted. It helps to answer the question of whether duplicate content checking computer software assists in the identification of research misconduct related to research-stream papers. Insight is provided into the abilities of university administrators or other stakeholder to appropriately detect research misconduct.

Each individual paper was processed with *iThenticate* to obtain a similarity value using its database and similarity matching algorithm. Limits were set to include only text strings of more that fifteen words. If the 1:M comparison returned the same paper, then that entry was removed from the *iThenticate* comparison. A confounding problem with *iThenticate* is the publication of a paper in both hardcopy and online formats. Such a match with the subject paper was excluded from the duplicate content comparison.

The other analysis of the duplicate content comparison of papers from the research-stream set is conducted using the *PlagiarismA Similarity Checker*. This does a 1:1 match of two subject papers as a pairwise comparison. When there are more than two papers in a research-stream set, then the papers are compared pairwise for all pair combinations in the set. *PlagiarismA* performs a direct comparison with the textual content of a paper pair. There is a single comparative value. *iThenticate* performs a 1:M comparison of one paper

with its huge publication database. This produces a single value for each paper. For each paper pair evaluated with the *PlagiarismA*, their *iThenticate* values are averaged to provide a single measure from *iThenticate*. This provides a method for comparing the pair of papers from *PlagiarismA* with the *iThenticate* results for that same pair of papers.

RESULTS

Figure 1 displays the results obtained with the 1:M content checking performed using *iThenticate*. The circled observations are those for which a known allegation of research misconduct occurred. It is notable that a pattern of *iThenticate* values does appear in these results. For observation H3 and H4, these low *iThenticate* values appear to indicate these papers are not included in the *iThenticate* database. This is reflective of the limitation of *iThenticate* in that content checking occurs only with the items included in the *iThenticate* database. The results for G1 indicate there is a large amount of similar content with other items in that database.

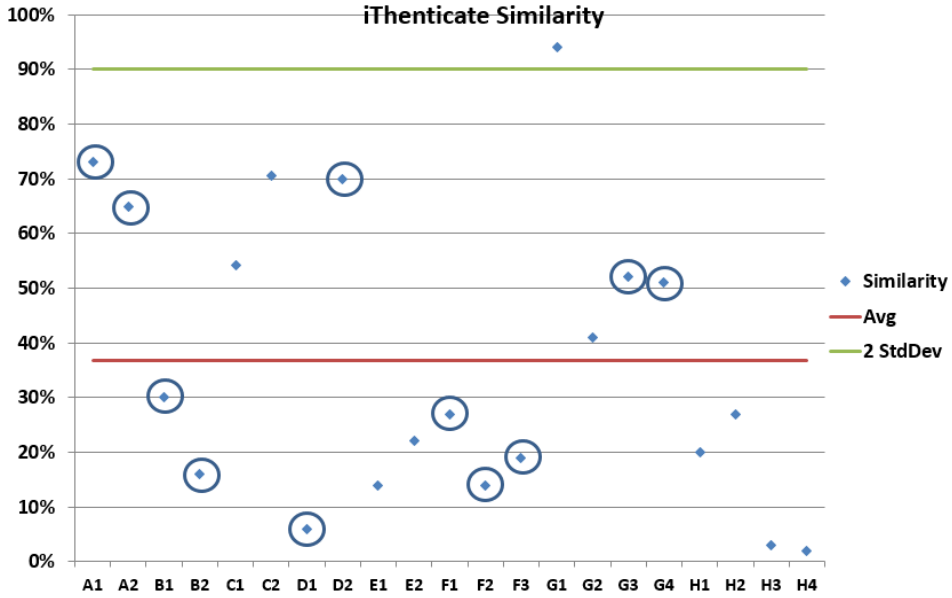

Figure 1. Comparative results with iThenticate Plagiarism Software

Content checking using *PlagiarismA* is shown in Figure 2. These are the pairwise comparisons for the papers in each set. The 1:1 comparison displays less variation than the 1:M comparisons from iThenticate. For example, the set A papers exhibit duplicate content values greater than 60% when the comparison is to the *iThenticate* database, whereas when paper A1 is compared directly to paper A2 the duplicate content drops to 50%. This can be explained as the overall extent of publication of the topic of the papers in set A. That is, *iThenticate* tends to indicate this is a topic on which a number of papers have been published, whereas the direct comparison indicates there are considerable differences between those two papers. It is interesting to observe the paper pair G3 and G4 were selected for an allegation of research misconduct, while another paper pair of G1 and G4 with a much larger similarity value was not. This begins to raise a question concerning the manner in which papers are selected for allegations of research misconduct.

It appears such selection is made using a different criteria than similarity or duplicate content. And, duplicate content is the basis for plagiarism as set forth by the USCL.

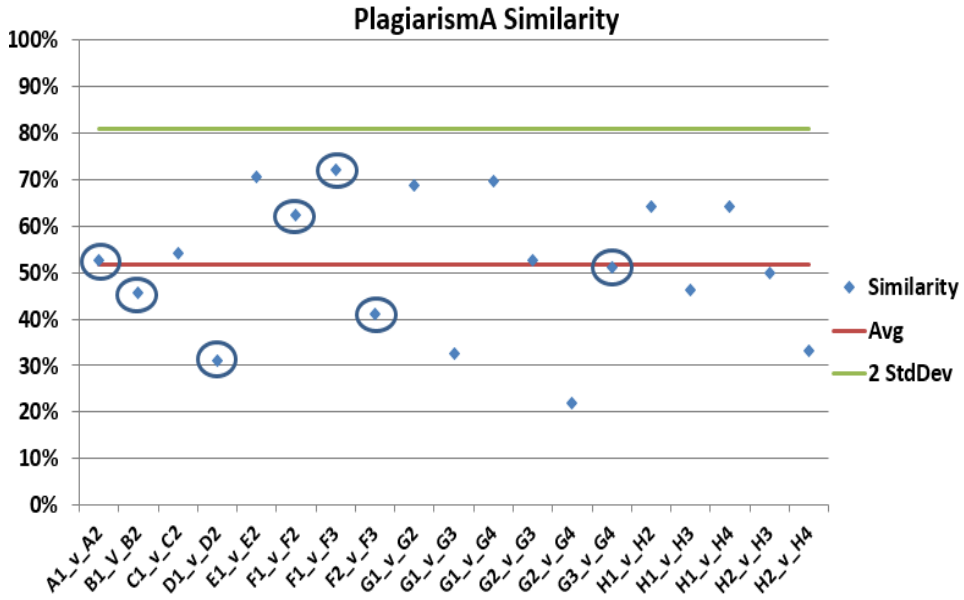

Figure 2. Comparative results with PlagiarismA Similarity Checker

There appears to be differences between the duplicate content checking of these two software programs for the paired sets of research papers. A paired-comparison of the means of the *PlagiarismA* ($\bar{x}$ = 51.8%) and *iThenticate* ($\bar{x}$ = 36.7%) similarity values for all the papers in the study indicate they are not equal (t-value = 0.016, $\alpha = 0.05$). Considering these means, *PlagiarismA* appears to yield a stronger evaluation of the similarity between a pair of papers under evaluation. This is an indicator the preferred method for conducting duplicate content checking for the similarity of two papers is the application of *PlagiarismA*.

Comparison of the means of the Alleged and Not Alleged groups for the papers in the study using the *PlagiarismA* ($\bar{x}_{\text{alleged}}$ = 50.9%, $\bar{x}_{\text{not-alleged}}$ = 52.3%) and *iThenticate* ($\bar{x}_{\text{alleged}}$ = 34.5%, $\bar{x}_{\text{not-alleged}}$ = 35.7%) similarities for each computer software program indicates there is no difference in the means of the Alleged and Not Alleged groups of papers (t-value *PlagiarismA* = 0.845; t-value *iThenticate* = 0.918, $\alpha = 0.05$). With no differences in these means, this denotes the papers alleged to be similar and subject to research misconduct appear to be selected randomly. Those papers with alleged research misconduct were selected based on some other condition or criteria than their actual content similarity.

Does a casual similarity between unrelated papers within the same general discipline? Is this a limitation with *PlagiarismA*? This is tested by comparisons of papers in sets A, B, D, F, G, and J. Here J1 is established as a paper from a different discipline that was used specifically for this testing. Results of the individual pairwise comparisons are shown in Table 1. This is used to determine the casual similarity that occurs among unrelated works in different research streams. There may be an expectation such comparison would have absolutely no similarity. The table results show there is an average casual similarity of 6.68%. This is an expected outcome as research works often follow similar outlines and approaches to writing research papers.

Table 1. Casual Similarity

Paper Pair	Similarity	Paper Pair	Similarity
A1 v D1	7%	J1 v B1	9%
A1v D2	9%	J1 v B2	5%
F1 v G3	7%	J1 v F1	6%
F3 v G3	7%		

All stakeholders, and especially those bring allegations of research misconduct, need to be familiar with results afforded by duplicate content checking software. This is an absolute requirement as the use of this software is recommended to faculty and subsequently deployed by university stakeholders as they engage in nondiscriminatory investigations of allegations of research misconduct.

SUMMARY AND CONCLUSION

Research misconduct is a multi-faceted circumstance that touches a diversity of stakeholders. Regulations and policies emanate in different approaches by stakeholders that include the NIH, USCL, and professional organizations. Of the various aspects of research misconduct, "self-plagiarism" is the most difficult to assess. It is acceptable both legally and ethically. Stakeholders, especially university administrations, could potentially deploy self-plagiarism as a contrivance to discipline faculty members. Those stakeholders investigating allegations of research misconduct have wide-ranging and undefined practices they can manipulate to justify any outcome they desire. The results of this research investigation demonstration there is a statically significant difference in the similarity of research papers evaluated with 1:M software versus 1:1 software. The 1:1 software provides a higher level of content similarity detection. Clearly, additional research on duplicate content checking software programs, the results produced by those programs, and the accepted practices of the relevant research discipline need to be performed to establish the efficacy of these aspects of research misconduct including self-plagiarism.

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AN ASSESSMENT OF UNIVERSITY STUDENTS' HEALTHY EATING BEHAVIORS WITH THE EXPECTANCY THEORY

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ABSTRACT

The consequences of poor eating behaviors can impact, not only the overall health of individuals, but it can negatively impact government and organizational costs. Healthy eating behaviours are influenced by personal, behaviour, and environmental factors, and have been investigated through many theoretical frameworks. In this study, expectancy theory was explored as a tool to understand healthy eating motivations in the context of consumer behaviour. Based on the expectancy theory, six hypotheses were created and tested using a survey conducted at two universities. A total of 188 students completed the survey which included questions on eating behaviors, nutrition knowledge and self-efficacy for healthy eating. An expectancy theory model based on the resulting scores was analyzed through Partial Least Square regression. The six hypotheses were confirmed by the analysis and the null hypotheses were rejected. This indicates that Healthy Eating Behaviour can be positively impacted by various interventions dealing with knowledge and self-efficacy (Expectancy), enhancing students' understanding of nutrition impacts on health (Instrumentality), and encouraging a change in values to believe in the importance of having a healthy eating lifestyle (Valence). Therefore, expectancy theory has a role to play in explaining healthy eating consumer behaviour and promoting health among university students.

INTRODUCTION

Good nutrition is critical to maintain health for people of all ages. Nova Scotia (NS) is on the front lines of a battle against obesity, a condition that is affecting North Americans from coast to coast. Healthy eating could contribute to a healthier population, increased quality of life and reduced health care costs. Health related organizations and government departments are engaged in promoting health and wellness.

University students are often living on their own for the first time. They may be eating in university dormitories, or sharing meals with friends at local eateries or in students' apartments. Are university students living a healthy eating lifestyle, and if not, how can they be motivated to do so?

The purpose of this paper was to better understand how university students approach healthy eating, and how best to motivate them to pursue a healthy lifestyle. First, nutrition knowledge, eating habits, self-efficacy and perceived importance of eating nutritious meals were evaluated for a sample of university students living in Halifax, NS, then the expectancy theory was explored as a tool to better understand healthy eating motivations in the context of consumer behaviour.

INFLUENCES ON CONSUMER HEALTHY EATING BEHAVIORS

Rising rates of obesity and nutrition related chronic diseases in western societies have been contributing to an economic burden for health care at government, organization and family levels (World Health Organization (WHO), 2009). Worldwide, it has been reported that

51% of strokes and 45% of heart disease are caused by high blood pressure which in turn is impacted by overweight and obesity and consumption of excess salt and processed foods (WHO, 2009). Also worldwide, the WHO (2009), estimated that more than a billion people were overweight (Body Mass Index (BMI) ≥25), more than 300 million were obese (BMI≥30) and that the rates were expected to increase.

In high income countries, while tobacco use was reported to be the leading cause of deaths (17.9%) and disability-adjusted life years (DALY; 10.7%), the combined totals from high blood pressure, overweight and obesity, high blood sugar, high cholesterol and low vegetable and fruit intake were identified as causes of 40.5% of deaths and 22.2% of DALY (WHO, 2009). This indicates that is is imperative to improve healthy eating behaviors.There is also evidence that poor eating behaviors can lead to reduced resistance to infection, poor mental and overall malaise (Qi, Phillips and Hopman, 2006; Boyle and LaRose, 2009; Edelstein and Sarlin, 2009; Gibney, Lanham-New, Cassidy and Vorster, 2009). This, in turn, leads to decreased productivity due to sick time and diminished performance.

The cost to governments and organizations for all these negative outcomes of poor eating behaviors is significant. For example, in Canada, the combined direct and indirect costs of obesity was reported to be over $4.6 billion, diabetes $11.7 billion and heart disease over $20.9 billion (Public Health Agency of Canada, 2011; Canadian Diabetes Association, 2010; Public Health Agency of Canada and Canadian Institute for Health Information, 2011). In the United States, total health care expenditures were reported to be $2.7 trillion (Centers for Disease Control and Prevention (CDC), 2013) with chronic, mostly nutrition related, diseases costing more than 75% of this total (CDC, 2009).

Therefore, governments and organizations have been investing resources to promote healthy eating behaviors. For example national food guides, child and school nutrition standards and food product labeling are all government health promotion strategies. At the organizational level there has been a growth in wellness programs intended to reduce benefits costs, increase productivity and improve the overall health of employees (Burton, 2007; Touger-Decker, O'Sullivan-Maillet, Byham-Gray and Stoler, 2008).

University students are an important population group to target for promotion of healthy eating behaviors because they are in transition from care by their families to independent adulthood (Gores, 2008; Boyle and LaRose, 2009; Kim, Ahn, and No, 2012). Establishment of healthy eating behaviors at this stage will likely lead to long term health and reduced risk of developing obesity and other nutrition related diseases (Gores, 2008). It is also expected that better nutrition and health status will also enable students to maximize their performance and therefore their investment in their education. Therefore, universities have a social responsibility to their students as well as their public funders to support and promote healthy eating behaviors. The influencers on consumer healthy eating, both external and internal, need to be well understood before effective health strategies can be identified and implemented.

External and internal influencers of healthy eating and other health behaviors of university students have been examined through the lens of a number of theoretical frameworks. The common theme of these examinations is that the influencers of healthy eating are complex and interrelated. However, understanding motivations and the underlying beliefs or attitudes have been identified as key to influencing health behaviors (Lowe and Norman, 2013).

The theory of planned behavior states that behaviors can be predicted by beliefs or knowledge, attitudes and intentions (Ajzen, 2005). This theory has been shown to predict about 44% of intention and 19% of the variance in health behaviors (McEachan, Conner, Taylor and Lawton, 2011; Lowe and Norman, 2013). This indicates that there may be additional variables to be considered.

Building on the theory of planned behavior, social cognitive theory illustrates health behavior within a dynamic framework in which a person is driven by internal personal factors, behavioral patterns and environmental events (Bandura, 1986; 1999). When there is interaction among all three of these factors it is known as reciprocal determinism (Bandura, 1986, 1999; Savoca and Miller, 2001; Dewar, Lubans, Plotnikoff and Morgan, 2013). For example, social cognitive interventions have been found to be more effective than just education based interventions in increasing fruit and vegetable consumption (Kreausukon, Gellert, Lippke and Schwarzer, 2012). Self-efficacy is an internal personal factor of the social cognitive theory which can affect a person's motivation, knowledge uptake and implementation of change (Bandura, 1986; 1999) and its role in outcome expectation forms the expectancy-value theory (Vroom, 1964; Bandura, 1999).

The health belief model is often used to describe disease prevention and focuses on a person's belief on perceived susceptibility and severity of the consequences of disease. Briefly, if a person believes that the benefits of taking actions to prevent disease outweigh the perceived consequences than that person will take action to prevent the disease. However, if a person views barriers to preventing the disease as too high then that person is unlikely to make changes or modify behavior (Kim et al., 2012). In one study examining health behaviors in university students it was found that perceived benefits of healthy eating, as well as perceived barriers to healthy eating both had significant effects on behavioral intentions with a high perception of benefits and a low perception of barriers leading to positive intentions to eat healthy foods (Kim et al., 2012). One drawback of using this model with youth and university students is that because of their age and life-stage they may not perceive the long-term consequences of obesity as severe enough to outweigh the associated barriers to eating healthy resulting in no behavioral changes.

Central to these theoretical frameworks are the personal beliefs or expectations about how well one can perform an activity and the value placed on the activity and its outcome. Therefore this paper explores the application of expectancy theory to study healthy eating motivations and behaviors. Expectancy theory and the related expectancy-value theory have been rigorously researched and refined for over 80 years (Vroom, 1964; Lawler, 1971; Eccles and Harold, 1991; Cox and Whaley, 2004; Gao, Lee and Harrison, 2008). Expectancy theory forms the basis of much of the management literature related to motivation in organizations.

According to expectancy theory, a person's motivation to perform a particular task is impacted by how they perceive their ability to perform the task and the reward for doing so. Three perceptions or beliefs relevant to the theory are expectancy or the extent to which the person perceives their effort or performance as leading to the desired outcome; instrumentality or the likelihood that performance will lead to a reward; and valence or the perceived value of the reward (Johnson and Marshall, 2009). The theory requires that three perceived conditions be met: effort leads to performance; performance leads to reward; and reward is valued (Johnston and Marshall, 2009). Strength of belief is expressed by accuracy and magnitude. A person must have an accurate perception of the links for expectancy and

instrumentality in order to be motivated; and the strength of the belief must be sufficiently robust to compel them to act (Johnston and Marshall, 2009).

Healthy eating, making wise food choices and eating a nutritious and balanced diet, is the desired outcome for people of all ages. If expectancy theory can be successfully applied to motivate consumers to eat healthy they must also believe that doing so will lead to a desired outcome (performance), and that the performance will lead to a desired reward (good health). The ability of consumers to gain health outcomes from their attempts to eat a nutritious diet can be linked back to self-efficacy: their confidence in their ability to follow healthy eating behaviors. Those who believe that they can successfully source, prepare and consume a nutritious diet will have higher levels of self-efficacy than those who do not believe they are capable of doing so. Also, those who believe they can successfully embrace a healthy eating lifestyle will only be motivated if the outcome of such activities (good health) is valued by them. Do they seek good health outcomes? Do they value eating a nutritious diet?

HYPOTHESES

If a person sees the link between effort and performance (expectancy) and they see the link between performance and reward (instrumentality), and they also value a nutritious diet, then they should be motivated and engaged in having a healthy eating lifestyle. Therefore, based on expectancy theory, six hypotheses were created to test the theory's relevance to encouraging a healthy lifestyle. The hypotheses reflect the basic tenets of expectancy theory and they are designed to explore its fit to a healthy eating model, while also providing insight into motivations to follow a nutritious diet. The six hypotheses developed for this study and based on expectancy theory included:

H1: Expectancy will influence Instrumentality for healthy eating.

H2: Instrumentality for healthy eating will influence the Valence associated with healthy eating.

H3: The Valence for healthy eating will influence Healthy Eating Behaviour.

H4: Expectancy will influence the Valence for healthy eating.

H5: Expectancy will influence Healthy Eating Behaviour.

H6: Instrumentality for healthy eating will influence Healthy Eating Behaviour.

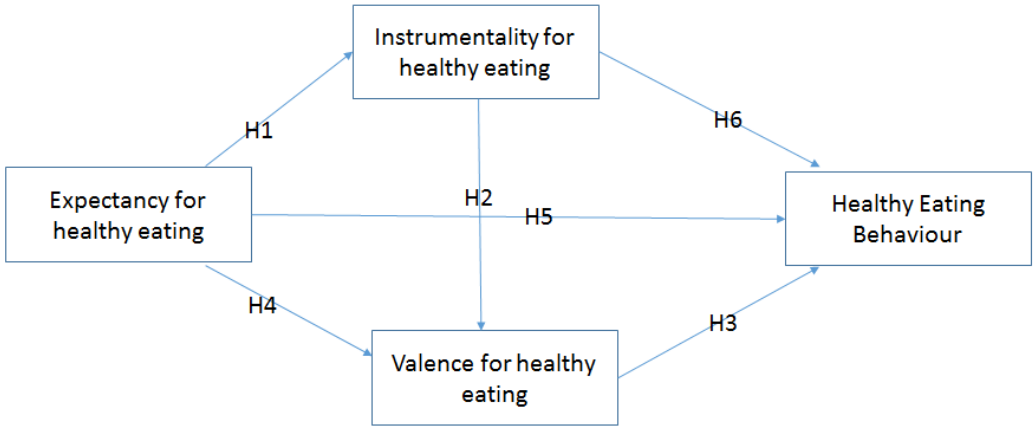
If the null hypotheses are rejected, expectancy theory could become a useful tool to facilitate healthy eating behaviour among university students.

METHODOLOGY

The research was cleared by the university research ethics boards prior to data collection. The questionnaire was face validated, tested and made available on Fluidsurveys.com. The link to the questionnaire was distributed to students at two universities in Halifax, NS, through university professors who had agreed to distribute the invitation to their students. In return for questionnaire completion, students could voluntarily enter their names into a draw for one of 15 amazon.ca gift cards.

In order to run PLS, a formative model must be created to be tested by the regression procedure. The formative model (Figure 1) was created to measure the hypotheses based on the scales used in the questionnaire.

Figure 1. Hypotheses Formative Model



Partial Least Square regression (PLS) was chosen as the most appropriate method with which to evaluate the research model. PLS analysis does not rely on assumptions of multivariate normal distributions (Hair, Black, Babin, Anderson and Tatham, 2006; Pirouz, 2006; Drenger, Hansjoerg and Jahn, 2008; Garson, 2008). Therefore, no data transformations were done to support the technique. Testing of the model required several steps and iterations. First, a confirmatory factor analysis was completed to finalize the additive scales used and to be sure that the data supported the underlying scale structures (Hair et al., 2006; Drenger et al., 2008; Garson, 2008). Following the confirmatory factor analysis, scales were adjusted by deleting items with low factor loadings. The next step in the analysis was to test for scale reliability. A reliability analysis was completed for each of the additive scales in the model. This step resulted in the inclusion in the research of only those items that added to the overall reliability of the scale as an additive measure (Hair et al., 2006; Drenger et al., 2008). Completion of the confirmatory factor analysis and the reliability analysis purified the factors and ensured their unidimensionality prior to evaluating the model (Hair et al., 2006; Drenger et al., 2008).

Following the verification of reliable scales a PLS analysis was conducted. The initial analysis provided feedback on the regression coefficients for the model. Data from the PLS analysis also provided information on overall model reliability. This analysis was then followed by a bootstrap analysis to identify the significant relationships in the model and to test the regression equations (Drenger et al., 2008). Finally, a blindfold analysis was completed to determine the overall model fit (Drenger et al., 2008).

After the analyses were completed, the initial measurement model was evaluated to reflect relationships in the model that were statistically significant and to best represent the structural attributes of the model (Drenger et al., 2008; Garson, 2008; Hair et al., 2006; Pirouz, 2006). The hypotheses were then evaluated based on the final model as determined by the analyses. It should be noted that demographic data were run using data weights to remove any inherent bias due to university distribution in the final sample. However, PLS regression is not based on data weights, resulting in a case weight of 1 for each survey response.

In order to measure the formative model two scales were created from the data collected in the survey. To measure Expectancy, self-efficacy and student knowledge were combined into a single additive scale. To measure Instrumentality, student agreement with statements describing healthy eating was combined into a single additive scale. Scale development

included confirmatory factor analysis to ensure unidimensionality, followed by reliability analysis for each scale. In addition, the descriptive scale statistics were also measured to conduct a detailed analysis of students' self-efficacy, knowledge, and underlying beliefs about what constituted healthy eating. Valence, the value that students place on healthy eating, was measured in a single scaled variable that asked students how important a nutritious diet was to them. Healthy Eating Behaviour, the desired outcome of the analysis, was measured in a single scaled variable that ascertained whether or not students currently ate a nutritious diet.

All of the measures used in the analysis were based on students' perceptions and knowledge. The results were not tested and students' eating habits were not observed. However, with expectancy theory it is the perceptions of participants that are fundamental to their willingness to exert the effort to obtain the desired performance.

RESULTS AND DISCUSSION

A total of 188 students completed the online questionnaire. Most of the students were female (79%) and single (79%). Nearly 18% were married or living with a partner. They ranged in age from 17 to 55 years with an average age of 22 years. Ninety-five percent were full-time university students. Nearly one-third were in their first year of university. Thirty-eight percent were in their second or third year of university study. Nearly 16% were in their fourth year, and approximately 14% of students were in their fifth year or more of university study. Most students were completing an arts degree (55%), followed by science (20%) and business administration (9%). Nearly 10% identified their area of study as professional studies without providing detailed information about major discipline. Approximately six percent of respondents were taking education degrees and one percent were nutrition students. Given that only two of the students were studying nutrition it is unlikely that their knowledge of healthy eating, which could greatly exceed that of the typical university student, could bias the study.

Self-efficacy was measured by first focusing on the confidence that students felt in their ability to eat a nutritious diet both during, and outside of, the academic term. Students were asked to rate their confidence on a five-point Likert scale and ratings ranging from 1) Very high to 5) Very low with an average scale rating of 2.13 (SD=.88) for their confidence outside of the academic term. Ratings for student confidence during the academic term was less confident, ranging from 1) Very high to 5) Very low, with an average scale rating of 2.76 (SD=.99). The results revealed that typically the students felt confident in their ability to eat a nutritious diet, but with less confidence during the academic term than outside of the academic term. The differences in the average confidence ratings were statistically significant ($t(165)=8.591$, $p=.000$). The lower level of confidence in ability to eat healthy diets during the academic term is intriguing. Other researchers also identified self-efficacy as an important predictor of healthy eating behaviors of university students (Boyle and LaRose, 2009; Yilmaz, 2014) but not differences, as identified in this study. The specific issues impacting student confidence were outside of the scope of this research, but it is possible that reciprocal determinants (Bandura, 1986; 1999) such as being on one's own for the first time, or having to make intelligent food choices while being exposed to a broad range of menu options, may confuse students.

Students were also asked to rate their own knowledge of nutrition on a five-point Likert scale and ratings ranged from 1) Very good to 4) Poor with an average scale rating of 2.13 (SD=.88). The results revealed that typically the students felt reasonably comfortable with

their level of nutrition knowledge. Student knowledge was not tested as part of this research, but clearly they perceived themselves as being fairly knowledgeable. It should be noted that although nutrition education improves knowledge (Kolodinsky, Harvey-Berino, Berlin et al., 2007; Podder, Hosig, Anderson, et al., 2010; Ha and Caine-Bish, 2011); it must be intertwined with other factors (Savoca and Miller, 2001; Kreausukon et al, 2012). Students were asked to indicate their agreement with a list of healthy eating statements by rating each on a five-point Likert scale ranging from 1) Strongly agree to 5) Strongly disagree. Students had very high agreement ratings related to avoiding processed foods (M=1.95, SD=.95), eating vegetables, whole grains, and milk daily (M=1.81, SD=.86), and eating a variety of foods everyday (M=1.87, SD=.86). They had good ratings for avoiding high salt, sugar, and fatty foods (M=2.03, SD=98), and choosing locally grown food (M=2.26, SD=1.14). Students were asked if they engaged in eating a healthy diet. Most believed that they did so with an average rating of 2.17 (SD=.90) on the five-point Likert agreement scale. However, when they were asked if it was important to eat a healthy diet their rating was neutral, averaging 2.66 on the five-point Likert agreement scale (SD=1). This indicates that just because students understand healthy eating principles, they may not see the value in practicing the behavior. Similarly, Boyle and LaRose (2008) observed that students may not take action to improve health if the need is not perceived.

To conduct the PLS analysis of the formative model created from the literature to test the hypotheses, Valence was measured as the importance of eating a healthy diet. The five-point agreement scaled variable was used directly as the Valence measure in the model. Also, the desired behaviour in the formative model, Healthy Eating Behavior, was measured by using the five-point scaled variable for currently engaging in eating a healthy diet. However, in order to measure Expectancy and Instrumentality in the model, scales had to be created from existing variables. The statistics for Valence and Healthy Eating Behaviour are summarized in Table 1.

Table 1. Valence and Healthy Eating Behaviour Measures

Variable	Number	Min.	Max.	Mean	Std. Dev.
Valence (B3): Importance of eating a nutritious diet	179	1	5	2.66	1.012
Behavior (B9a): Eats a Healthy Diet	174	1	5	2.17	.898

Scale: 1) Strongly Agree; 2) Agree; 3) Neutral; 4) Disagree; 5) Strongly Disagree

The Expectancy scale, designed to capture the link between effort and performance, was measured by creating an additive scale consisting of three variables: confidence in one's ability to eat nutritious diet during the academic term, confidence in one's ability to eat nutritious diet outside of the academic term, and the student's knowledge rating. A confirmatory factor analysis revealed that the three variables combined to measure as single factor (unidimensionality) with robust factor scores (greater than equal to .50), and a reliable scale rating of Cronbach's alpha of .70, which meets the criteria for scale reliability. The total variance explained in the factor analysis was 63%. The additive scale ranged from 2 to 10, with the stronger score being 2. The average scale total was 7.39 (SD=2.17). The scale measures are summarized in Table 2.

Table 2. Confirmatory Factor Analysis and Expectancy Scale Reliability

Variable (indicator)	Number	Min.	Max.	Mean	Std. Deviation	Factor Loading
B12: Confidence outside of academic term	180	1	5	2.13	.88	.85
B11: Confidence during academic term	166	1	5	2.76	.99	.76
B2: Nutrition Knowledge (Self-rated)	166	1	4	2.50	.81	.73
Total Variance Explained						62.8%
Cronbach's alpha						.70
Expectancy Scale	166	2	10	7.39	2.17	

Scale for Knowledge: 1) Very Good; 2) Good; 3) Moderate; 4) Poor; 5) Very Poor
Scale for Nutrition: 1) Very High; 2) High; 3) Moderate; 4) Low; 5) Very Low

A confirmatory factor analysis was completed for students' beliefs of what constituted healthy eating to measure Instrumentality (the link between performance and reward). The results revealed that of eight statements, five resulted in factor loadings robust enough to be kept in the scale (.50 or higher). The five statements explained 48% of the variation in the data and had a reliability measure of .72 for Cronbach's alpha. The additive scale ranged from 5 to 25, with the strongest score being 5. The average scale total was 9.94 (SD=3.31). The scale statistics are summarized in Table 3.

Table 3. Confirmatory Factor Analysis and Instrumentality Scale Reliability

Variable (indicator)	Number	Min.	Max.	Mean	Std. Deviation	Factor Loading
B8d: Avoid Processed Foods	180	1	5	1.95	.953	.80
B8c: Avoiding high salt, sugar, and fatty foods	181	1	5	2.03	.980	.80
B8e: Choosing locally grown foods	181	1	5	2.26	1.137	.71
B8a: Eating vegetables, whole grains, and milk daily	180	1	5	1.81	.857	.58
B8b: Eating a variety of foods everyday	181	1	5	1.87	.857	.52
Total Variance Explained						47.9%
Cronbach's alpha						.72
Instrumentality Scale	180	5	25	9.94	3.314	

Scale: 1) Strongly Agree; 2) Agree; 3) Neutral; 4) Disagree; 5) Strongly Disagree

PLS analysis was conducted to test the formative model and required three different procedures. The first procedure is the basic PLS analysis which results in a regression analysis for all of the relationships in the model. Endogenous variables (those with other variables flowing into them) result in R^2 values while the flows result in beta weights. The PLS analysis also provides further tests of construct unidimensionality and convergent validity. Following the PLS analysis a second analysis is conducted that measures the statistical significance of the relationships in the model by using a bootstrap procedure. This analysis used 199 resamples of the data to generate t-values for the relationships in the model from which statistical significance can be determined. The third and last analysis, called a blindfold analysis, provides measures by which to determine the discriminant validity of the model.

A review of the cross-loadings of scales along each of the model constructs was completed to ensure that the variables loaded more heavily on the construct they were supposed to measure in the formative model, ensuring unidimensionality. The results showed that the strongest loadings did load where they were expected to within the model. The structure of variable loadings appears in Table 4.

Table 4. Cross-loading Summary to Confirm Unidimensionality

	Expectancy	Healthy Eating Behaviour	Instrumentality	Valence
B11 Confidence during academic term	**0.82**	0.58	0.26	0.33
B12 Confidence outside of academic term	**0.83**	0.45	0.22	0.37
B2 Nutrition Knowledge	**0.72**	0.36	0.06	0.47
B3 Importance of eating nutritious diet	0.49	0.50	0.29	**1.00**
B8a Eat vegetables, whole grains and milk	0.16	0.20	**0.61**	0.21
B8b Eat a variety of foods	0.23	0.28	**0.60**	0.16
B8c Avoid salt/sugar/fatty foods	0.14	0.27	**0.76**	0.23
B8d Avoid processed foods	0.14	0.31	**0.77**	0.21
B8e Eat local foods	0.14	0.27	**0.70**	0.20
B9a Eat healthy diet	0.59	**1.00**	0.39	0.50

Convergent validity was then examined by ensuring that all factor loadings, reliability, and average variance extracted for each scale met the criteria for each test. The criteria were as follows: factor loadings $\geq$ .50, reliability coefficients $\geq$ .70, and average variance extracted (AVE) $\geq$ .50. All of these criteria were met by the model except for average variance extracted by the Expectancy scale, with .48. This is very close to the cut-off of .50, but it was a weaker measure. The results of this analysis are summarized in Table 5.

Table 5: Construct Reliability and Convergent Validity

	AVE	Composite Reliability	R-square	Cronbach's Alpha	Communality	Redundancy
Expectancy	0.63	0.83	-	0.70	0.62	-
Healthy Eating Behaviour	1.00	1.00	0.46	1.00	1.00	0.33
Instrumentality	0.48	0.82	0.05	0.72	0.48	0.02
Valence	1.00	1.00	0.27	1.00	1.00	0.23

The final step in determining the appropriateness of the model was to determine the discriminant validity for each of the model constructs using multiple measures (Rigdon, 2007). Measures included R^2 for endogeneous variables (inner circle of the formative model). In addition, two additional measures, Fornall-Larcker and Stone-Geisser (Q^2) were used for remaining variables in the model. The Fornell-Larcker measure requires that the average variance extracted (AVE) be greater than the highest squared correlation for each construct. These criteria were met by the model. The results are summarized in Table 6.

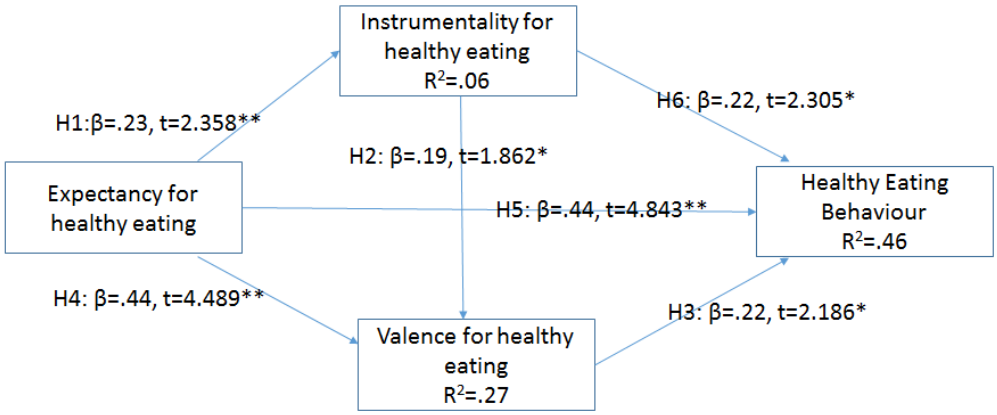
Table 6: Evaluation of Model Discriminant Validity

	AVE	Highest Correlation Squared	Stone-Geisser Q^2
Expectancy	0.62	0.35	0.26
Healthy Eating Behaviour	1.00	0.25	0.43
Instrumentality	0.48	0.08	0.02
Valence	1.00	1.00	0.27

The six hypotheses were confirmed by the analysis and the null hypotheses were rejected. The R^2 was low for 1 out of 3 variables, with Instrumentality having the lowest R^2 of .06. However, the results for Healthy Eating Behaviour and Valence were much stronger. The R^2 for Healthy Eating Behaviour was .46, which was sufficient to exceed the critical level of .35 for a strong effect (power = .99). Also, the R^2 for Valence was .27, which was strong enough to exceed the level of .15 for medium effect (power = .99). The result was a reasonably strong analysis.

This indicates that Healthy Eating Behaviour can be positively impacted by various interventions dealing with knowledge and self-efficacy (Expectancy), enhancing students' understanding of nutrition impacts on health (Instrumentality), and encouraging a change in values to believe in the importance of having a healthy eating lifestyle (Valence). Shifts in any of these factors can enhance a healthy eating lifestyle. This analysis also indicates that the expectancy theory can be used to encourage a healthy eating lifestyle among university students. Those who do not have a positive expectancy will not have strong instrumentalities or valences. As a result, they will not be motivated to pursue healthy eating behaviour. The PLS Analysis of the Formative Research Model appears in Figure 2.

Figure 2: Partial Least Squares Analysis of Formative Research Model
(*Significant at .05 level: ** Significant at .01 level)



LIMITATIONS

As the sample for this research were from two NS universities, skewed to first and second year students and mostly female, a limitation was? that the findings may not be representative of all university students. A second limitation was? that the questionnaire did not contain a construct to measure expectancy theory per se. However, the survey measures were successful in creating the conceptual model for an expectancy analysis and the results indicated the potential for the application of this classic theoretical framework to influence healthy eating behaviors.

CONCLUSIONS

Expectancy theory has a role to play in explaining consumer behaviour for health promotion among university students. As noted by Lowe and Norman (2013) there is a need to focus on the underlying attitudinal constructs of health behaviors. While external influencers are important, the findings from this study indicated that consumer healthy eating promotions should focus on presenting healthy eating and its health outcomes as realistic and valued goals along with the knowledge and supports to achieve these goals. The motivational constructs work in concert; as expectancy increases, so does instrumentality and valence for the reward. And finally, as valence increases, so does the behavior.

Recommendations for future research stemming from this study include exploration of why students' self-efficacy varies by attendance at university, evaluation of specific consumer healthy eating behavior promotions, and the application of the expectancy theory to other heath behaviors. Similar to Dewar et al (2012), who tested a tool to evaluate social cognitive theory, development of a refined tool to assess healthy eating behavior within the expectancy framework, and perhaps as a complement to the social cognitive theory tool, is suggested.

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CREATING IPHONE APPLICATIONS FOR THAI GENERATION Y: TEXTUAL ANALYSIS AND DEVELOPERS AND USERS' OPINIONS

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ABSTRACT

Branded iphone apps have had varying degrees of success in appealing to the Millennial demographic. Our research conclusions are based on literature review, textual analysis of award winning apps, developer interviews, and discussion with two groups from the Thai Generation Y demographic, and show that successful branded apps for iphone follow a 3 stage development strategy, express brand identity, and meet the needs and preferences of the target audience. The findings show that in app design, color and typeface are commonly used to subtly express brand identity. Relevant messages delivered through an experimental style were found to express brand personality. Technologies and features in all three apps were simple enough to increase usability and prevent user confusion. The development strategy can be divided into 3 stages: pre-production, production and evaluation. It is also found that Thai Generation Y have a strong demand for iPhone apps that provide them with useful content, serve their specific needs, and fit with their lifestyles. It suggests that the brand officers should always be clear about the target group's needs and expectations of design, features, and usage. Apps should be designed to engage with the consumer rather than simply selling products to them.

INTRODUCTION

With the rising usage of iPhone applications among the Thai Generation Y demographic, branding officers have been tasked with maximizing the effectiveness of this new channel. According to Appling and Pappalardo (2014), iPhone apps can be categorized as games, lifestyle and health care, education and reference, multimedia and entertainment, finance and productivity, and social networking. So called Generation Y or Millennials, those consumers born between 1980 and the early 2000's, are being targeted as they are heavy users and rely on digital applications to obtain most of their information including brand information. In addition, Millennials possess increased purchasing power and are considered vital to the global economy (Tapscott, 2010; Van Den Bergh & Behrer, 2013).In Bangkok, the capital city of Thailand, as in many parts of the world, Generation Y are using applications on mobile communication devices in many aspects of their lives.
Like other marketers around the world, Marketers in Thailand are exploring this opportunity to tap their branded content into these applications (Ives, 2009; Lynn & Berger,

2014). Communication scholars are also trying to learn about consumer's digital media usage; especially mobile smart phone applications, as these young users dedicate more and more time to new media technology (BinDhim, Freeman, & Trevena, 2014; Boonchutima & Tang, 2014; Djamasbi, Siegel, & Tullis, 2010; Paschou, Sakkopoulos, & Tsakalidis, 2013; Willnat & Aw, 2014). The branding officers have been searching for effective uses of this new channel to optimize engagement with their young consumers (Evans & McKee, 2010; Gualtieri, 2011).

There have been varying degrees of success by branding officers in communicating their brand attributes and increasing the consumers' interaction and engagement with the brands. Frequently, an apps' popularity hasn't been sustained even with considerable investment (Gualtieri, 2011). Among the failed apps, some apps still managed to successfully emphasize their brand attributes and increase consumer engagement. Therefore, we aim to examine the communication tactics used by successful branded iPhone apps to discover the branded iPhone apps development strategy and to examine opinions towards branded iPhone apps among Generation Y.

LITERATURE REVIEW

The current framework was created by reviewing academic literature on branding (Bellman, Potter, Treleaven-Hassard, Robinson, & Varan, 2011), iPhone apps development (Ginsburg, 2010; Wen, Chang, Lin, Liang, & Yang, 2014), characteristics of Generation Y (Savage & Sara Savage, 2011; Van Den Bergh & Behrer, 2013), and the uses and gratification theory (Hui-Yi & Ling-Yin, 2010; Lin, Fang, & Hsu, 2014).

Bellman et al. (2011) found that the effect of applications is significantly associated with a positive persuasive impact. That is to say, an app's effectiveness is measured as a true increased interest in the brand and the brand's product category. However, increased consumer interest does not always lead to consumer action. Even with a large increase in the favorability of brand attitude among consumers, often there was only a small effect on a possibly corresponding purchase intention.Bellman et al. (2011) shows that purchase intention is most heavily influenced towards consumer action by an apps utilization of an informative communication style. His research proved that apps using an informational style were able to boost purchase intention compared to apps that use an experiential style.

Ginsburg (2010) proposed that development of iPhone apps begins with research, user analysis, and competition analysis. Developers then need to assess and use the resulting data for conceptualizing and creating the app. In this stage, the activities include brainstorming, creating a prototype, and performing a usability concept test. The following stage is to refine the concept and, of course, actual design of the user interface. At this point, the visual design is aimed to attract users, improve usability, and 'delight' users. Ginsburg (2010) also emphasized the importance of optimal integration of brands and advertising in the app. Brand expression can be found through naming, trademarks, and even the user experience (Gualtieri, 2011). The app should fit with the users' context, that is to say, the user can access useful location-based content with fast response times as users are on the go. Content should be personalized and related to a user's contacts and friends. In addition, given that many users have multiple devices, content from branded apps should not be limited by platform incompatibility.

Van Den Bergh and Behrer (2013) suggest that Millennials pay more attention to themselves and become cynical towards commercial messages. As a result, Millennials view friends as their most trusted source of information. There is a premium placed on authenticity so brand communicators must ensure that all product claims can be perceived as honest and valid by the target audience. Because Generation Y consumers are still in the process of identity formation, brands take on extra significance and meaning. Brand identities become intimately connected to the individual consumer's identity. Savage and Sara Savage (2011) have found that the symbolic meaning of cultural products is interpreted as part of the users identity. Millenials prefer brands that embody and exemplify happiness as this age group is not overly serious or concerned with negative events like wars or famine. Gamification can also be used as a marketing tool to engage these young consumers where the interplay of content and user occurs by design (Feldmann, 2005; Wen et al., 2014).

Hui-Yi and Ling-Yin (2010) discovered that the main motive of Generation Y app users is "relaxing and relieving stress." Game and entertainment apps were used more than one hour per day on average. Accordingly, user gratification is not based on an app's utility as a personal assistant nor its ability to provide real-time information, as many had predicted. The findings are consistent with Lin et al. (2014)'s findings where entertainment is one of the primary factors driving the participants' app usage. User gratification and motives are not influenced by gender and income level; however, age, education levels, and occupation are demographic markers where differences are indicated. Specifically, younger consumers and/or students express higher motivation and gratification compared to other population groups (Hui-Yi & Ling-Yin, 2010).

METHODOLOGY

To meet the research objectives, we divide the research into three parts, including textual analysis, in-depth interview, and focus group discussion.

Textual analysis was used to examine how successful apps express their brand identity. The sample group consisted of award-winning apps (Gold, Silver, and Bronze) from the 2011-2012 Cannes Lions International Festival of Creativity in the interactive digital media categories called Mobile Lions or Cyber Lions. Using that criteria we selected four branded apps: Toyota's *Backseat Driver* (Gold, Mobile Lion in 2012), Heineken's *Star Players* (Gold, Cyber Lions in 2011), Nike's *Training Club* (Bronze, Cyber Lions in 2011), and Lego's *Life of George* (Bronze, Mobile Lion in 2012). Award winners from this festival were purposively selected because it has been attracting marketing communication agencies from around the globe to participate in annual competitions, and the jurors were all distinguished professionals. The units of analysis for the textual analysis research are the brand expression, content, and usability.

Semi-structured in-depth interviews were used to gain information on iPhone app development strategies. We interviewed three experienced Thai branded mobile app developers, who were purposively selected. The inclusion criteria dictated that the developers must be leaders in the development of at least ten branded apps. Interview questions aimed to clarify the differences between branded and general apps, branded app development considerations, objectives, operation procedures, evaluation, and constraints, then the responses were coded and interpreted by the researchers.

Two focus group discussions were also conducted. The participants were born 1981-1996 or aged 16-31 (as of 2012), living in the Bangkok metropolitan area, and used more than 10 downloaded branded apps on iPhone. One group was composed of 5 first jobbers in private companies. The other was composed of 5 students. The rational of selection is that these age groups are found to be heavy users and tend to have higher motive and gratification than other age groups (Hui-Yi & Ling-Yin, 2010). The topics of discussion aimed at garnering information regarding the participant's reasoning when downloading, using, and uninstalling particular apps. Attitudes and expectations toward branded apps were also discussed.

RESULTS

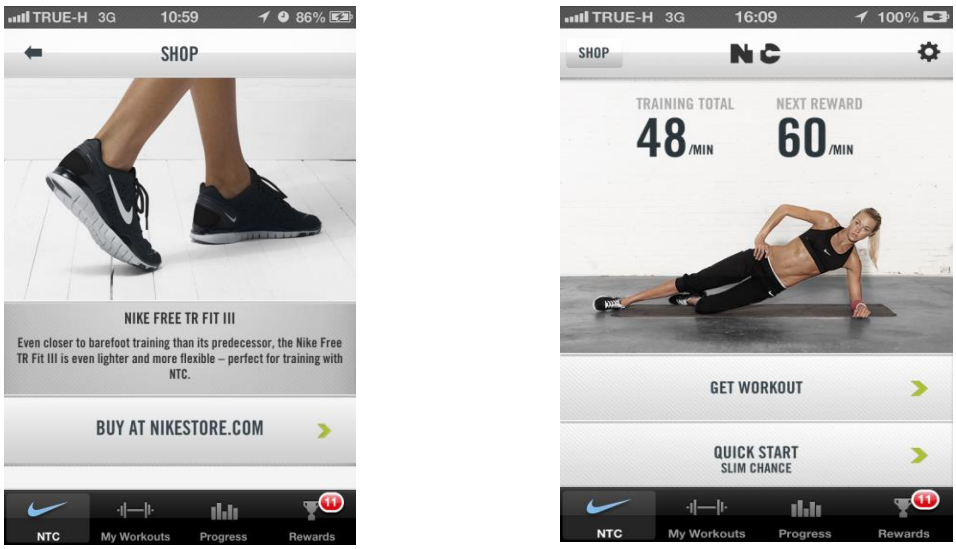
Textual analysis

Visual elements such as colors, symbols, typefaces, products, and names were used to express brand identity. However, color was the most fundamental element. Only Nike's Training Club featured references to specific products.

Table 1 Brand expression of successful iPhone applications

App elements	Applications			
	Backseat Driver	*Life of George*	*Star Player*	*Training Club*
App Icon	Color	Color	Color	Color Symbol
Navigation	None	None	Color Symbol Product	Color Typeface
Main screen	Typeface Name	Typeface Symbol Product Name	Color Typeface Symbol Product	Color Typeface Symbol Product
Button	None	None	Color	Color Symbol

Figure 1 Brand expression in the Nike's *Training Club* app.



Similarity across these successful apps includes content relevancy to each brand. We also found each app made use of interactive play strategies. Lego's *Life of George* encouraged users to share their brick constructions on social networking sites and allow others to comment and provide feedback. Heineken's *Star Player* allowed users to chat with their friends, guess the results of games, or even in game features like particular free kicks while the games were still on. Nike's *Training Club* allowed users to share their exercise achievements on social networking sites and also to participate in challenges to win special gifts. Toyota's *Backseat Driver* provided iPhone simulations of the roads where users were traveling. The target users were the kids using the app in the back seat. This was to make the kids feel as if they are driving the car.

In respect to app style, Nike's *Training Club* used an informational style to give instructions for exercises along with a product description. On the other hand, the other three apps used an experiential style. The users could receive the message only by actively interacting with the app. Toyota's *Backseat Driver* would show new images only when the car moved or the users moved their devices. In Lego's *Life of George*, users have to construct the bricks on plates and share the image of their creation with friends on social network sites. As for Heineken's *Star player*, to get more points the users had to watch a live game and make a correct prediction in time.

For usability, Toyota's *Backseat Driver* used the embedded geographic positioning system, or GPS, of the iPhone to locate where the users were and provide them with relevant content. The apps were designed to give fast responses and personalized content, including app-generated content as well as content from friends of the user. Heineken's *Star Player* required real-time responses from users and their friends to get higher scores. The Nike's *Training Club* provided customized exercise programs and users get support from their friends via sharing to social networking sites. In Lego's *Life of George*, sharing the image on social networking sites allowed users to get responses from friends. We also found that common technologies and features, rather than novelties and gimmicks, were utilized to increase usability and prevent confusion among users. Familiar technologies include

simple navigation (buttons/menu bar), embedded GPS, camera, and sharing on social networking sites.

Table 2 Characteristics of successful branded mobile apps

Brand expression	Content	Usability
Color	Relevant content	Location
Symbol	Interactive play	Immediacy
Typeface	Experiential style (Aiming for Attitude)	Intimacy
Product	Informational style (Aiming for Purchase intention)	
Name		

In-depth Interview

The App development strategy can be divided into 3 stages: (1) Pre-production stage includes fact finding through client need analysis, user analysis, competitor analysis, and brainstorming to develop an app concept proposition. In this stage, it is important that objective setting be based on analysis of the target group's needs (2) Production stage includes interface design, content design, testing, launching, and app promotion. This stage aims to meet the target group's needs with a focus on accessibility and unique content. The developer team must allow enough time not only for Apple's iTunes store to approve an app but also for making necessary corrections after receiving feedback from all stakeholders. Last but not least, (3) Post-production stage includes records of the number of downloads, users' interaction with the content, and in-program questionnaires to assess the app performance in terms of increasing the consumers' engagement and satisfaction.

Table 3 Stages of developing successful iPhone apps and the quotes from the key informants

Stage	Details	Example of Quotes
Pre-production	• Client need analysis • User need analysis • Competitor analysis • Brainstorming for App concept proposition	*We need to know the business objectives. Everything we do needs to answer to their marketing problems and reflect brand identity.* *Today, consumers are mobile so….we need them to engage with brands. We need to make the brands mobile.* *We always start out by asking, what is the core concept of the brand? Then, how we are going to communicate the brand value with the consumers?* *We analyze marketing problems along with a consumer needs assessment and competitor analysis. Then we brainstorm for solutions.*

Stage	Details	Example of Quotes
Production	• Interface design • Content design • App testing • App Launch • App promotion	*To create content, we will start with thinking of what we lack. Sometimes clients can provide us with that content. If not, we create it ourselves.* *After clients agree with what experience they want to offer to their consumers, we continue with designing.* *As for testing, we test the apps before letting the clients test them. We have to test them ourselves until we are sure that they work.* *Using offline media like radio spots and magazines to promote the apps is still essential. For online promotion, it is uncommon for consumers to check out the brands' website. Paid online advertising like banners and advertorial blogger have to be integrated into the app's promotional tools.*
Post-production	• Assessing the app from total downloads engagement, and satisfaction.	*We report app download figures only if campaign assessments require such data.* *We measure user/app interaction compared with other touch points. Basically, we measure if more consumers use the app, and if yes, how many of them, and how much time they spend on the app.* *Most of the time we do not measure usability, instead we measure interaction.* *If we embed questionnaires in the app, we will find a good opportunity to ask for their responses.*

Generation Y has strong demand for branded apps that can serve their functional needs. The apps must provide them with useful content, serve their specific needs, and fit with their lifestyle. There clearly was a negative attitude towards branded apps that aimed to sell them products. Moreover, the applications must be easy-to-use with a short feedback time.

Table 4 Thai Generation Y's reasons for downloading, using, and uninstalling branded apps on iPhone.

Behaviors	Reasons	First jobbers' Quotes	Students' Quotes
Downloading	**<u>Application</u>** • Free of charge • Attractive icon • Informative screenshot • Well-written app description • Unique Functions • Solve user problems • Make users' lives easier • Enhance social status and user identity **<u>Environment</u>** • Peer recommendation • Positive reviews • Downloaded by many other users	*Almost every day I check the iTunes store for new apps, and I also follow IT geeks' Facebook page where I can find app reviews.* *As far as branded apps are concerned, I know those apps from friends or search for them on the iTunes store.* *I look at reviews, worthiness, popularity, and, importantly, free availability. If not free, it is not worth paying attention to.* *Firstly, it must be what I will use. Secondly, it must be free.* *When I search I use the name of the brand instead of other keywords. I feel it is more trustworthy.* *If it is not free, it takes me quite some time to decide whether or not to download. The one and only thing that I am ready to download is Line app stickers.* *If the apps are larger than 50MB, I feel that iTunes won't allow downloading without Wi-Fi. Then, I have to wait until I get home.*	*I seldom read print media. I usually read online. Therefore, I do not know whether or not the apps get promoted in print.* *I search for my favorite brands' apps in the iTune store.* *Mostly from friends' recommendation or I just look at the Top chart list in the iTunes store.* *The apps I downloaded were related to my interests. Sometimes they were games that my friends told me were fun. Some are useful to me, suitable for mobile phone use and adding convenience.* *My friends' suggestion, or looking at the Top Chart. Mostly they were free. I don't dare download an app that charges me, as I am afraid that it is not worth my money.* *If it is released for free, I download it. If it is just reduced, I don't. I just stick with free downloads.* *I don't download any apps just because of attractive icons. If I*

Behaviors	Reasons	First jobbers' Quotes	Students' Quotes
		Anyway, I prefer downloading from a mobile phone connection. *I recommended some apps to my father. That was when I knew he needed to have an app to help him do something. However, I still do not know if he actually used it or not. I do recommend apps to friends, especially games that give me points when I invite friends to play. Other apps I recommend to friends are those apps I feel are cool or will make my friends laugh.*	*find it interesting, I continue reading the description. If its right, I will download, if not, I don't.* *If new apps are easier to use, they are great. It also needs to serve my needs. If not, there is no reason to download them.* *Actually I prefer downloading the apps from my mobile phone instead of my Mac Book as I have it with me all the time. When any apps interest me, I can just download them instantly.* *It seems to be part of our lives. When there is nothing else to talk about with friends, we talk about apps. Hey, do you know this app? It's cool. Then, it becomes a recommendation.*
Using	**<u>Relative evaluation</u>** • Attractiveness • Ease for use • Fast response • Stability	*One thing that makes me continue using are their unique functions that no other apps can provide.* *The reason to keep using any apps is that they have new features added, they are only apps that can do the job, or it is the first*	*Some of the apps I downloaded are informative or useful. Others are for entertainment or relaxing. Informative apps last longer on my phone, but the entertaining or relaxing apps are used more often.*

Behaviors	Reasons	First jobbers' Quotes	Students' Quotes
		app that serves my needs. *It still serves my needs. It is more convenient than working from desktop computers.* *For example, I use branded apps from movie theaters to check the screening schedules, but I prefer to book online from a computer as it is more convenient, or I just go to the box office. Actually it also depends on conditions of the special deals offered for each purchase channel.* *It depends on the amount of money involved. If it is just one or two hundred baht, it is fine. But, if I have to electronically transfer a large amount of money to my friends, I might think differently. I would rather use my computer.*	
Uninstalling	**<u>Content</u>** • Entertaining but useless • Required purchase for more content • Contains only product catalogs • Substitute found	*If I do not benefit from the apps I usually remove them.* *Some apps work well when I first download them, but later, they become unstable. Say,*	*The apps I remove are those I rarely use, are of no use, or they just require me to pay for more content. These are plain useless. Then I remove them.*

Behaviors	Reasons	First jobbers' Quotes	Students' Quotes
	Usability • Instability • Slow response • Takes too much memory space **Location** • Irrelevant for Thailand • Doesn't support Thai or English language **Time** • Outdated information • Rarely use	*the movie ticket apps, I now give up and go back to use the traditional means to book a ticket which is from the box office.* *If I keep it but it doesn't make my life better, I will uninstall it. Its' data are from a foreign country that is irrelevant to Thailand.* *It's outdated or never provides update versions. Or I find new apps that work better.*	*If the new apps are found to be able not only to do the same old tasks as the existing apps but also new tasks. Then I remove the existing ones and move on to the new ones.*

Table 5 Thai Generation Y's Attitudes and Expectation

	First Jobbers	Students
Attitudes towards branded apps	*The brands that provide apps that serve my needs makes me want to interact with the brands more.* *It doesn't help me to perceive the brand better or worse. It won't work for me. If it does well in this communication channel, but fails in others, it cannot make a good overall impression.* *To me, it shifts my attitude a lot. Any brands that make good apps, I then feel more positive toward that brand.*	*Of course, I feel that the apps that increase users' convenience will have a positive image.*
Expectations from branded apps	*I prefer simple designs. I use apps because of their functionality. The appearance I expect is just good to look at.* *The content or information must be concise and understandable.*	*I want it to be three dimensional. It should look good and advanced. It will make a mobile phone be more than a mobile phone.* *I prefer classic looks with trustworthiness.*

First Jobbers	Students
It must be easy to use, otherwise I will not want to use it.	*Usefulness should be a focus. If it does not look pretty but it works, I can bear with its looks.*
	I don't like text heavy designs. I want to see more images. I don't like to click many times before I can get what I want. Can it be just one or two clicks and here you go? I like it this way.

DISCUSSION

The successful branded apps were found to use color, symbols, and typefaces to represent their brands more than products or names. This is can be explained because these successful elements are perceived as more subtle ways to express brand identities. Simply showing products might make consumers feel they are being forcefully exposed to a commercial message or getting pushed to purchase the advertised products (Bellman et al., 2011). This is also consistent with what feedback from focus group participants. The participants said they would have negative attitudes toward the brand and uninstall an app if they found that they were just product catalogs (Bellman et al., 2011).

The strategies of developing successful apps are all centered on the users. The apps have to serve the users' needs and expectations, make their lives easier, and most importantly let them feel relaxed and free from stress (Hui-Yi & Ling-Yin, 2010). App content should be tailored to where users are, provide fast real-time responses, and allow friends to join in and have fun with them (Lin et al., 2014). The fun value is indispensable for the Thai Generation Y even for branded apps. Consequently, the user experience must be designed to add fun while marketing messages are still tactfully conveyed (Feldmann, 2005; Wen et al., 2014). Also important is consent from friends of the user and agreement regarding the app. Group consensus and collective decision making is still important for this demographic. Successful branded apps have to be viewed favorably by both the users and their friends (Van Den Bergh & Behrer, 2013). Therefore, word-of-mouth marketing is found to be a confirmed strategy when promoting an app among Thai Generation Y (Van Den Bergh & Behrer, 2013). Participants shared with us that they downloaded an app when their friends positively talked about it. Brands with a good image and reputation are the brands the young consumer would like to associate themselves with. This might be partly due to the importance of symbolic brand consumption, which Millennials take quite seriously (Savage & Sara Savage, 2011). However, the developers we interviewed did not reveal their methods for promoting their apps without using traditional offline and online advertising tools.

With more useful free apps available on the iTunes Stores, users are not expecting to pay for an app. Also they are ready to uninstall the existing ones if they can find substitutes that can perform better. Both users and developers agree that visual appeal is a necessity, and functionality and stability are equally essential.

CONCLUSION

iPhone apps are becoming one of the brand communication tools that marketers use to target their Generation Y audience. However, there have been varying degrees of success in communicating their brand attributes and increasing consumer interaction and engagement with the brands. This paper therefore aimed to examine how successful branded iPhone apps express their brand identities, discover the branded iPhone apps development strategy, and survey Thai Generation Y's opinions towards branded iPhone apps. Using textual analysis, in-depth interviews, and focus group discussion, we found similarities between the selected successful branded apps. These shared similarities include prominent usage of color, symbols, and typeface with and emphasis on design and relevant content. The most common style is experiential. The apps analyzed use games to drive the users to learn more or interact with brands. The technologies used are related to location, immediacy, and intimacy while ease of use are to be ensured.

The development strategy starts with careful analysis of client's needs, user's needs, and competitors. The app concept proposition is derived from brain storming. To produce an app, the interface and content are designed. The app will be tested until the developer team and clients are certain that it works. After launching the app onto the iTunes Store, the developer team must promote it online and offline. Most importantly, developers must monitor and incorporate user feedback to update and optimize the user experience.

The reasons for downloading, using, and uninstalling a branded app on the iPhone are both internal to the application and external or environmental, including: relative evaluation, content, usability, location, and responsiveness.

LIMITATIONS AND RECOMMENDATIONS

Due to the limited number of interviewees and focus group participants, the results might not be generalizable to represent the wider population of Thai Generation Y.

The researchers did not interview the creators of the award-wining apps that were used for textual analysis. Therefore, the interpretation of the apps may be subjective to the researchers' point of view without cross-checking with the producers of the text. The developers should take the above mentioned steps when developing iPhone apps, especially the pre-production and evaluation phases. We learned from the interview that developers sometimes skip these stages due to time and budget limitations. Future research should expand the number of participants or use quantitative research methodology.

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ONLINE PRIVACY AND SECURITY AT THE FORTUNE 500: AN EMPIRICAL EXAMINATION OF PRACTICES

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ABSTRACT

Fair Information Practices (FIP) principles have been recognized by U.S. government agencies since 1974 in an effort to provide stakeholders with a measure of protection. However, the recent proliferation of online data breaches calls to question the policies and practices of the businesses responsible for protection of the constituent data. This study was undertaken to expand upon previous studies and investigate the usage and composition of privacy policies and, in particular, the security aspects of these policies. Results illustrates that nearly all Fortune 500 firms post their privacy policy online and the number of firms utilizing third-party compliance logos is increasing. Moreover, security techniques, data collection techniques, child data policies, and mobile application policies are now more commonly included and described in privacy policies. The usage of the FIP practices of notice/awareness, choice/consent, access/participation, and security/integrity, however, does vary and is changing.

INTRODUCTION

Recently, there has been a flood of online data breaches. In October of 2013, federal prosecutors stated that an identity theft service in Vietnam managed to obtain as many as 200 million personal records, including Social Security numbers, credit card data, and bank account information from Court Ventures, a company now owned by the data brokerage firm Experian (Perlroth & Gelles, 2014). In December of 2013, 40 million credit card numbers and 70 million addresses, phone numbers and additional pieces of personal information were stolen from the retail giant Target by hackers in Eastern Europe. Overall, in 2013, there were 619 data security breaches in the U.S., nearly a 300% increase from 2005 (Chatzky, 2014). This resulted in one-third of data breach victims becoming identity theft victims and the compromise of over 250 million individual records (The Privacy Clearinghouse, 2014). In 2014, a Russian crime ring was found to have amassed the largest known collection of stolen Internet credentials, including 1.2 billion user name and password combinations and more than 500 million email addresses. The records, discovered by Hold Security in Milwaukee, include confidential material gathered from 420,000 websites, ranging from *Fortune* 500 companies to small websites. An SQL injection, in which a hacker enters commands that cause a database to produce its contents, was utilized even though injection was named as one of the top ten web application vulnerabilities in 2013 (OWASP, 2013).

The primary cause of security incidents, according to Verizon's 2014 Data Breach Investigations Report, are web application attacks. These attacks more than doubled in 2013 (Qualys, 2014). An international survey of nearly 700 individuals from all sizes of companies also found that the leading source of risk to companies (52%) is the customer-facing web applications (Bird and Kim,

2012). While 33% have had a formal application security program in place for 1 to 5 years, 34% of respondents indicated that their firm had no program. The application security programs were driven primarily by external factors such as regulatory requirements, requirements from customers, and security incidents, particularly security incidents at other companies within their industry.

Moreover, a WhiteHat (2013) survey of 76 organizations found that 86% had at least one serious vulnerability. The most prevalent vulnerability class was information leakage, identified in 56% of websites. Information leakage is defined as a vulnerability in which the website reveals sensitive data. Exposure to sensitive data such as credit cards, tax IDs, and authentication credentials has been identified one of the top 10 web application vulnerabilities (OWASP, 2013). A 2014 *InformationWeek* survey of 536 individuals from organizations with at least 100 employees found that 56% of respondents indicate that cyber-criminals pose the greatest threat to their organizations in 2014, ahead of authorized users and employees (49% of respondents) (Davis, 2014). Of note, 23% have experienced a security breach or espionage in the past year. Even social networking site usage has the unintended user consequence of providing private information for "like farming" (Sharifrazi, & McCabe, 2014). This results when users click like, share, or comment.

The costs from breaches include expenses for investigating and repairing the breach, notification of affected stakeholders, managing public relations, lawsuits from stakeholders, governmental fines, and damage to the business's brands, relationships with partners, and reputation (Cox and Singh, 2014). The Center for Strategic and International Studies, a Washington think tank, has estimated that the annual cost of cybercrime and economic espionage to the world economy is more than $445 billion (Nakashima & Peterson, 2014). The United States, Germany and China together accounted for about $200 billion of the total in 2013.

Although there is no law providing a uniform set of rules governing data breach notification, there are specialized federal laws such as the Health Insurance Portability and Accountability Act and the Children's Online Privacy Protection Act. Moreover, 47 states have enacted legislation requiring companies to notify state residents in a timely fashion when the company becomes aware of a loss of unencrypted data containing a state resident's personal information (Cox and Singh, 2014).

FAIR INFORMATION PRACTICES

The right to privacy was described in the *Harvard Law Review* in1890. Louis Brandeis and Samuel Warren defined protection of the private realm as the foundation of individual freedom in the modern age (Warren and Brandeis, 1890).

Fair information practice (FIP) principles have been recognized by U.S. government agencies since 1974. The Federal Trade Commission (FTC) promotes adherence to the principles to insure effective privacy protection (Liu and Arnett, 2002).

The four FIP principles are:

- Notice/awareness – consumers have the right to know if personal information is being collected and how it will be used. Thus, data collectors must disclose their information practices before collecting information from consumers;
- Choice/consent – consumers must be given options with respect to whether and how information collected from them may be used for purposes beyond those for which the information was provided;
- Access/participation – consumers should be able to view and contest the accuracy and completeness of data collected about them and to correct errors; and

- Security/integrity – data collectors must take reasonable steps to assure that information collected from consumers is secure from unauthorized use during transmission and storage.

The corporate policies regarding online collection, use, and dissemination of personal information are commonly posted on company websites. Although developing and posting a policy does not guarantee compliance, the absence of a policy violates "notice/awareness," one of the fundamental FIPs. In addition to internal self-regulation of policies, firms also utilize third-party assurance organizations for compliance. These organizations generally employ iconic seals that may be readily and easily recognized by the firm's stakeholders. Examples include TRUSTe, BBB Online (Better Business Bureau Online Seal), U.S.-EU Safe Harbor, and ESRB (Entertainment Software Rating Board Seal) (Benassi, 1999; export.gov, 2014).

PREVIOUS RESEARCH

Previous research has explored privacy practices at consumer websites, the *Fortune* e-50, and the *Fortune* 500. Moreover, researchers have explored information privacy dynamics and disclosure.

A chronology of online privacy practices research suggests that online privacy policies were uncommon until recently. In 2000, for example, a study of 335 consumer websites found that 80% failed to comply with one or more FIP principles (FTC, 2000). In 2002, a study of more than 300 companies found that only 51% had privacy policies (Whiting, 2002). Another study of 600 firms found that approximately one-half posted privacy policies on their website and 60% did not monitor their website to make certain that they delivered the privacy that was promised. Moreover, a survey of 1,500 consumers by *Privacy & American Business* found that only 8% of respondents were concerned about data privacy. One firm, the Royal Bank of Canada, even calculated that privacy drove 7% of the demand for its products and services. Interestingly, however, 35% of 1,500 Internet users in a *PC World* survey indicated that they rarely or never read privacy policies (Kandra and Brandt, 2003).

A content analysis of the privacy policies of the *Fortune* e-50 indicated that 6% of the 35 business-to-consumer firms fully complied with all fair information practices, 63% partially complied, and 31% failed to comply with one or more fair information practices (Ryker, et.al, 2002). The *Fortune* e-50 included public Internet firms with a market cap in excess of $100 million. Specifically, 86% were in full compliance with notice, 43% were in full compliance with choice, 17% were in full compliance with access, and 54% were in full compliance with security. Of the 15 business-to-business firms, only 20% posted a privacy policy and all were non-compliant.

In terms of the *Fortune* 500, an initial study was conducted in 2002. Results indicated that 52% of the *Fortune* 500 had a privacy policy posted on their website (Liu and Arnett, 2002). Of those with privacy policies, 11% also exhibited a seal program. These included 16 firms with TRUSTe, 10 firms with BBBOnLine, and 1 with ESRB. The majority, 87%, of policies were found on the home page. The remaining policies were found either through a site search or on subsequent pages. In terms of FIP, 92% explained information use and 91% detailed collection policies for customer information. In addition, 77% of policies addressed information disclosure, 58% provided a contact method to answer customer privacy concerns, 46% described security, 26% discussed access/correction, 26% detailed internal protection, 26% addressed children protection, and 9% detailed policy consent. Overall, 92% addressed notice/awareness, 27% addressed access/participation, and less than half complied with choice/consent and security/integrity.

Another study also empirically investigated the information privacy policies of the *Fortune* 500 (Schwaig, Kane, & Storey, 2006). A content analysis found that 79% of the firms had a policy

posted on its website with 86% of those firms with a link from the homepage, 14% with policies located elsewhere on the website, and 9% using a seal. Of the firms with policies, 98% addressed notice, 61% addressed choice, 45% addressed access, and 71% addressed security.

Relative to dynamics, researchers have proposed a new construct, Information Privacy Situation Awareness (IPSA), in an effort to capture consumer personal information disclosure behavior in online settings (Sim, Liginlal, & Khansa, 2012). The IPSA scale incorporates situation awareness (SA). SA is described as the individual's ability to deal with a situation-specific environment with only limited cognitive resources at their disposal.

In terms of disclosure, the Willis *Fortune* 500 Cyber Disclosure Report 2013 found that 88% of the firms followed Securities and Exchange Commission Guidelines and provided "some level" of disclosure regarding cyber exposures (infosecurity, 2013). The top cyber risks identified included the loss or theft of confidential information (65%), loss of reputation (50%), and direct loss from malicious acts such as hackers and viruses (48%). Moreover, 20% mentioned cyber-terror as a factor and only 6% indicated purchasing insurance to cover cyber risks.

Given that privacy and security issues continue to be an organizational challenge, this study examines several questions. How many *Fortune* 500 companies have privacy policies posted on their website? Are seals utilized? Which aspects of the FIP principle dimensions are incorporated into each company's policies? How is security described? Are there additional policy components? Finally, what are the trends, if any, in policies? Results are important in determining the effectiveness of privacy policies in the face of mounting online privacy invasions.

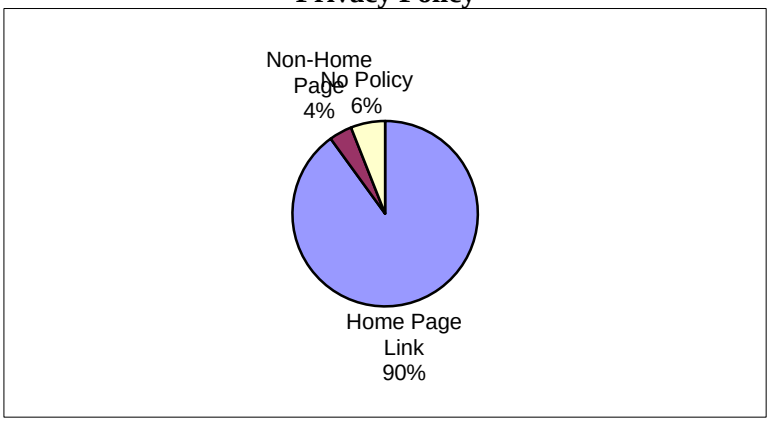
RESEARCH DESIGN

This study utilized the *Fortune* magazine website to obtain the *Fortune* 500 company directory and the corresponding company home page web address (Fortune, 2014). A two-step process was used to locate privacy policies and seal programs for each organization in September of 2014. First, each company home page was examined for privacy policy links and seals. Next, if a privacy policy link was not found on the home page, the home page's search engine was utilized to search for the policies. A content analysis of the posted information privacy policies was then conducted to examine each firm's use of the FIP principles, additional policies, data collection procedures, and security techniques. In addition, resultant policy practices were examined to determine if there were correlations between the use of specific practices.

RESULTS

A review of the *Fortune* 500 found that 450 firms (90% of companies) have a posted privacy policy that is linked to the company homepage (Chart 1). In addition, 20 firms (4% of companies) have a policy on a page that is not hyper-linked to the home page. Overall, 94% of firms have an online policy.

CHART 1
Privacy Policy



In terms of privacy logos, a variety are utilized. Table 1 illustrates that the most common logos are the U.S.-EU Safe Harbor logo (24 firms or 5% of companies) and the TRUSTe logo (23 firms or 5% of companies). In addition, the BBBOnline logo is used by 11 (or 2%) of firms and the ESRB logo is used by 1 firm. Overall, 12% of companies utilize third-party privacy compliance firm logos.

TABLE 1
Third-Party Compliance Logos

Third-Party	Number of Firms	Percentage of Firms
BBBOnline	11	2%
ESRB	1	1%
TRUSTe	23	5%
U.S.-EU Safe Harbor	24	5%
Overall	59	12%

Posted policies were subsequently evaluated in terms of content. Table 2 depicts that 91% of the *Fortune* 500 firms provide notice/awareness within their policies. Moreover, 81% include choice/consent, 76% describe access/participation, and 70% detail security/integrity.

TABLE 2
Fair Information Practice Principles

Principle	Number of Firms	Percentage of Firms
Notice/Awareness	454	91%
Choice/Consent	403	81%
Access/Participation	327	65%
Security/Integrity	351	70%

FIP principles were next examined to determine if there were correlations between the use of any two principles for those firms posting policies. Table 3 illustrates that there are correlations significant at the .01 level (2-tailed test) for all four principles. In other words, for example, the use of notice/awareness was significantly positively correlated with the use of choice/consent.

TABLE 3
Fair Information Practice Principles Pearson Correlations

Principle	Notice	Choice	Access	Security
Notice/Awareness	1	.399**	.300**	.341**
Choice/Consent	.399**	1	.497**	.325**
Access/Participation	.300**	.497**	1	.331**
Security/Integrity	.341**	.325**	.331**	1

** Correlation significant at the .01 level (2-tailed)

In terms of data collection and security techniques, two primary practices were described within the privacy policies. Table 4 illustrates that 81% use cookies and beacons to collect data. Moreover, 22% of firms use SSL/TSL to enhance security during transmission. A cookie is a text file with tracking number that is downloaded onto a user's computer hard drive and a beacon is a tiny graphic one pixel wide and one pixel deep embedded in a web page or email (Laudon and Traver, 2014). The beacon is transparent and is used to report the visitor's IP address and cookie information. SSL (Secure Sockets Layer) and TLS (Transport Layer Security) are standard security technologies for establishing an encrypted link between a server and a client—typically a web server (website) and a browser (Fitzgerald, Dennis, & Durcikova, 2012).

TABLE 4
Data Collection and Security Techniques

Practice	Number of Firms	Percentage of Firms
Cookies/Beacons	403	81%
SSL/TLS	109	22%

Finally, policies were examined to determine the prevalence of additional policies. Table 5 illustrates the inclusion of mobile application policies by 30% of firms and the description of children data policies by 57% of firms.

TABLE 5
Additional Policies

Policies	Number of Firms	Percentage of Firms
Mobile Application Policies	149	30%
Children Policies	285	57%

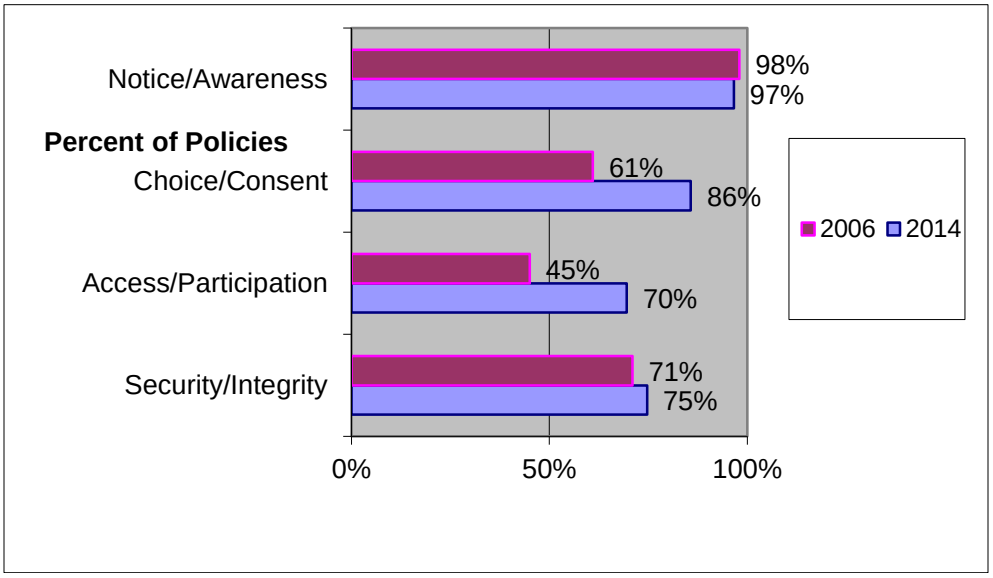
CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Results indicate that the online posting of privacy policies is increasing. In 2002, only 52% of the *Fortune* 500 had a privacy policy posted on their website. In 2006, the percentage increased to 79%. And by 2014, 94% of the firms posted a policy. Thus, within 12 years, the number of the *Fortune* 500 firms posting their policy nearly doubled. In terms of the use of third-party privacy logs, there has also been an increase. From 2006 to 2014, the use of TRUSTe increased from 16 to 23 firms and BBB Online increased from 10 to 11 firms. Moreover, in 2014, 24 firms used the US-EU Safe Harbor logo.

In terms of privacy policy composition, there have been changes. Chart 2 illustrates that in 2006, 98% of policies addressed notice/awareness, 61% addressed choice/consent, 45% addressed

access/participation, and 71% addressed security/integrity. In 2014, notice/awareness remained stable at 97% of policies, choice/consent increased to 86%, access/participation increased to 70%, and security/integrity increased slightly to 75%. Overall, notice/awareness remained the most common practice addressed and access/participation remained the least common practice addressed.

CHART 2
Policy Trends



Relative to data collection, 88% of organizations describe the use of cookies and beacons. In terms of transmissions security, 22% describe the use of SSL/TLS procedures.

There are three important implications from the study. First, although most firms adhere to the principle of notice/awareness, there are varying degrees of inclusion with respect to the other three primary practices. Access/participation is included in just over two-thirds of policies and security/integrity is included in three-fourths of policies. One implication is that there are gaps in policies. As a result, organizations may need to review their policy composition to ensure that all four FIP principles are included. These deficiencies may open the firm to potential litigation from stakeholders or increased public scrutiny should a security breach occur. This is even more problematic given that nearly one-fourth of organizations do not include a security/integrity section in their policies. Moreover, it also critical that organizations have strong due diligence mechanisms in place to ensure that these stated policies are actually implemented and security protections, for example, are properly and fully followed.

A second implication relates to the evolution of policies. One aspect is with respect to the inclusion of practices related to mobile applications and child data collection. Because few firms describe these practices, there may be first mover advantages for those that opt to include them. The dramatic growth in mobile technology use, especially among children, make both of these policies important in mitigating risks to the firm and consumer. A second aspect relates to the increasing use of visible symbols and third-party privacy organizations. The most common logo is the US-EU Safe Harbor. This is likely a result of the increasing global economy and the need for the U.S. firms to communicate with and to store data about European customers and stakeholders. Given that only 5% of firms have displayed the logo, those firms not using this logo may wish to explore its use. It is possible that new adopters may enjoy a competitive advantage if the logo becomes

more recognizable in the marketplace. European consumers may choose to do business with those firms that assure data privacy and a visual symbol may draw them to a given firm.

A third implication relates to the usage of cookies and beacons. Given that 88% of firms describe their practices in their policies, this aspect of data collection and data privacy appears to be highly important to firms. As a result, users of the Internet need to be vigilant in monitoring and perpetually removing these data collection tools if privacy is to be increased within the business or at home.

The limitations of this study are primarily a function of the sample. Only the *Fortune* 500 firms were studied. The use of additional size firms and firm locations (those outside the U.S.) would increase the robustness of results. Future research is also needed to explore how industry sector and firm size may affect the policy principles. Such an analysis, for example, may be helpful in providing additional insight as to whether deficiencies or exploitable competitive advantages exist for the firm.

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WHERE TO INVEST: NYSE OR NASDAQ?

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ABSTRACT: A central market-based question posed by companies today is where to list, the NYSE or Nasdaq? A similar question is also being asked by investors as to which exchange, if either, produces greater positive results. There exists documented differences between the two exchanges, along with the types of companies each tends to attract. Several studies have concentrated on the rule changes for these exchanges and the subsequent impact on security returns or on issues such as transaction costs and the impact that they have on security returns. Most studies have analyzed security returns over short periods while providing minimal evidence for the long-term investor. This study analyzes security returns associated with a sample of similar sized companies in each exchange over a short run period (2011-2013) versus a long run period (1999-2013). Findings indicate that, for short run periods, Nasdaq firms exert a greater positive effect on stock prices. In fact, the average percentage change in stock price for Nasdaq firms is more than twice as great as that for NYSE firms. For long run periods, findings indicate that NYSE firms exert a greater positive effect on stock prices. Average percentage change in stock price for NYSE firms is close to three times as great as that for Nasdaq firms, almost the exact opposite of short run findings. Nasdaq, therefore, appears to be better suited for short run investors while the NYSE seems a better fir for longer run investors.

INTRODUCTION

Coke vs. Pepsi. Apple vs. Microsoft. Energizer vs. Duracell. All are great brand rivalries. Today we are confronted with one of the biggest rivalries in the capital markets space: NYSE vs. Nasdaq. And ever since the Nasdaq debacle with the Facebook IPO, the rivalry has only intensified. Companies going public face lots of decisions including where to list their shares. Ever since the dot-com craze of the late 1990s, the rivalry between the NYSE and Nasdaq has been fierce. Each exchange attempts to woo each other's clients to switch their listing. In fact, some big names have changed exchanges over the past year. Texas Instruments and Viacom switched from the NYSE to Nasdaq in 2011. Early in 2012, TD Ameritrade left Nasdaq for the Big Board, but Nasdaq countered by poaching Kraft. Nasdaq (with its history of winning the listings of technology companies) and the NYSE have been fighting hand-to-hand in the technology company space with Groupon and Zynga choosing Nasdaq and LinkedIn and Pandora going with the NYSE. So is one exchange better than the other from either a placement or investment perspective?

The biggest difference between the two exchanges is the public's perception of the exchanges. Nasdaq with its upstart image and all electronic trading platform has attracted more technology-based companies, many of which did not qualify to list on the NYSE when they originally went public. The Big Board, on the other hand, has traditionally listed the biggest public companies in the world. Even the way the two exchanges market themselves show their different heritages. Nasdaq publicizes listed companies and their products on its seven-story electronic billboard in New York's Times Square. The NYSE has the familiar trading floor bell that marks the beginning and ending of trading each day. Kraft cited the difference in marketing when it announced it was switching to Nasdaq, as it believes the Nasdaq billboard in Times Square will give its products greater visibility. So, part of the decision may hinge on which exchange will give your company the most visibility and best marketing opportunities. Do you want to position yourself as a blue chip company associated with a 200 year old brand or as a more cutting edge company?

If your only concern is cost, then Nasdaq is probably the exchange for you. Nasdaq has three market tiers each with increasing minimum requirements (and theoretically prestige): Global Select Market, Global Market, and the Capital Market. While there is a range of fees, listing 75 million shares on the Global Select Market or the Global Market will run your company $225,000 for the initial listing fee and an additional $68,500 annually to continue the listing. Listing the same number of shares on Nasdaq's Capital Market will cost $80,000 for the initial listing fee and an additional $27,500 annually. For the same listing on the NYSE the initial listing fee would be $300,000 with an additional $69,750 due annually.

Generally, other than for the smallest companies going public, the listing requirements of the two exchanges should not impact a decision on where to list because there is not that much of a difference between the two exchanges' listing requirements. An issuer seeking to list on an exchange can qualify if it meets one of several different tests set forth by the NYSE and Nasdaq, which basically involve a combination of meeting income, assets, cash flow, valuation and revenue minimums. Nasdaq's Global Select Market tier has generally the highest standards to meet. Again, most companies (that have any business going public) will meet one of the standards of both exchanges, so this should not be a big factor.

The Sarbanes-Oxley Act of 2002 requires that audit committees be independent, but both the NYSE and Nasdaq also require that a majority of an issuer's directors be independent. What constitutes "independent" is slightly different under the two exchange's listing standards. In addition, each exchange has its own corporate governance standards. Without trudging through the "weeds" to find technical differences between the two exchanges, here are some high level relatively significant differences that may cause a company to choose one exchange versus the other:

- NYSE-listed companies must have an independent compensation committee and an independent nominating committee. Nasdaq-listed companies, on the other hand, have the option of having an independent compensation committee and independent nominating committee or having executive compensation and nominating decisions made by a majority of their independent directors. Smaller companies with smaller boards may find the Nasdaq standard more flexible (although you will have to disclose in your proxy statement why you don't have a separate compensation and nominating committee).
- A director who is an employee of an organization that has made payments to or received payments from the issuer in an amount that exceeds the greater of 2% of the payment recipient's gross revenues or $1 million would not be independent under the NYSE rules. You would exclude charitable contributions in the calculation. The application of the Nasdaq rule, however, tends to be much stricter in certain circumstances by applying a test of 5% of the recipient's gross revenue or $200,000, whichever is greater. For Nasdaq-listed companies, you would include charitable contributions in assessing independence.
- NYSE-listed companies must have an internal audit function while Nasdaq-listed companies do not.
- NYSE-listed companies must have corporate governance guidelines. Nasdaq does not have such a requirement.
- The CEO of NYSE-listed companies must certify annually that the CEO is not aware of any violations of the listing standards and the company must affirm annually that it is in compliance with the corporate governance listing standards. Interim written affirmations (within 5 business days) must be submitted

any time a change occurs in the composition or independence of the Board or any of its committees and certain other matters. Nasdaq-listed companies need only certify upon their initial listing.

Having delineated the similarities and differences between the two exchanges, the question to answer is does either exchange possess an investment advantage over the other from either a short run or long run perspective? This becomes the scope of this research, to assess similar-sized firms in each exchange over a short study period and a longer study period in order to determine if there are any investor perception differences, that in turn affect securities prices of firms in both exchanges. Results would imply investor implications through helping to choose the firms/exchanges in which to invest.

LITERATURE REVIEW

The NYSE was perceived to be more prestigious and visible than Nasdaq before the 1990s. If companies desired to increase their visibility and liquidity, they were more likely to choose to list on the NYSE (Baker, Powell, and Weaver 1999). Investors were compensated with lower returns given a higher market price and visibility of the shares on the NYSE. This has been documented in the prior research (Kaldec and McConnell 1994).

Investor recognition and market returns between NYSE and NASDAQ

Merton (1987) argues and derives an analytical model in which investors' expected returns are a decreasing function of the degree of investor recognition. According to his model, an increase in the size of a firm's investor base will increase the market value of the firm's stock and lower investors' expected returns when all other factors are equal. Amihud and Mendelson (1986) argue that investors' expected returns are a decreasing function of liquidity. According to their model, investors will be compensated with lower returns given the higher liquidity and market value of a company's stock. Both models have been tested by Kaldec and McConnell (1994). The empirical result supports the theory and finds that both investor recognition and liquidity increased after firms switched from Nasdaq to the NYSE during 1980-1989. They also find that investor recognition and liquidity were negatively and significantly related to the weekly abnormal returns when firms switched from Nasdaq to the NYSE.

Reinganum (1990) investigates the influence of market microstructure on liquidity premiums by comparing the monthly returns of NYSE stocks with the returns of Nasdaq stocks. He finds that for small firms, the average returns of NYSE stocks are about 6% higher than the average returns of Nasdaq stocks and the difference persists even after controlling for size, risk, and liquidity-related variables. However, as firm size increases, the return differential between NYSE and Nasdaq stocks vanishes. He argues that Nasdaq provides liquidity at a lower cost than the NYSE for small firms and investors are willing to accept lower expected returns on Nasdaq because of the superiority of its trading mechanism.

However, Loughran (1993) argues that differences in the characteristics of the companies, especially IPO firms, listed on the two exchanges explain much of the disparity. By comparing the returns of NYSE stocks with the returns of total stocks, seasonal stocks and IPOs from Nasdaq, he finds that 60% of the difference in returns between NYSE and Nasdaq stocks during 1983-1988 period is attributed to the IPO effect from Nasdaq stocks. He finds that Nasdaq contains mostly growth stocks from young firms and these firms underperform during the six calendar years after going public.

Elliott and Warr (2003) compare the price effect for NYSE and Nasdaq stocks added to the S&P 500 Index from October 1998 to December 2000 and find that the market-adjusted returns

(AR) on the listing-day for Nasdaq stocks are 2.2% higher than the market-adjusted returns for NYSE stocks after controlling for firm characteristics, arbitrage risk and index fund demand. However, the abnormal trading volume for both NYSE and Nasdaq stocks on the listing day is closer. Additionally, they find that the list-day return reverses very quickly for NYSE stocks, while the stock returns from Nasdaq still drift after the listing day and only partial returns are reversed over several days. They interpret the result as evidence that the NYSE specialist system is better able to mitigate price pressures than is the Nasdaq dealer system.

Cheon, Christensen and Bamber (2001) investigate the potential factors associated with differences in the magnitude of abnormal returns around the NYSE versus Nasdaq firms' earnings announcements during the 1991-1993 period. Their findings indicate that the magnitude of abnormal returns around the earnings announcement period is higher for Nasdaq firms than for NYSE firms and investors are more sensitive to growth opportunities of Nasdaq firms than of NYSE firms.

During the mid-1990s, there were substantial changes and reforms to both exchanges and the differences between the two exchanges have largely disappeared over the years. To better understand whether the NYSE still has a competitive advantage over Nasdaq from investors' perceptions, Jain and Kim (2006) investigate the phenomenon of firms switching from Nasdaq to the NYSE and the market reaction to the switch using simultaneous equations. They find that the switch is positively related to the investors' recognition and liquidity during the full sample period. However, the liquidity benefit of the switch declines after the reforms. They also find a significant and positive relationship between the three-day cumulative abnormal return (CAR) and investors' recognition. No significant relationship is found between the three-day CAR and liquidity, which differs from prior studies. In addition, they find that firms already have high volumes and investors' recognition are less likely to switch the exchange. Therefore, they provide evidence that investors' recognition is the main reason that firms switch from Nasdaq to the NYSE and markets positively react to the switch.

Panchapagesan and Kedia (2011) compare corporate transactions between firms that switch from Nasdaq to the NYSE and firms that meet the criteria but choose to stay on Nasdaq between 1996 and 1998. They find that firms that switch to the NYSE issue more debt and equity, are more likely to have merger and acquisition transactions and have higher CARs following the switch than do peer firms that chose to stay on Nasdaq.

Transaction costs between NYSE and Nasdaq

Some studies have compared the transaction cost difference between the NYSE and Nasdaq and find that the transaction cost is higher on the Nasdaq than on the NYSE. Huang and Stoll (1996) compare the execution cost of NYSE and Nasdaq stocks using different spread measures and find that the execution costs are twice as large for a sample of Nasdaq stocks as they are for a matched sample of NYSE stocks. They suggest that the dealer trading system limits dealers' incentives to narrow spreads on Nasdaq.

Bessembinder (1999) compares the execution cost difference between NYSE and Nasdaq stocks after stock exchanges adopted the SEC's new rules. He finds that although the trade execution cost differential has narrowed after the adoption of new rules and smaller tick sizes, the trade execution costs still remain higher on the Nasdaq compared with the execution costs on the NYSE, which may indicate that the dealer market structure is less efficient than the specialist auction structure.

Chung, Ness, and Ness (2004) also investigate the execution cost difference between the two exchanges after decimalization and find that the mean Nasdaq spread is wider than the mean NYSE spread for small companies when spreads are equally weighted across stocks. However, the mean of the Nasdaq spread is narrower than the mean of NYSE spreads for large companies when spreads are volume-weighted across stocks. Their results are consistent with the result from Bessembinder (1999) and suggest that the NYSE specialist system provides low execution costs

for small, low-volume stocks and Nasdaq dealer system provides low execution costs for large, high-volume stocks.

Kim and Jiang (2009) use the data from May 2001 to July 2001 to compare the adverse selection costs between the NYSE and Nasdaq after decimalization. They find that the adverse selection component of the bid-ask spread is significantly lower on Nasdaq than on the NYSE after decimalization and it is not attributed to the differences in characteristics of the samples of the two exchanges. They also find that the adverse selection costs increase with trade size on the NYSE. But there is no similar pattern for Nasdaq stocks.

Overall, prior studies provide evidence that the NYSE had higher visibility and prestige than did Nasdaq before the 1990s, which led to higher market values, liquidity, and lower cost of capital for firms listed on the NYSE than for firms listed on Nasdaq. However, with the new technology and substantial reforms of both exchanges, the differences between two exchanges have largely disappeared over the past few years. Although there are companies that continue to switch from the Nasdaq to the NYSE, there are also some companies that switch from the NYSE to Nasdaq. This suggests that investors may have changed their perceptions of the two exchanges. It is this investor perception that this study seeks to research.

HYPOTHESES

In spite of the dissimilarities between the NYSE and Nasdaq there has been minimal research conducted assessing any short run and long run advantages of either, and no research that has attempted to compare or contrast the advantage that either may have from a time frame perspective. From a short-run perspective, if either exchange possesses an advantage, we would expect to see such advantage manifested in the stock price, as established by investor trading. This gives rise to the first hypothesis, stated in the null form:

H1: There is no significant difference in stock price effect when comparing NYSE firms to Nasdaq firms over the short run.

Applying similar logic as used in hypothesis 1, we then assess any potential stock effect differences between the two exchanges from a long-run perspective. This gives rise to the second hypothesis, stated in the null form:

H2: There is no significant difference in stock price effect when comparing NYSE firms to Nasdaq firms over the long run.

SAMPLE SELECTION

The study is comprised of two sample periods. One, consists of similar-sized asset based firms listed on the NYSE and Nasdaq between the years 2011-2013 (i.e., short run). The second consists of similar-sized asset based firms listed on the NYSE and Nasdaq between the years of 1999-2013 (i.e., long run). For the long run period, 1999 was the year selected as the starting point since it was about this time that all changes in the two exchanges were fully incorporated (Jain and Kim [2006]). The short run period, beginning with the most recent year available, 2013, and working back for three years was used in an attempt to stay consistent with prior research utilizing a three year short run window (Elliott and Warr [2003], Cheon, Christensen and Bamber [2001], Panchapagesan and Kedia [2011]). These samples have met the following criteria: 1) Security price data was available on the Center for Research on Security Prices (CRSP). 2) Earnings data, along with asset data, was available on Compustat. Table 1 provides the summary of the samples used in the study.

Table 1: Study Sample Summary				
	NYSE Firms 2011-2013	Nasdaq Firms 2011-2013	NYSE Firms 1999-2013	Nasdaq Firms 1999-2013
Firms identified	1,288	1,119	1,311	1,057
Firms removed due to insufficient Compustat data for all study periods	38	17	41	13
Firms removed due to insufficient CRSP data for all study periods	29	12	32	8
Final overall firms sample	1,221	1,090	1,238	1,036

TEST OF HYPOTHESIS ONE

The purpose of this test is to assess the relative information content of earnings releases for NYSE firms versus Nasdaq firms in short run periods. In order to accomplish this, an approach similar to that used by Jain and Kim (2006) is used. A pooled cross-sectional sample of firms contained in each listing is derived for the period 2011-2013. The following model is used to evaluate information content:

$$CAR_{it} = a + b_1UE_{it} + b_2D1_{it}UE_{it} + b_3D2_{it}UE_{it} + b_4MB_{it} + b_5B_{it} + B_6MV_{it} + e_{it} \quad (1)$$

Where: CAR_{it} = Cumulative abnormal return firm i, time t
- a = Intercept term
- UE_{it} = Unexpected earnings for firm i, time t
- $D1_{it}$ = Dummy variable, 0 for Nasdaq firms, 1 for NYSE firms
- $D2_{it}$ = Dummy variable, 0 for NYSE firms, 1 for Nasdaq firms
- MB_{it} = Market to book value of equity as proxy for growth and persistence
- B_{it} = Market model slope coefficient as proxy for systematic risk
- MV_{it} = Market value of equity as a proxy for firm size
- e_{it} = error term for forecast i, time t

The coefficient "a" measures the intercept. The coefficient b_1 is the earnings response coefficient (ERC) for all firms in the sample (during both NYSE and Nasdaq firms in short run study periods). The coefficient b_2 represents the incremental ERC for NYSE firms. The coefficient b_3 represents the incremental ERC for Nasdaq firms. The coefficients b_4, b_5, and b_6 are contributions to the ERC for all firms in the sample. To investigate the effect of the information content on ERC, there must be some control for variables shown by prior studies to be determinants of ERC. For this reason, the variables represented by coefficients b_4 though b_6 are included in the study.

Unexpected earnings (UE_i) is measured as the difference between actual annual earnings (AE_i) and security market participants' expectations for earnings proxied by consensus analyst following as per Investment Brokers Estimate Service (IBES) (EX_i). The unexpected earnings are scaled by the firm's stock price (P_i) 180 days prior to the forecast:

$$UE_i = \frac{(AE_i - EX_i)}{P_i} \quad (2)$$

For each disclosure sample, an abnormal return (AR_{it})is generated around a three day event window, for event days -1, 0, +1, where day 0 is defined as the date of the earnings announcement identified by the Wall Street Journal. This approach is again similar to the one used by Jain and Kim (2006). The market model is utilized along with the CRSP equally-weighted market index and regression parameters are estimated between -290 and -91. Abnormal returns are then summed to calculate a cumulative abnormal return (CAR_{it}). Hypothesis 1 is tested by examining the coefficients associated with unexpected earnings for NYSE study period firms (b_2) and the coefficient associated with unexpected earnings for Nasdaq study period firms (b_3).

RESULTS OF HYPOTHESIS ONE

As shown in Table 2, the coefficient representing the combined NYSE and Nasdaq firms for the short run period of 2011-2013, b_1, is positive .09 (.01 significance level). The coefficient representing NYSE-only firms during the same period, b_2, is positive, .03 (.05 significance level). The coefficient representing Nasdaq-only firms during this period, b_3, is positive .15 (.01 significance level). All other coefficients are not significant at traditional levels.

Findings indicate that both NYSE and Nasdaq firms have a significantly positive effect on security prices in the short run, while Nasdaq firms appear to exert a greater positive effect on stock prices during these short run periods.

In addition, whenever regression variables are employed, there is a probability of the presence of multicollinearity within the set of independent variables which may be problematic from an interpretive perspective. To assess the presence of multicollinearity, the Variance Inflation Factor (VIP) was utilized. Values of VIP exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 2, a VIP of 2.0 was observed, thus indicating a non-presence of significant multicollinearity.

Table 2: Test of Hypothesis 1

Model: $CAR_{it} = a + b_1UE + b_2D1UE + b_3D2UE + b_4MB_{it} + b_5B_{it} + b_6MV_{it} + e_{it}$

a	b_1	b_2	b_3	b_4	b_5	b_6	Adj. R^2
.20	.09	.03	.15	.03	.15	.25	
(.48)	(2.36)[a]	(1.87)[b]	(2.44)[a]	(.53)	(.69)	(.39)	.251

[a] Significant at the .01 level
[b] Significant at the .05 level

b_1 = Unexpected earnings of 2,311 NYSE & Nasdaq combined firms 2011-2013
b_2 = Unexpected earnings of 1,221 NYSE firms 2011-2013
b_3 = Unexpected earnings of 1,090 Nasdaq firms 2011-2013
b_4, b_5, b_6 = Unexpected earnings of 2,311 NYSE and Nasdaq combined firms 2011-2013

In addition to a cross-sectional regression analysis, a one-way ANOVA test is conducted to assess any differences between the NYSE and Nasdaq groups of firms. This includes the average

percentage change in security prices for; NYSE firms (1,221) and Nasdaq firms (1,090), around a three day window (i.e., -1, 0, +1, with day 0 representing the day of earnings release as per the Wall Street Journal, for the study period 2011-2013.

Table 3 shows the results of the ANOVA test and indicates an F-ratio of 22.918 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 6.6480 was obtained with a significance level of .001. This test indicates significant differences in the variances of the groups. These results, combined with the results of the cross-sectional regression test lead to the rejection of the null hypothesis that there is no difference in stock prices when comparing NYSE and Nasdaq firms in the short run.

In addition, close analysis of Table 3 indicates that the average composite percentage change in stock price for the Nasdaq sample was +9.033, while the respective change for the NYSE sample was +3.246. This indicates that there exists greater movement in stock price of Nasdaq firms in the short run, in fact nearly triple that of NYSE firms. The average stock price movement is significant and positive for both groups.

Table 3: Test of Hypothesis 1
One Way ANOVA Summary

Groups	Count	Sum	Average	Variance
NYSE firms	1,221	3,963.8	3.246	5.2897
Nasdaq firms	1,090	9,845.9	9.033	2.9106

Source of Variation	SS	*df*	MS	F-ratio	P-value
Between Groups	2,569.305	1	298.326	22.918	.0000
Within Groups	824.952	2,309	2.102		
Total	3,294.257	2,310			

Levene Statistic	*df*1	*df*2	Two-tail Significance
6.6480	1	2,309	.001

TEST OF HYPOTHESIS TWO

The purpose of this test is to assess the relative information content of earnings releases for NYSE firms versus Nasdaq firms in long run periods. In order to accomplish this, and similar to hypothesis one, a pooled cross-sectional sample of firms contained in each listing is derived for the period 1999-2013. The following model is used to evaluate information content:

$$CAR_{it} = a + b_1UE_{it} + b_2D1_{it}UE_{it} + b_3D2_{it}UE_{it} + b_4MB_{it} + b_5B_{it} + B_6MV_{it} + e_{it} \quad (3)$$

Where: CAR_{it} = Cumulative abnormal return firm i, time t
- a = Intercept term
- UE_{it} = Unexpected earnings for firm i, time t
- $D1_{it}$ = Dummy variable, 0 for Nasdaq firms, 1 for NYSE firms
- $D2_{it}$ = Dummy variable, 0 for NYSE firms, 1 for Nasdaq firms
- MB_{it} = Market to book value of equity as proxy for growth and persistence
- B_{it} = Market model slope coefficient as proxy for systematic risk
- MV_{it} = Market value of equity as a proxy for firm size
- e_{it} = error term for forecast i, time t

The coefficient "a" measures the intercept. The coefficient b_1 is the earnings response coefficient (ERC) for all firms in the sample (during both NYSE and Nasdaq firms in long run study periods). The coefficient b_2 represents the incremental ERC for NYSE firms. The coefficient b_3 represents the incremental ERC for Nasdaq firms. The coefficients b_4, b_5, and b_6 are contributions to the ERC for all firms in the sample. To investigate the effect of the information content on ERC, there must be some control for variables shown by prior studies to be determinants of ERC. For this reason, the variables represented by coefficients b_4 though b_6 are included in the study.

Unexpected earnings (UE_i) is measured as the difference between actual annual earnings (AE_i) and security market participants' expectations for earnings proxied by consensus analyst following as per Investment Brokers Estimate Service (IBES) (EX_i). The unexpected earnings are scaled by the firm's stock price (P_i) 180 days prior to the forecast:

$$UE_i = \frac{(AE_i - EX_i)}{P_i} \qquad (4)$$

For each disclosure sample, an abnormal return (AR_{it}) is generated for event days -1, 0, +1, where day 0 is defined as the date of earnings announcement identified by the Wall Street Journal. The market model is utilized along with the CRSP equally-weighted market index and regression parameters are estimated between -290 and -91. Abnormal returns are then summed to calculate a cumulative abnormal return (CAR_{it}). Hypothesis 2 is tested by examining the coefficients associated with unexpected earnings for NYSE study period firms (b_2) and the coefficient associated with unexpected earnings for Nasdaq study period firms (b_3).

RESULTS OF HYPOTHESIS TWO

As shown in Table 4, the coefficient representing the combined NYSE and Nasdaq firms for the long run period of 1999-2013, b_1, is positive .10 (.01 significance level). The coefficient representing NYSE-only firms during the same period, b_2, is positive, .17 (.01 significance level). The coefficient representing Nasdaq-only firms during this period, b_3, is positive .02 (.01 significance level). All other coefficients are not significant at traditional levels.

Findings indicate that both NYSE and Nasdaq firms have a significantly positive effect on security prices in the long run, while NYSE firms appear to exert a greater positive effect on stock prices during these long run periods.

To assess the presence of multicollinearity, the Variance Inflation Factor (VIP) was utilized. Values of VIP exceeding 10 are often regarded as indicating multicollinearity. In the test of hypothesis 2, a VIP of 2.4 was observed, thus indicating a non-presence of significant multicollinearity.

Table 4: Test of Hypothesis 2

Model: $CAR_{it} = a + b_1UE + b_2D1UE + b_3D2UE + b_4MB_{it} + b_5B_{it} + b_6MV_{it} + e_{it}$

a	b_1	b_2	b_3	b_4	b_5	b_6	Adj. R^2
.12	.10	.17	.02	.07	.11	.31	
(.51)	(2.47)[a]	(2.35)[a]	(2.50)[a]	(.63)	(.26)	(.51)	.301

[a] Significant at the .01 level

b_1 = Unexpected earnings of 2,274 NYSE & Nasdaq combined firms 1999-2013
b_2 = Unexpected earnings of 1,238 NYSE firms 1999-2013
b_3 = Unexpected earnings of 1,036 Nasdaq firms 1999-2013
b_4, b_5, b_6 = Unexpected earnings of 2,274 NYSE and Nasdaq combined firms 1999-2013

In addition to a cross-sectional regression analysis, a one-way ANOVA test is conducted to assess any differences between the NYSE and Nasdaq groups of firms. This included the average percentage change in security prices for; NYSE firms (1,238) and Nasdaq firms (1,036), around a three day window (i.e., -1, 0, +1 with day 0 representing the day of earnings release as per the Wall Street Journal, for the study period 1999-2013.

Table 5 shows the results of the ANOVA test and indicates an F-ratio of 22.474 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 6.9281 was obtained with a significance level of .001. This test indicates significant differences in the variances of the groups. These results, combined with the results of the cross-sectional regression test lead to the rejection of the null hypothesis that there is no difference in stock prices when comparing NYSE and Nasdaq firms in the long run.

In addition, close analysis of Table5 indicates that the average composite percentage change in stock price for the NYSE sample was +10.149, while the respective change for the Nasdaq sample was +3.510. This indicates that there exists greater movement in stock price of Nasdaq firms in the long run, in fact nearly triple that of NYSE firms. These results are the exact opposite when comparing the two exchanges in the short run.

Table 5: Test of Hypothesis 2

One Way ANOVA Summary

Groups	Count	Sum	Average	Variance
NYSE firms	1,238	12,564.5	10.149	3.1892
Nasdaq firms	1,036	9,845.9	3.510	3.0195

Source of Variation	SS	*df*	MS	F-ratio	P-value
Between Groups	2,229.875	1	247.198	21.474	.0000
Within Groups	699.253	2,273	2.091		
Total	2929.128	2,274			

Levene Statistic	*df*1	*df*2	Two-tail Significance
6.9281	1	2,273	.001

CONCLUSIONS

A central market-based question posed by companies today is where to list, the NYSE or Nasdaq? A similar question is also being asked by investors as to which exchange, if either, produces greater positive results. There exists documented differences between the two exchanges, along with the types of companies each tends to attract. Several studies have concentrated on the rule changes for these exchanges and the subsequent impact on security returns or on issues such as transaction costs and the impact that they have on security returns. Most studies have analyzed security returns over short periods while providing minimal evidence for the long-term investor. This study analyzes security returns associated with a sample of similar sized companies in each exchange over a short run period (2011-2013) versus a long run period (1999-2013)

Findings indicate that, for short run periods, both NYSE and Nasdaq firms have a significantly positive effect on security prices, while Nasdaq firms appear to exert a greater positive effect on stock prices during these short run periods. While for long run periods, findings indicate that both NYSE and Nasdaq firms have a significantly positive effect on security prices, while NYSE firms appear to exert a greater positive effect on stock prices during these long run periods.

This research contributes to extant literature by examining a greater number of firms in each exchange, delineating investment time periods by short run and long run holding periods, and detailing which exchange might be more preferable for the short run versus the long run investor. While firms in both exchanges produce positive stock price effects, the Nasdaq appears to be better suited for short run investors while the NYSE seems a better fir for longer run investors.

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ENTREPRENEUR OPTIONS: "FRANCHISING" VS. "LICENSING" (MCDONALD'S VS. STARBUCKS AND CHICK-FIL-A)

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ABSTRACT

As entrepreneurs decide to open or pursue a small business, one important option available to most entrepreneurs involves whether or not to purchase a "franchise" or "licensed" business. Many small businesses started during the last 30 years have involved either franchising or licensing. One major reason small business owners choose to become franchisees or licensees is these small business models allow individuals to function as if they were operating a much larger enterprise or corporation. Many entrepreneurs could be confused over what fees are required, what the various fees entail, and the difference between a "franchised" and "licensed" business. It seems a large number of fees and monthly expenses are based on the McDonald's Corporation fee structure. Important insights can be gained by analyzing the concepts employed by McDonald's with regard to fees and expenses as presented in an earlier paper, ASBBS Annual Conference Proceedings, February 2011 (Volume 18, Number 1). Franchise/license fees, security fees, base rent fees, percent rent fees, service fees, and royalty fees, not to mention the various purchase cost options, all come into play when analyzing a potential business such as McDonald's or Starbucks. Comparing Chick-fil-A and Starbucks licensees to McDonald's franchisees can help potential entrepreneurs identify possible issues. Based on the earlier research of McDonald's fee structures, comparisons of associated fees and expenses of franchised versus licensed companies can be analyzed in a more enlightened manner. Licensing of Chick-fil-A and Starbucks will be compared to a franchised McDonald's for base-line comparisons and analysis.

INTRODUCTION

Having limited funds available, combined with a lack of a complete understanding of franchising and licensing, can be a significant barrier to someone attempting to become a franchisee or licensee. Historically, required financial resources for the individual entrepreneur have been obtained from various sources, such as immediate family members, relatives, or banks. Franchising and licensing models serve as a financial resource multiplier, effectively allowing the entrepreneur to operate a small business with many of the attributes more often associated with much larger corporate entities. A thriving large corporation is able to offer its franchisees and licensees an extremely large reservoir of resources. A franchisor such as McDonald's serves as an excellent base-line for comparisons of various other franchises and licensing retail corporations with regard to fees and expenses.

The retail service sector, especially the restaurant sector, has become one of the more recognized industries associated with the franchising and licensing forms of business structures. Many such fast food franchising and licensing ventures have proven extremely successful. The name in this industry sector that has risen to become the pinnacle of the fast food franchising sector is McDonald's and hence serves as an excellent base-line for franchise fees and expenses. In a

previous paper (ASBBS Journal, Volume 9, Number 1, Summer 2013), comparisons were made of fees and expenses of
Chick-fil-A to McDonald's attempting to look for significant deviations in franchising versus licensing costs and expenses. This helps estimate future profits that may be realized in these types of businesses. In this paper an analysis will made comparing the Starbucks license to further enhance comparisons.

The current analysis will use descriptive statistics to summarize and present data comparing the franchise model of McDonald's to the licensing model used by Chick-fil-A and Starbucks. We will use a systematic comparison of fees, purchase prices, and projected annual revenues between the McDonald's "franchise" model and the "licensing model" of Chick-fil-A and Starbucks. This methodology will present opportunities for potential owner/operators in these types of businesses to make solid decisions on what works best for their future financial success based on the data collected. Past and present literature reviews on "franchising" and "licensing" agreements offer little if any substantial data for comparisons. This is an area that we will begin to address in this paper.

THE McDONALD'S FRANCHISING MODEL

When base-lining a McDonald's franchise, there are a variety of terms and conditions that come into play with regard to individual store franchise fees. For each McDonald's restaurant there is an operator's lease agreement with an assortment of stated fees and conditions "appropriate" to that specific restaurant. A portion of the table of contents from an Operator's Lease with various articles is shown as Table I.

TABLE I
OPERATOR'S LEASE (SAMPLE)
TABLE OF CONTENTS

TABLE I (continued)
OPERATOR'S LEASE (SAMPLE)
TABLE OF CONTENTS

The Operators Lease is a "legal" document signed by the franchisee that specifically states the rents and fees for that specific McDonald's restaurant. Each individual McDonald's store will have a separate and specific operator's lease. Most legitimate franchisors and licensees will use and employ some form of lease/franchise agreement that clearly states terms, fees and expenses. Chick-fil-A and Starbucks, that are being base-lined to McDonald's, also have some form of legal document/agreement that clearly states fees and expenses that will apply to the licensees. (Franchise Fees sand Expense Requirement. Base Line to McDonald's Corporation, ASBBS E Journal, Volume 9, Number 1, Summer 2013, ISSN 1557-5004.)

McDONALD'S TRADITIONAL/CONVENTIONAL FRANCHISE

The majority of traditional (stand-alone building) McDonald's franchises are termed "Conventional Franchises." This traditional McDonald's franchise is based on a 20 year agreement between the franchisee and McDonald's Corporation. The Operator's lease for a Conventional Franchise of McDonald's usually includes an ongoing service fee of approximately 4 % of the monthly sales/revenues of that particular store. This 4% is used for advertising and marketing. This may also be referred to as the advertising fee. This money is used for TV, radio, internet

advertising/promotions, as well as other marketing choices. In addition to this 4%, there is an ongoing "monthly fee" (royalty) of 8.5% to 13% of monthly revenues due to McDonald's Corporation for use of the building which is usually owned by McDonald's Corporation. This rent is based on McDonald's Corporation owning the land and building for that particular restaurant. This rent percent can be reduced in rare cases where the franchisee owns the building. There may be a few cases where the franchisee owns both the building and the land, but McDonald's Corporation usually owns the land and the majority of buildings where McDonald's restaurants are located. Hence, McDonald's has become one of this country's largest commercial real estate holding companies; owning thousands of prime commercial locations throughout the United States. Table II presents an example of McDonald's estimated monthly fees.

TABLE II
"Monthly Fees" to McDonald's for Restaurant – Based on Monthly Sales (Revenue) of $150,000.00 Per Month

Estimated Monthly Sales/Revenues	$150,000.00
	x.10
Percent Rent Fee (Figuring 10%)	$15,000.00
	$150,000.00
Service (Advertising Fee)	x.04
$6,000.00	

From Monthly Sales of $150,000.00 Franchisee Pays $15,000.00 + $6,000.00 = **$21,000.00** to McDonald's

There are some initial costs, in addition to the "service fee" (advertising) and "percent rent fee," (royalty) that are also required to be paid for a conventional McDonald's franchise. These costs include a security deposit (one-time payment of $15,000) and the initial franchise fee of $45,000. These costs are tied to the Operator's Lease Agreement for each individual store. These monthly fees and deposits are in addition to the purchase price of the actual restaurant. The purchase price reflects the fair market value paid for an existing restaurant. Although there is no set purchase price, a broad rule of thumb usually sets the purchase price between 50% - 75% of the store's past annual sales for an existing and established store. McDonald's usually requires the franchisee to invest 25% of the negotiated purchase price of a restaurant from personal funds while acquiring a mortgage for the remaining 75%. Average revenues for a traditional McDonald's are in the neighborhood of $1.5 - $1.8 million per year. These fees and expenses are shown in Table III.

TABLE III **Comparison Franchising vs. Licensing**			
Monthly Fees			
Different related costs	**McDonald's**	**Chick-fil-A**	**Starbucks**
% Rent (Royalty)	8-13% of sales	15% gross sales	8-15% of sales revenue based on agreement, 2.5% of gross revenue (sandwiches, bottled beverages) 5% of gross revenue from sandwiches
Service Fee (Advertising)	4% of sales	None	None
Purchasing Expenses			
Purchase Price	varies	none—no equity	none—no equity
% Down of Purchase Price	25%	none—no equity	none—no equity
Franchise Fee	$45K	$5K	$15-$30K
Security Fee	$15K	None	None
Projected Annual Revenues			
	$1.5-$1.8 million	$2-$3 million	Avg. $750,000
Lease Agreement			
	20 years	year to year	Varies (1-5 years)

Monthly advertising fees and monthly rent fees as well as the security deposit, franchise fee, and the amount of money required as a down payment will be analyzed in the following paragraphs for Chick-fil-A and Starbucks which are being compared to McDonald's.

TRADITIONAL CHICK-fil-A LICENSEE

The majority of licensed Chick-fil-A's are traditional stand-alone locations. These restaurants are operated by an individual who is licensing the restaurant from the Chick-fil-A Corporation on a year to year agreement. Unlike most franchises, Chick-fil-A operators serve basically as partners with the corporation, sharing bottom line profit, while acquiring no equity in the restaurant. Chick-fil-A's are not bought and sold as McDonald's franchisees since Corporate Chick-fil-A does retain all equity in the business. Hence, there are no initial purchase expenses (mortgage) or percent down payments when serving as the licensee of a Chick-fil-A. The year to year agreement between Chick-fil-A and the licensee does, however, involve a $5,000 initial fee which is substantially less than the $45,000 for the McDonald's 20 year franchise fee. Chick-fil-A licensed partners sublease restaurants from Corporate Chick-fil-A and manage the restaurant. There are also no advertising fees since Chick-fil-A maintains control over advertising.

Chick-fil-A does, however, have fees and expenses involved when one is a licensee. The largest of these fees is the Operator Service Charge. This charge is usually 15% of monthly gross sales

and also includes 50% of monthly net profit. There are other smaller expenses such as accounting services (provided by Chick-fil-A) that are $60 per month and hardware/software support which can run from $500 - $4,000 per month.

Chick-fil-A's Operator Service Charges are extremely high but indications are that annual revenues are also high and may range from $2 to $3 million annually per traditional store. The most significant difference between Chick-fil-A and McDonald's or most other food franchises is the lack of equity or ability to buy or sell when a Chick-fil-A licensee decides to retire or move on to another opportunity. All of these expenses for Chick-fil-A are summarized on Table III. (ASBSS E Journal, Volume 9, Number 1, Summer 13, ISSN1557-5004)

STARBUCKS LICENSEE

The majority of Starbucks, in stand-alone locations with a lounge area and drive-thru, are corporation owned stores. There are 10,194 corporate owned stores and 9,573 licensed stores as of September 2013. Most of the current "licensed" stores appear to be small versions of the stand-alone corporate stores and are found in large grocery stores (Kroger, Albertsons, Safeway) or in retail shops (Target and Barnes and Noble). Licensed Starbucks are usually what you will also find in casinos, college campuses and hospitals.

These smaller venue licensed Starbucks, which for this paper are of primary concern, are operated by an individual or organization (casino, hospital, etc.) who is managing the Starbucks for some agreed period of time (1-5 years) per the licensee agreement with the Starbucks Corporation. Unlike a McDonald's franchise, Starbucks licensees serve basically as partners with Starbucks Corporation (like Chick-fil-A), paying fees and product expenses to Starbucks, but acquiring no equity in the business. Starbucks cannot be bought and sold like McDonald's franchises since Starbucks retains all control, ownership and equity in the licensed business. In other words, a Starbucks license agreement does not allow the licensee to eventually sell his/her business and leave with equity/profit from the sale.

As a result of this type of business model (licensing) there is no initial business purchase cost (mortgage) while serving as a Starbucks licensee. There are, however, numerous references that indicate an initial opening and equipment cost to the Starbucks licensee of approximately $315,000. These costs are included to purchase the required restaurant equipment and marketing materials to open a licensed Starbucks. Starbucks, like Chick-fil-A's, are not bought and sold like McDonald's. Hence, there are no monthly mortgage payments in most licensed Starbucks. The $315,000 equipment purchase expense, plus the building rent expense, is all that is initially required to open a Starbucks.

There are some licensee stores found in the larger stand-alone buildings. Here the Starbucks licensee has previously bought or owns the property for his Starbucks business before acquiring the license. There is a specific licensee agreement for each Starbucks licensee store that is usually between 1-5 years and can cost between $15K and $30K. All Starbucks licensees are essentially business managers, like Chick-fil-A, who rent retail space or in some cases own the building they are using to operate a Starbucks. They pay required monthly fees to Starbucks while keeping the monthly bottom line profit from that store. These Starbucks fees and expenses for a licensee vary as much as 8-15% of the gross monthly revenues based on what is specifically defined in the specific license agreement. This 8-15% of the revenues can include fees of 2.5% of any sandwiches and bottled beverages sold in that Starbucks. Certain specific Starbucks sandwiches can have fees of up to 5% of gross revenue. Also included in expenses/fees for the Starbucks licensees is the requirement to purchase specific Starbucks coffee blends only from Starbucks with all the

associated food costs for these products. One of the best reasons to license a Starbucks involves the ability to take advantage of the Starbucks name recognition. In addition to packaged coffee beans—the company also places its name on cold, canned coffee drinks, breath mints, candy bars, ice cream treats, and anything else that either contains coffee or is likely to be found in a coffee shop. There are Starbucks brand travel mugs, tote bags, coffee grinders, and home espresso machines. All of these items must be purchased directly from Starbucks Corporation and then sold by the licensee with appropriate fees going back to Starbucks Corporation.

The smaller licensed Starbucks found in grocery stores, colleges and airports appear to average $750,000 in annual revenues based on 2014 SEC corporate filings. This average of $750,000 is probably significantly lower than the Starbucks Corporate owned stand-alone stores which probably generate $1.5 - $2.5 million in annual revenues. All of these Starbucks fees and expenses are displayed in Table III.

CONCLUSION

Licensed businesses such as Starbucks and Chick-fil-A are significantly different than a franchise business such as McDonald's. Licensed businesses are generally portrayed as a cheaper alternative to franchising. This appears to be tied to the fact that licensed models "do not" own the business and "do not" incur an initial expense of purchasing the business with a monthly mortgage payment.

The fees for operating a "licensed" business do appear cheaper in some aspects than a "franchise" business as shown in Table III. There are usually no corporate advertising fees for licensed stores since this expense is paid for the most part by the Corporation, while a franchise owner may be paying 4-5% of monthly revenues for advertising to the Corporation. Some franchises also charge an initial security fee ($15K—McDonald's) while licensees are not burdened with this expense. Indications are the initial franchise fee is usually relatively expensive ($45K-McDonald's) for a longer agreement time (20 years-McDonald's) while the license expenses for a Starbucks ($15-$30K) and Chick-fil-A ($5K) are cheaper but for a significantly shorter period of time (1-5 years) as shown in Table III.

The most apparent cost saving factor in licensing is probably the possible lack of a monthly mortgage payment since the licensee does not own the business or purchase the business. The lack of a mortgage payment eliminates a large monthly expense but results in no equity in the business. There are numerous McDonald's franchisees paying off their mortgagees in 7-10 years and then acquiring full equity in the business. When one looks at the monthly fees of 8-15% for products required to be purchased by licensees of a Starbucks compared to the monthly royalty fees of 8-13% for a McDonald's, franchisees and licensees are very similar with the exception of advertising fees. Licensing and Franchising models both involve food and labor costs which are large factors on bottom line profit.

In summary franchising and licensing can both be very effective business models. Whether one wishes to obtain equity in the business while paying down a mortgage is a significant factor to be considered. The license and franchise models both offer opportunities to make significant monthly profits based on the age old concept of "how well the business is managed and operated". All potential franchisees and licensees need to analyze the fees and expenses involved as discussed and presented in this paper as well as analyzing the expenses of labor, materials, utilities and the impact of a mortgage to determine accurate and reliable actual bottom-line profits. Only through careful analysis of expenses and fees can one determine the best option available to them when comparing a franchised to a licensed business.

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CRITERIA FOR OCEAN FREIGHT CARRIER SELECTION: A PERSPECTIVE OF JAPANESE AUTOMOTIVE COMPANY IN THAILAND

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ABSTRACT

Selecting freight carrier is one of the most important activities in supply chain management since transportation significantly affect cost, efficiency, ability to deliver the product to customer on time, and customer satisfaction. As a result, shippers are focusing on developing framework and selection criteria to ensure that they select the right carrier. For freight carrier, it is also important to understand how its customers (shippers) select carrier. By identifying selection criteria, freight carrier will be able to focus its resources and efforts to improve the areas that are more important for customer. Japanese automotive company in Thailand is one of the most important groups of customer for ocean freight carrier due to high shipment volumes both in importing parts to assemble and exporting vehicles to other countries. Therefore, the objective of this paper is to identify criteria that Japanese automotive companies use in order to choose ocean freight carrier. Five selection criteria are identified which include reliability of service, quality of service, cost, after-sale service, and perceived capability. The result shows that after-sale service is the most influential factor affecting the ocean carrier, followed by reliability of service. These findings are beneficial for ocean freight carrier in order to develop strategy to attract and retain its customers. Focusing solely on service price (cost) is no longer sufficient in today competition; carrier should place more attention to train its people and focus on customer-oriented strategy.

INTRODUCTION

Since 2008, Thailand export value has been decreased in terms of both value and growth rate due to global financial crisis together with appreciate value of Thai Baht against U.S dollar in 2013. The growth rate was at negative 3.72 percent in the second quarter of 2013, and the value of exporting was at 3.34 billion Baht compared to 3.46 billion in 2012. The decline in exporting undoubtedly affects demand for freight transportation especially sea transportation since demand for transportation is a derived demand. Furthermore, with the advancement in ship technology, vessel size has been increasing in order to achieve economy of scale. Unfortunately, this also contributes to the situation that the supply side of transportation (carrier capacity) starts to be higher than the demand from shipper. Thus, competition among ocean freight carriers has been more intense. Fierce competition leads to stronger bargaining power from shippers. Ocean freight carrier has to rely more on aggressive pricing policies in order to maintain market share and sale volume in order to secure a stable revenue stream. For instance, liner freight charge of 40 foot dry container from Thailand to Europe in the second quarter of 2013 compared to same period in 2012, dramatically declined by approximately 30%. In order to avoid price war, it is important for carriers to understand how shippers (customers) select carrier. By identifying selection

criteria, freight carrier will be able to focus its resources and efforts to improve the areas that are more important for customer. The ocean freight carrier that can offer reasonable price and be able to satisfy other selection factors such as service quality can easily gain long-term shipper satisfaction and customer loyalty, and be able to maintain revenue and survive in today's competition.

According to the Department of International Trade Promotion, Thailand's top three export commodities in 2013 are electronic parts, electronic goods, and automotive parts and CKD (completely knocked-down). Automotive parts and CKD has the largest growth rate of 29.92% and 15.44% in 2012 and 2013 respectively while electronic parts, which has the highest exporting value, declined 3.15% in 2013. One can see that automotive industry is likely to be an important group of customer for ocean freight carrier because of the volume and a potential to grow. To further understand automotive industry in Thailand, the authors analyzed the players in the market and found that Japanese automobile companies are the dominant players. According to Thai Automotive industry Association and the federation of Thai Industries, there are 16 Japanese automobile companies in Thailand. The top five Japanese automobile companies including Toyota, Mitsubishi, Nissan, Isuzu, and Honda account for more than 85% of the total vehicle export volume, which is approximately at 3.2 million units in 2013.

Thus, the objective of this study is to develop insight and identify factors that Japanese automotive companies consider in selecting ocean freight carrier. The rest of this paper begins with the methodology of this study. Literature review on freight carrier selection criteria is then discussed. After that, the paper describes survey method and the survey results. Lastly, conclusion and the discussion are provided in the last section.

METHODOLOGY OF THE STUDY

There are several steps to perform in order to achieve the objective of this study including:

1. Review of related journals and theories to identify related freight carrier selection criteria. (Secondary data)
2. Survey by using questionnaire to identify freight carrier selection criteria used in Japanese automotive companies and the importance level of each criterion (Primary data)
3. Analyze data using statistical method and provide recommendation on the factors that freight carrier should focus in order to attract new customers and retain current customers

LITERATURE REVIEW

Transportation plays such a crucial role in bridging global consumer demand and manufacturing supply. Approximately 80% of global trade by volume, which accounts for over 70% of global trade by value, is carried by Ocean transportation (UNCTAD, 2012). The ability to satisfy customer in term of delivery performance is partly due to the ocean freight carrier that a company choose to use. As a result, it is important to understand how company chooses a carrier. The importance of carrier selection and the criteria used in freight transport decision has been studied since the 1960s.

Cook (1967) found that the companies emphasize on cost, reliability, and service as main requirement in transportation. McGinnis (1980) examined the importance of the factors and found that speed and reliability are the most important factors, followed by freight rate and loss/damage rate. These two studies stated that freight rate was considered as the main requirement on transport selection. On the other hand, various studies mentioned non-price factors were considered more

important than price factor. Burdg and Daley (1985) surveyed industrial shippers/users of the U.S. inland waterway system and found that the important factors in selecting a transportation method are ability to satisfy customer's requirements, dependable transit time, low freight charges, and allowance for large shipments. Martin et al. (1988) identified the five most important attributions of buyers in selecting a transportation method which are ability to satisfy customer requirements, dependable transit time, service consistency, low freight charges, and equipment availability. Nevertheless, most studies during 1960-1980, tends to indicate that price factor is the most important factor affecting choice of transport selection. On the other hand, the studies conducted during 1985-1990, has shown different indications in terms of choice of transport selection where non-price factor were considered more important than price factor.

For more recent studies, the more influential factors start to shift to non-price factors. Whyte (1993) found that the top 5 most important determinants of hauler selection by Scottish Production Industries are ability to provide a good service, Reputation for integrity, Flexibility to future requirements, price and the likelihood of establishing a long-term relationship. The price factor and the flexibility to future requirement were at same ranking (3rd rank), while ability to provide good service was the 1st rank. The researcher also pointed out the most important element of service was flexibility especially the ability to meet requirements at short notice. Matear and Gray (1993) examined whether shippers and freight forwarders employ different criteria in selecting freight transport services. The study was based on the Irish Sea market for freight transport services. Result of the study suggested the three most important factors for shippers were fast response to problems, avoidance of loss or damage, and on-time collection and delivery. On the other hand, the top 3 attributes freight forwarders used in transport service selection were punctuality of sea service, availability of freight space, and high frequency of sea service. Kent and Parker (1999) conducted research among U.S. export and import shippers and found that the top five most important factors for export shippers were equipment availability, service frequency, reliability, financial stability and service changes, whereas the top five most important factors for import shipper were reliability, equipment availability, service frequency, rate changes and rate/ expediting. Larson and GammelGaard (2001) found that the five most important selection factors were pick-up/delivery reliability, lead time performance, rates/price levels, geographic coverage, and quality of personnel. Göl, and Çatay (2007) showed that some shippers adopt the analytic hierarchy process (AHP) to support their carrier selection process. A total of 27 selection criteria are identified which can be grouped into 5 groups as followed.

1. General company consideration factor including price, financial considerations, industry experience, location, asset ownership, international scope, growth forecasts and yearly efficiency
2. Capabilities factor including optimization capabilities, IT systems, customer service, supply chain vision, creative management and responsiveness.
3. Quality factor including service quality and performance, continuous improvement, and KPI measurement and reporting.
4. Client relationship factor including availability of top management, cultural fit, service cancellation, and general reputation.
5. Labor relations factor including HR policies, and availability of qualified talent.

Mohammaditabar and Teimoury (2008) studied various criteria used in different industries and from multiple viewpoints and found that there are 28 selection criteria which were grouped into 5 different groups.

1. Insurance of service provision criteria including financial stability, ease of claim settlement, building invoice accuracy, freight loss experience, carrier response in emergency situation and ability to provide service that not damage goods.
2. Customer service criteria including reliability of on time pickup and delivery, flexibility in scheduling, computer link, quality of drivers and personnel and shipment tracking and tracing capabilities.

3. Strategic compatibility including Reputation for integrity, likelihood of establishing a long term relationship, carrier representative, previous experience and administrative support.
4. Handling service including equipment, handling expedited shipments, customer clearance capabilities, carrier ability to handle special products, Geographic coverage, carrier cooperation and cargo capacity limitation.
5. Cost relevant including cost, flexible rate, billing invoice accuracy, inventory carrying cost and inventory cost required to produce the inventory to fill the pipeline.

Yeung et al. (2011) studied selection criteria by analyzing through the theoretical lens of the resource-based view (RBV). The population of this research is exporting firm in Hong Kong and the PDR region. The indicators of resource-based view of 3PL selection were timely response, close relationship, delivery reliability, performance accuracy, creative solutions, efficiency improvement, package service, automation, customized services, completed arrival, total cost, shared schedule, and long relation. In conclusion, the important carrier selection factors include not only price/cost but also non-price factors. In particular, the more recent studies show an increase in the number of selection factors and the emphasis towards non-price factors.

SURVEY METHOD

Based on the literature review in previous section, twenty four ocean freight carrier selection criteria are identified and grouped into 5 categories as followed.

1. **Reliability of service**: ocean freight service provider can provide service as promise to customer. The factors in this category are total transit time, transit time reliability, frequency and/or consistency of service, schedule flexibility, and carrier's coverage services.
2. **Quality of service**: ocean freight service provider can facilitate transportation service solution to company. The factors in this category are quality of sales representatives, special equipment, pickup and delivery service, willingness to negotiate service change, equipment availability, and convenient pickup and delivery time.
3. **Service cost**: ocean freight service provider's charge and other surcharge of using service from the service provider. The factors in this category are transportation rate and willingness to negotiate rate change.
4. **After-sale service**: ocean freight service provides the treatment of customer after sales. The factors in this category are quality of customer service, 24 hours support team, fast response to problems and/or dependability in handling problem, availability of shipment information, IT tracking and trace system, accuracy of invoice, and claims processing.
5. **Perceived capability**: past performance and reputation of ocean freight service provider. The factors in this category are cargo loss and damage rate, carrier reputation, and financial stability.

A questionnaire was developed to examine the importance of the above factors. Five-point Likert scales were employed for this study, 1 refers to the lowest important factor and 5 refers to the highest important factor.

The top five Japanese automotive exporting companies in Thailand including Toyota, Mitsubishi, Nissan, Isuzu, and Honda were selected as the survey population since their combined vehicle export volume accounted for 87% of the total vehicle export from Thailand. Purposive sampling process is obtained in order to select representative of the population of interest without sampling random. The questionnaire is divided into three

parts, using various methods of question asking in order to identify demographic, current job position and degree of influential factors toward ocean freight provider selection and ranking prioritization of factor. Questionnaire was distributed to 10 logistics employees of each selected company through various e-mail communications to both Thai logistics staff and oversea logistics staff mainly in Japan, Europe and South Africa. Moreover, the questionnaires are also distributed by hand during many different events with targeted companies such as weekly customer visiting event in order to minimize non-responding rate. Fifty questionnaires are completed and returned (100% response rate) for further analysis. The overall mean score will be used to rank factors in order from the most important to lowest important factor affecting ocean freight carrier selection.

DISSCUSSION OF SURVEY RESULTS

Out of fifty staffs from five companies surveyed, 56% of the respondents are located in Laem Chabang area and 44% are located in other areas such as Bangkok, Tokyo, Osaka, United Kingdom and South Africa. Almost 60 % of the respondents contacted the carrier service provider at around 1-3 times per day. This indicates that they are a heavy user and has routine and daily activities to deal with the service provider such as dealing with customer service for booking creation, contacting sale representative for price quotation, and etc. Furthermore, more than half of the respondents have export volume of more than 100 forty-foot container per week. A majority of the respondents (96%) use Laem Chabang port as a port of origin for export. This shows strong correlation between company location and port of loading. The reason behind this relationship are haulage cost saving, inland transportation cost saving, and flexible time of empty container haulage process.

For comparison among overall five selection criteria, it was found that After-sale service factor (μ=4.45, SD = 0.46), reliability of service factor (μ=4.18, SD = 0.47), service cost factor (μ=4.11, SD = 0.99), quality of service factor (μ=4.01, SD = 0.81) were determined as the most important factors in terms of ocean freight service provider selection. On the other hand, perceived capability factor (μ=3.86, SD = 1.09) was determined as the lowest important factor. Ranking of the most influential to the least influential factor on ocean freight service provider selection can be ranked in order as followed.

1. After-sale service factor
2. Reliability of service factor
3. Service cost factor
4. Quality of service factor
5. Perceived capability factor

Nevertheless, when analyzing each of the 24 factors individually, it was found that the top ten most important factors are:

1. Reliability of service factor - transit time reliability
2. After-sale service factor - document completely by carrier
3. After-sale service factor - quality of customer service
4. After-sale service factor - fast responds to problems/dependability in handing problem
5. After-sale service factor - issuing accurate invoice
6. Quality of service factor - Equipment availability
7. After-sale service factor - provide information concerned shipment
8. Quality of service factor - Quality of Sale representative and employees with positive attitude
9. After Sale service factor - 24 hours support team
10. Reliability of service factor - Total transit time

Although reliability of service factor-transit time reliability is in the top rank, it is interesting to note that there are 6 after-sale service factors in the top ten most important factors on ocean freight service provider selection. Table 1 shows the important score of each factor and the rank of each factor.

Table 1: The rank of freight carrier selection criteria

Factor	Score (5)	Rank
Reliability - Transit time reliability	4.78	1
After-Sale Service - Document completely by carriers	4.72	2
After-Sale Service - Quality of customer service	4.72	3
After-Sale Service - Fast responds to problems/dependability in handing problem	4.70	4
After-Sale Service - Issuing accurate invoice	4.64	5
Quality of Service - Equipment availability	4.60	6
After-Sale Service - Provide information concerned shipment	4.48	7
Quality of Service - Quality of Sale representative and employees with positive attitude	4.48	8
After-Sale Service - 24 hours support team	4.44	9
Reliability of service - Total transit time	4.38	10
Cost - Transportation rate	4.32	11
Perceived Capability - Low frequency of cargo loss or damage	4.08	12
Reliability of service - Frequency and/or consistent of service	4.08	13
Quality of Service - Convenient pick up and delivery times	4.00	14
After-Sale Service - Claims processing	3.96	15
Quality of Service - Willingness to negotiate service change	3.96	16
After-Sale Service - IT track and trace system	3.92	17
Reliability of service - Carrier's coverage services	3.90	18
Cost - Willingness to negotiate rate change	3.90	19
Perceived Capability - Financial stability of carrier	3.86	20
Quality of Service - pick up and delivery service	3.76	21
Reliability of service - Schedule flexibility	3.76	22
Perceived Capability - Established name and reputation	3.64	23
Quality of Service - Special equipment	3.26	24

This finding stresses the importance of after-sale service that freight carrier should place more attention to. Cost factor-transportation rate is not even in the top ten factors; it is ranked at the eleventh place. This finding agrees with the finding for overall five-factors ranking which shows that after-sale service factor had a significant higher average score on the ocean freight service selection than the other factors.

Furthermore, the authors also perform further comparison analysis to determine whether the five Japanese automotive companies place the important on each selection criteria differently. It was found that the importance of all five factors is not statistically significantly different for Toyota, Mitsubishi, and Isuzu. However, the importance of five factors are statistically significant different at 0.05 level for Nissan and Honda. Specifically, Nissan places more emphasis on after-sale service factor, followed by reliability of service; while Honda focuses more on service cost factor, followed by after-sale service. Table 2 shows the company comparison for the important score of each factor.

Table 2: Summary of important factor for each company

	Company				
	Toyota Motor (Thailand)	**Mitsubishi Motor (Thailand)**	**Nissan Motor (Thailand)**	**Isuzu Motors International (Thailand)**	**Honda Automobile (Thailand)**
Factor	All five factors are equally important.	All five factors are equally important.	1. After-sale service (4.41)	All five factors are equally important.	1. Service cost (4.75)
			2. Reliability of service (4.16)		2. After-sale service (4.49)
			3. Quality of service (4.10)		3. Reliability of service (4.22)
			4. Service cost (4.40)		4. Quality of service (4.03)
			5. Perceived capability (4.03)		5. Perceived capability (3.87)

CONCLUSION

The main objective of this study is to explore and identify criteria that Japanese automotive companies use in selecting ocean freight carrier and also examine the importance of each criterion. Based on the literature review, it was found that selection criteria include both price and non-price factor. The degree of importance of price factors has been decreasing. The early studies (during 1960-1980) emphasized that price is the most important factor; however, the focus was shifted towards non-price factors in more recent studies. For this study, questionnaire was distributed to logistics staff who work in Japanese automotive companies in order to identify the criteria that they use in selecting ocean carrier and also evaluate the important level of each criteria. It was found that there are five major selection criteria with 24 sub-criteria. The most important criteria is after-sale service, followed by reliability of service, service cost, quality of service, and perceived capabilities. Nonetheless, when examining each sub-criterion individually, it was found that reliability of service factor-transit time reliability is in the top rank. It is also interesting to note that there are 6 after-sale service factors in the top ten most important factors. Cost factor-transportation rate is not even in the top ten; it was ranked 11^{th} on ocean freight service provider selection. This agrees with the recent literature that selection criteria started to shift towards non-price factors. Nonetheless, cost is still important but not as much as stated in the past.

By understanding the selection criteria, ocean freight carrier can appropriately allocate and prioritize resources to improve the areas that are more important for the customers (shippers). Customer service employees and sale representatives are very crucial since they may be the first and only physical point of contact between the company and its customer. Frontline officers as customer service and sale representative play a dramatically important position in customer perception of quality of service delivered. Therefore, ocean freight carrier should focus more on people strategy and customer-oriented management strategy in order to better satisfy the customer and win the competition.

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IS THE AFFORDABLE CARE ACT HERE TO STAY? THE SUPREME COURT WILL DECIDE

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ABSTRACT: On March 23, 2010, Congress enacted the Patient Protection and Affordable Care Act, Pub L. No. 111-148, 124 Stat. 119 (2010) with the goal of increasing the number of Americans covered by health insurance and decreasing the cost of health care. Under the law, most Americans must either obtain "minimum essential" health insurance coverage or pay a tax penalty. Certain tools are available to facilitate the purchase of insurance. More specifically, the law provides for the establishment of "Exchanges" through which individuals can purchase health insurance on a competitive basis. Under the Affordable Care Act, states have the option to set up insurance exchanges from which consumers can purchase health insurance. If a state declines to set up an exchange, insurance may be purchased from a federal Exchange. The Affordable Care Act (ACA) also authorizes a subsidy in the form of a federal tax credit for many low and middle income individuals to offset the cost of insurance provided on the exchange. During the last few years a number employers and individuals filed lawsuits contesting the authority of a "Federally –Facilitated Exchange" to authorize a purchaser to receive a related subsidy. The issue in these disputes is whether the federal government can offer health insurance subsidies to individuals in the states that opted not to create insurance exchanges. Recently, the Supreme Court granted certiorari to review one of the cases to resolve this important controversy.

INTRODUCTION

The recent economic climate coupled with the significant level of unemployment has increased the focus on the inability to pay for rising expenses. One of the more common living expenses that is of utmost concern is health insurance. With the rising cost of health insurance during the past years, Congress enacted the Patient Protection and Affordable Care Act (the "ACA") in 2010 with the goal of increasing the number of Americans covered by health insurance and decreasing the cost of health care. Certain tools are available to facilitate the purchase of insurance. More specifically, the law provides for the establishment of "Exchanges" through which individuals can purchase health insurance on a competitive basis.

On March 23, 2012, the Internal Revenue Service issued a final rule implementing the premium tax credit provision of the ACA. In its final rule, the IRS interpreted the ACA as authorizing the agency to grant tax credits to certain individuals who purchase insurance on either a state-run health insurance "Exchange" or a federally-facilitated "Exchange." An Exchange is a means of organizing the insurance marketplace to help individuals shop for insurance coverage and compare the insurance marketplace.

During the last few years, different group of employers and individuals commenced four different lawsuits around the country contesting the authority of a "Federally-Facilitated Exchange" under Section 1321 of the Affordable Care Act to receive a related subsidy. Two of the cases, *Halbig v Sebelius,* 758 F.3d 412, and *King v. Burwell,* 759 F.3d 358, have been decided by their respective Circuit Courts of Appeals. The remaining two cases, *Indiana v IRS* and *Pruitt v Burwell* remain at the District Court level.

Today's news is full of announcements regarding the Supreme Court's recent decision to review a decision of the Fourth Circuit upholding an IRS rule extending tax credits to federally established exchanges. Two years ago, the Supreme Court decided on the constitutionality of the landmark legislation that is formally known as the Patient Protection and Affordable Care Act more commonly known as Obamacare. Last year, the Supreme Court decided the hobby lobby case. The saga continues. Recently, the Supreme Court granted certiorari to review the tax subsidy provision of the Affordable Care Act. Although little attention had been paid to the tax subsidy, the implications of the conflicting federal decisions can be far reaching. This paper will discuss an analysis of the conflicting Circuit Courts' decisions as well as the decision of the Supreme Court to grant certiorari. Before the specific cases are discussed, a few key statutory sections are worth noting.

OVERVIEW OF THE RELEVANT SECTIONS OF THE ACA AND CODE

Section 1311 of the ACA requires that "each State shall, not later than January 1, 2014, establish an American Health Benefit Exchange (referred to in this title as an 'Exchange')." ACA § 1311(b) (1), *codified at* 42 U.S.C. § 18031(b) (1).

Section 1321 of the ACA directs HHS to step in and establish "such Exchange" in that state if a state decides not to establish its own Exchange, or fails to establish an Exchange consistent with federal standards. Only sixteen states and the District of Columbia have elected to set up their own Exchanges and thirty-four states rely on federally-facilitated Exchanges. The ACA authorizes tax credits for many low and middle-income individuals who purchase health insurance through the Exchanges. The Exchanges administer a program to provide advance payments of tax credits for eligible individuals; where an advance payment is approved, the Exchange arranges for the payment to be made directly to the individual's insurer, lowering the net cost of insurance to the individual.

Section 1401 of the ACA sets forth how this tax credit is determined. Section 1401, codified at 26 U.S.C. § 36B – calculates this credit based in part on the premium expenses for the health plan "enrolled in [by the individual] through an Exchange established by the State."

Notwithstanding the ACA's text, The Internal Revenue Service promulgated regulations in 2012("the IRS Rule") making the premium tax credit available to qualifying individuals who purchase health insurance on state-run or federally-facilitated Exchanges. 26 C.F.R. § 1.36B-1(k).

Specifically, 26 C.F.R. § 1.36B-2(a) (1) provides that an applicable taxpayer who meets certain other criteria is allowed a tax credit if he or she, or a member of his or her family, "is enrolled in one or more qualified health plans through an Exchange." 26 C.F.R. § 1.36B-1(k) provides that the term Exchange "has the same meaning as in 45 C.F.R. § 155.20," which in turn defines Exchange in the following manner:

> Exchange means a governmental agency or non-profit entity that meets the applicable standards of this part and makes [Qualified Health Plans] available to qualified individuals and/or qualified employers. Unless otherwise identified, this term includes an Exchange serving the individual market for qualified individuals and a [Small Business Health Options Program] serving the small group market for qualified employers, *regardless of whether the Exchange is established and operated by a State (including a regional Exchange or subsidiary Exchange) or by HHS.*

These regulations ("the IRS Rule") contradict section 1311 of the statutory text restricting subsidies to Exchanges "established by the State."

In describing the Rule, the IRS noted that "commentators disagreed on whether the language in 26 U.S.C. § 36B(b)(2)(A) limits the availability of the premium tax credit only to taxpayers who enroll in qualified health plans on State Exchanges."

The IRS rejected such a limitation, explaining:

> The statutory language of section 36B and other provisions of the Affordable Care Act support the interpretation that credits are available to taxpayers who obtain coverage through a State Exchange, regional Exchange, subsidiary Exchange, and the Federally-facilitated Exchange. Moreover, the relevant legislative history does not demonstrate that Congress intended to limit the premium tax credit to State Exchanges. Accordingly, the final regulations maintain the rule in the proposed regulations because it is consistent with the language, purpose, and structure of section 36B and the Affordable Care Act as a whole.

Section 4980 of the ACA provides for an "employer mandate" which is synonymous to a penalty. This provision may require an "assessable payment" or penalty by an "applicable large employer" if that employer fails to provide affordable health coverage to its full-time employees and their dependents. The availability of the subsidy also triggers the assessable payments under the employer mandate. For employers, the availability of subsidies triggers the "assessable payments" used to enforce the Act's "employer mandate."
Section 5000 of the ACA, the Minimum Coverage Provision, which requires most individuals either to maintain qualifying coverage or to pay a tax penalty for failure to do so. The IRS has also promulgated a regulation ("IRS Rule") that grants premium tax credits to individuals in all Exchanges, regardless of whether they are state-run or federally-facilitated.
By expanding subsidies to coverage on HHS Exchanges, the IRS Rule triggers ACA mandates and penalties for millions of individuals and thousands of employers. For individuals, eligibility for a subsidy triggers the Act's individual mandate for many that would have been exempt. The tax credits thereby reduce the number of individuals exempt from the minimum coverage requirement, and in turn increase the number of individuals who must either purchase health insurance coverage at a discounted rate or pay a penalty.

KING V. BURWELL AND THE FOURTH CIRCUIT

The facts in *King* are not overly complex. Plaintiffs are a group of individuals residing in Virginia, which has declined to establish its own exchange. Pursuant to its statutory authority, HHS has established an Exchange in Virginia. Under the IRS Rule, tax credits are available to eligible individuals purchasing qualified health plans in those states.

The plaintiffs did not want to comply with the individual mandate, and given their low incomes, would not be subject to penalties for failing to do so but for the IRS Rule. The cost of the insurance on the federally-facilitated Exchange in Virginia exceeded eight percent of their projected household income for 2014, so therefore they would have been eligible for a certified exemption from the Minimum Coverage Provision penalty for 2014 without the subsidy. However, the

plaintiffs were eligible for a subsidy that brought them within the ambit of the Minimum Coverage Provision.

Plaintiffs alleged that a regulation promulgated by the Internal Revenue Service ("IRS"), which extends eligibility for premium assistance subsidies under the Patient Protection and Affordable Care Act ("ACA") to individuals who purchase health coverage through federally-facilitated Exchanges, exceeds the IRS's statutory authority, and is arbitrary and capricious, and is contrary to law in violation of the Administrative Procedure Act ("APA"). Plaintiffs argued that, as a result of the IRS Rule, they incurred some financial cost because they were forced to buy insurance or pay the Minimum Coverage Provision penalty.

Defendants in turn moved the court to dismiss Plaintiffs' Complaint and uphold the relevant regulation. The Plaintiffs argued that the statutory language calculating the amount of premium tax credits according to the cost of the insurance policy that the taxpayer "enrolled in through an *Exchange established by the State under §1311"*precluded the IRS's interpretation that the credits are also available on national Exchanges. 26 U.S.C. §36B (b) (2) (A), (c) (2) (A) (i) (emphasis added).

The Fourth Circuit applied the familiar two-step analytic framework set forth in *Chevron U.S.A, Inc. v .Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984). "Chevron deference is a tool of statutory construction whereby courts are instructed to defer to the reasonable interpretations of expert agencies charged by Congress to fill any gap left, implicitly or explicitly, in the statutes they administer." *Nat'l Elec. Mfrs. Ass'n v. U.S. Dep't of Energy*, 654 F.3d 496,504 (4th Cir. 2011). Chevron deference requires a court to undertake a two-part analysis to review an agency's regulation. At the first step, a court must look to the "plain meaning" of the statute and determine if the regulation responds to it. Id. at 837, 842-43. If it does, the inquiry need not continue. Under Chevron, if a statute is unambiguous regarding the question presented, the statute's plain meaning controls. *Morgan v. Sebelius*, 694 F.3d 535,537 (4th Cir. 2012).

In order to be ambiguous, disputed language must be "reasonably susceptible of different interpretations." *Nat'l R.R. Passenger Corp. v. Atchison Topeka &Santa Fe Ry. Co.,* 470 U.S.451. However, if the statute is susceptible to multiple interpretations, the court will move to Chevron's second step and defer to the agency's interpretation so long as it is based on a permissible construction of the statute.

The plaintiffs asserted that the plain language of both relevant subsections in §36B was determinative, the language says what it says, and that clearly mentions state-run exchanges under §1311. They argued that Congress meant to include federally –run Exchanges, it would have not specifically chosen the word "state" or referenced §1311. Further, the plaintiffs asserted that because state and federal exchanges are referred to separately in §1311 and §1321, the omission in Code §36B of any reference to Exchanges established under §1321 represents an intentional choice to exclude federal Exchanges and include only state Exchanges established under §1311.Although the Fourth Circuit thought that the plaintiff's position was rational the court acknowledged that when conducting statutory analysis, "a reviewing court should not confine itself to examining a particular statutory provision in isolation. Rather, the meaning – or ambiguity – of certain words or phrases may only become evident when placed in context." *Nat'l Ass'n of Home Builders v. Defenders of Wildlife,* 551 U.S. 644, 666 (2007). With this in mind, the defendants' primary counterargument pointed to ACA §§ 1311 and 1321, which, when read in conjunction with 26 U.S.C. § 36B, provide an equally plausible understanding of the statute, and one that comports with the IRS's interpretation that credits are available nationwide.

The court opined that the defendants have the stronger position, although only slightly. Given that Congress defined "Exchange" as an Exchange established by the state, it makes sense to read § 1321(c)'s directive that HHS establish "such Exchange" to mean that the federal government acts on behalf of the state when it establishes its own Exchange. However, the court could not ignore the common-sense appeal of the plaintiffs' argument. Based solely on the language and context of the most relevant statutory provisions, the court could not say that Congress's intent was clear and unambiguous that it "forecloses any other interpretation."

The court next examined two other relevant provisions of the Act to see if they shed any more light on Congress's intent. First, the defendants argued that reporting provisions in § 36B (f) conflicted with the plaintiffs' interpretation and confirmed that the premium tax credits must be available on federally-run Exchanges. Section 36B (f) – titled "Reconciliation of credit and advance credit" – requires the IRS to reduce the amount of a taxpayer's end-of-year premium tax credit by the amount of any advance payment of such credit. There was no dispute that the reporting requirements applied regardless of whether an Exchange was established by a state or HHS.

The second source of potentially irreconcilable language concerned the "qualified individuals" provision under ACA § 1312 regarding which individuals may purchase insurance from the Exchanges. It provides that only "qualified individuals" may purchase health plans in the individual markets offered through the Exchanges, and explains that a "qualified individual" is a person who "resides in the State that established the Exchange." under ACA § 1312. The defendants argued that unless their reading of § 1321 is adopted and understood to mean that the federal government stands in the shoes of the state for purposes of establishing an Exchange, there would be no "qualified individuals" existing in the thirty-four states with federally facilitated Exchanges because none of those states is a "State that established the Exchange." This interpretation would leave the federal Exchanges with no eligible customers, a result Congress could not possibly have intended. The plaintiffs acknowledged that this would be untenable.

After the Fourth Circuit considered the parties' competing arguments on both of the above-referenced sections, it remain unpersuaded by either side. The court opined, "Again, while we think the defendants make the better of the two cases, we are not convinced that either of the purported statutory conflicts render Congress's intent clear. Both parties offer reasonable arguments and counterarguments that made discerning Congress's intent difficult.

After both parties conceded that the legislative history of the Act was somewhat lacking, the court acknowledged that the Act's legislative history was not particularly illuminating on the issue of tax credits.

Finding that Congress has not "directly spoken to the precise question at issue," the court moved to Chevron's second step and asked whether the "agency's action was based on a permissible construction of the statute." 29 Id. at 843. The court noted that it will not usurp an agency's interpretive authority by supplanting its construction with our own, so long as the interpretation is not 'arbitrary, capricious, or manifestly contrary to the statute. The court opined, "A construction meets this standard if it 'represents a reasonable accommodation of conflicting policies that were committed to the agency's care by the statute.'" The court reasoned, "We have been clear that "review under this standard is highly deferential, with a presumption in favor of finding the agency action valid." *Ohio Vall. Envt'l Coalition v. Aracoma Coal Co*., 556 F.3d 177, 192 (4th Cir. 2009).

The court could not discern whether Congress intended one way or another to make the tax credits available on HHS facilitated Exchanges. The relevant statutory sections appeared to conflict with one another, yielding different possible interpretations. In light of this uncertainty, the Court

applied the principles of deference called for by Chevron which dictates that a court defer to the agency's choice. The Fourth Circuit reached Chevron's second step after describing statutory language as 'susceptible to more precise definition and open to varying constructions.

The court noted, "What we must decide is whether the statute permits the IRS to decide whether the tax credits would be available on federal Exchanges. In answering this question in the affirmative we are primarily persuaded by the IRS Rule's advancement of the broad policy goals of the Act."

The Fourth Circuit held, "It is thus entirely sensible that the IRS would enact the regulations it did, making Chevron deference appropriate. Confronted with the Act's ambiguity, the IRS crafted a rule ensuring the credits' broad availability and furthering the goals of the law. In the face of this permissible construction, we must defer to the IRS Rule."

HALBIG AND THE D.C. CIRCUIT

The plaintiffs in *Halbig* contended that that the IRS Rule violated the plain language of the ACA, which provides that an individual's tax credit is calculated based on the cost of insurance purchased on "an Exchange *established by the State*." Plaintiffs argued that the regulations exceed the scope of the agency's statutory authority and are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law
The U.S. District Court for the District of Columbia held on January 15, 2014 that Section 1321 of the Affordable Care Act not only allows the federal government to create an Exchange but also allows for the tax subsidy. However, that decision was reversed by the D.C. Court of Appeals within hours of the *King* decision in the Fourth Circuit Court of Appeals. The D.C. Circuit ruled that a Federal Exchange was plainly not "established by the State," and therefore ordered the Rule vacated.

The Fourth Circuit and the D.C. Circuit agreed on four major points. The courts agreed that Section 36B limits subsidies to Exchanges that are established by states, such a reading would not create absurd results in the rest of the statute, the legislative history did not refute the plain meaning of the law, and Congress had a plausible meaning for the words it used.

However, the D.C. Circuit Court of Appeals refused to proceed to the second step of Chevron analysis, and allow the IRS deference. Unlike the *King* court, the *Halbig* court did not find ambiguity. The court rejected the argument that §1321 of the ACA and use of the word "such" created relevant "equivalence" between state and federal Exchanges. The *Halbig* court opined that subsidies under §36B turn on "who established" the Exchange and a federal Exchange is not "established by the State."

CONCLUSION

The Fourth Circuit has ruled in a 3-0 decision that the IRS regulation confirming that tax credits and subsidies are available to individuals purchasing health insurance through the federal as well as state Exchanges was a "permissible exercise of the agency's discretion." The same day that the Fourth Circuit issued its ruling in *King*, the D.C. Circuit issued a contrary ruling in *Halbig*. Recently, the Supreme Court granted certiorari to review *King*. Two years after upholding the Affordable Care Act by a single vote, the fate of President Obama's signature health-care regime is once again in the hands of the U.S. Supreme

Court. The results of this appeal could block people in 36 states from getting tax subsidies. Two Courts of Appeals are squarely divided over its facial validity. The resulting uncertainty over this major plank of ACA implementation means that millions of people have no idea if they may rely on the IRS's promise to subsidize their health coverage. Employers in 36 states have no idea if they will be penalized under the ACA's employer mandate, or are effectively exempt from it. Insurers have no idea if their customers will pay for health coverage in which they enrolled, or if large numbers will default. Additionally, the Treasury has no idea if billions of dollars being spent each month were authorized by Congress, or if these expenditures are illegal. Only the Supreme Court can definitively resolve the matter. Time will tell if this matter will prove to be a mere cold which will pass with time or a fatal disease which sounds the death knell of Obamacare.

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LONG-RUN RETURNS FOR RETIREMENT PORTFOLIOS USING DIFFERENT IBBOTSON PORTFOLIOS

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ABSTRACT

This study showed that the decades of 1930 and 2000 were the two worst decades since 1926; while the decades starting in 1950, 1980 and 1990 were the best. For many readers of this paper, we have had the two best decades (1980 and 1990) as well as the worst decade (2000) for retirement accounts. Furthermore, the results also show that for normal retirement saving horizons (15 years or more) a saver would have done fine, even with these two horrific decades; and there is little merit for shifting all or some of your portfolios into T-bills for the last five years of saving.

INTRODUCTION

A USA Today article entitled "Investors Look Back on a Decade of *Grim* Stock Returns" Wagonner (2010) summed up investment returns for the first decade of the 21st century—grim. My research shows the wealth relative for the Ibbotson Large Company Total Returns (LCSTR) was 0.909 for the period 2000-2009. This was worse than the depression decade (1930-1939) with a wealth relative of 0.995. All other decades for the period of this study (1926-2013) had a positive return, wealth-relative greater than one. These grim results were nothing that most investors didn't already 'feel'. Certainly, it was cause for numerous conversations among faculty at our university, and I am confident in other universities as well. Another interesting question for us, with a retirement horizon of 5 to 10 years, is how this last decade affected retirement accounts and how these returns compare with prior decades. The purpose of this study will attempt to answer this question.

LITERATURE REVIEW, METHODOLOGY AND DATA

Past studies have looked at this very question. Levy (1978), Reichenstein (1986), and Butler (1991), used a single sum, not periodic contributions for various holding periods. They concluded that stocks outperform Treasury bills. Butler & Domian (1992) used Ibbotson's real returns and sampling with replacement to form returns for various retirement holding periods from 1926 to 1990. They conclude that the stock market is the better choice for long-term retirement investing. A clever paper by Hickman, Hunter, Byrd, Beck, & Terpening, (2001) uses a sample with replacement technique to examine the difference in returns between different retirement asset classes for the period. Unlike Butler and Domian's work their data isn't inflation adjusted. They find huge penalties for not being in risky assets (common stocks) for long investment horizons. They do find marginal support for several switching strategies for investors with shorter investment horizons.

Decade-long wealth relatives (decade-ending price level/decade-beginning price level) were calculated for all decades, starting in 1930 (1930-1939) through 2010 (2000-2010), and for 1926 to 1929 and 2010-2013. Wealth relatives for the period 1926-1929, 2010-2013, and 1926-2013 were also calculated. The purpose of these calculations was to estimate one time, or single sum, investments.

Besides single sum wealth relatives, we calculated wealth relatives for investors who make payments into a retirement plan yearly. Our hypothetical investor is assumed to be a wage earner that contributes a fixed proportion of salary, which is indexed for the prior year's inflation, each year over a retirement saving's period. The Ibbotson Inflation Index serves as the retirement plan contribution inflator. The plan contributions are then invested in an equity's market index fund with the Ibbotson Large Company Total Returns (LCSTR) serving as the investment proxy. For a five year savings period the calculation would be:

$\$1.00_{-5}(R_{-5to-4})(R_{-4to-3})(R_{-3to-2})(R_{-2to-1})(R_{-1to0})$
$+\$1.00_{-5}(I_{-5to-4})(R_{-4to-3})(R_{-3to-2})(R_{-2to-1})(R_{-1to0})$
$\mathbf{+\$1.00_{-5}(I_{-5to-4})(I_{-4to-3})(R_{-3to-2})(R_{-2to-1})(R_{-1to0})}$
$+\$1.00_{-5}(I_{-5to-4})(I_{-4to-3})(I_{-3to-2})(R_{-2to-1})(R_{-1to0})$
$+\$1.00_{-5}(I_{-5to-4})(I_{-4to-3})(I_{-3to-2})(I_{-2to-1})(R_{-1to0})$

Where R is $1+r$, and I is $1+i$. r is the return for the year in question, and i is the inflation rate from the prior year. The subscripts for R and I represent the time period relative to the end of the holding period. The future value 'Due' situation is assumed—investing starts at the beginning of the period, and no cash-flow at the end of the holding period. One of the assumptions that differentiate this project from Butler & Domian (1992) is that the inflation adjustment for the invested amount is the prior year's inflation. The reasoning is that pay increases are based on a cost of living adjustment using prior year's inflation.

If $1.00 is the initial annual contribution, this yearly installment will be indexed up or down as price levels change. The indexed installment will be invested at the then-current equity market level, and the resultant portfolio value will subsequently reflect both market performance and the saver's wage level assuming the wages are indexed to inflation (with a lag of one year). Savings and investment periods of 5, 10, 15, 20, 25, 30, 35 and 40 years are evaluated for participants who start saving in 1926 and all following years. $1.00 was used so that results will be for every dollar invested.

These results are based on actual, not simulated, returns. The holding periods are started for EVERY year between 1926 through the beginning of 2009. (The beginning of the year, 2009 is the latest one could start a five period compounding.) So every holding period overlaps the one next to it. For example, the 1926 forty-year holding period overlaps the 1927 forty-year holding period by 39 years. Likewise, the 1928 forty-year holding period overlaps the 1927 and forty-year holding period by 39 years, etc. We recognize the fact that summary statistics will be biased, but we were interested in how a pensioner would have fared investing for retirement, assuming various holding periods and a salary contribution adjustment based on inflation. Thus the results will show this for all various holding periods beginning in 1926.

The data used are from the 2014 Ibbotson SBBI Classic Yearbook. The data are yearly Large-Company Stocks Total Returns (LCSTR), U.S. Treasury Bills Total Returns (TBTR), and Inflation.

There were three investment strategies for each holding period: being in large-company stocks, being in T-bills, and being in the large-company stocks with a switch to T-bills for the final five-year period before retirement. The purpose for the switch portfolio is to examine if there is merit in shifting from risky to safe assets as one approaches retirement.

RESULTS:

Table 1a reports annual returns for Large-Company Stocks Total Returns by decade for the study period 1926 through 2013. The first row of data is the wealth relatives for the period in question. These statistics show that the first decade of the 21st century was the worst decade for investing, even surpassing the decade of the great worldwide depression. This fact will affect the holding period returns for the various retirement-saving horizons starting in the 1960s. There are some other periods throughout the years of this study that have negatively affected retirement results.

Table 1 a

Summary Statistics for yearly returns by decade

Wealth Relatives are the product of yearly *1+r*

	2009-2000	*1999-1990*	*1989-1980*	*1979-1970*	*1969-1960*	*1959-1950*
WR	0.909	5.328	5.039	1.768	2.121	5.866
Mean	0.012	0.190	0.182	0.075	0.087	0.208
Median	0.052	0.220	0.201	0.104	0.118	0.212
Stdev	0.211	0.142	0.127	0.192	0.144	0.198
Range	0.657	0.407	0.374	0.637	0.370	0.634
Min	-0.370	-0.031	-0.049	-0.265	-0.101	-0.108
Max	0.287	0.376	0.325	0.372	0.269	0.526
Sum	0.121	1.899	1.819	0.752	0.868	2.084
Count	10	10	10	10	10	10
% + return	60%	90%	90%	70%	70%	80%

Table 1 a continued

Summary Statistics for yearly returns by decade

Wealth Relatives are the product of yearly *1+r*

	1949-1940	*1939-1930*	*1929-1926*	*2013-1926*	*2013-2010*
WR	2.405	0.995	2.018	4676.4	1.804
Mean	0.103	0.053	0.211	0.118	0.086
Median	0.123	-0.009	0.246	0.143	0.086
Stdev	0.165	0.347	0.241	0.202	0.092
Range	0.480	0.973	0.520	0.973	0.129

Min	-0.116	-0.433	-0.084	-0.433	0.021
Max	0.364	0.540	0.436	0.540	0.151
Sum	1.030	0.534	0.843	10.282	0.172
Count	10	10	4	87	2
% + return	70%	40%	75%	73%	100%

*The wealth relative is not a monthly calculation but simply the decade closing price divided by the decade opening price. The data in the rest of the table are summary statistics for monthly returns

Table 2a gives the summary statistics of retirement period wealth-relatives generated by increasing each year's nominal contribution rate by the Inflation series in Ibbotson (lagged one year) and investing in the 'market' as defined by the Large-Company Stocks Total Returns series from Ibbotson. There are no holding period horizons where you 'lose it all.' However, when you get to the 10 year horizons you do have a period where you wind up with less than if you had taken your contributions and put them into a safety deposit box, this occurred in the holding period starting in 1999. The same is true for the five-year horizons. The years where this happens are 1927-1930, 1936, 1937, 1970, 1998, and 2004. The poor performance in the 1920s through the 1930s was due to inflation and negative stock returns. Deflation occurred from 1926-1928, 1930-1932, and in 1938-1939. The poor performance in the decade from 2000-2009 is from the fact that returns were worse than for the late 1920s and throughout the 1930s. Inflation (CPI-U from Ibbotson) for the first decade of the second millennium was below the long-term average. Of course, the pay reduction was much worse than inflation would indicate during the depression, as well as the period after 2008.

Table 2a

Summary Statistics for various Retirement Saving Period Wealth Relatives from 1926-2013

These relatives are for lagged inflation and returns on Ibbotson Large Company Total Returns

	Retirement Savings Periods							
	40	35	30	25	20	15	10	5
Mean	2681.43	1345.45	677.28	322.46	147.63	62.50	24.60	7.77
Median	2682.44	1169.77	627.01	316.57	132.45	58.18	22.39	7.70
Stdev	916.11	520.89	316.02	177.70	73.02	28.79	9.00	2.13
Range	4282.64	2400.78	1475.88	901.08	275.35	105.65	31.47	9.60
Min	1265.51	731.32	295.00	1.02	49.01	15.68	9.67	2.33
Max	5548.15	3132.11	1770.88	902.10	324.36	121.33	41.13	11.93
Sum	131390	72654	39959	20638	10187	4625	1944	652.82
Count	49	54	59	64	69	74	79	84

Table 2b gives the summary statistics of retirement period wealth-relatives generated by increasing each year's nominal contribution rate by the Inflation series in Ibbotson (lagged one year) and investing in the 'market' as defined by the T-Bill Total Returns series from Ibbotson. There are no holding period horizons where you 'lose it all.' However, when you get to the 15 year horizons you do wind up with less than if you had taken your

contributions and put them into a safety deposit box, this occurred in the holding period starting in 1926 and 1927. For ten-year horizons, this occurs from 1926 through 1931. For the five-year horizon, this occurred in 1928 through 1932. You do sacrifice the potential for much larger gains in your retirement account, and you don't remove the downside risk, in fact, the number of times you wind up with less than if you had done nothing is greater, thirteen vs. ten times for Large-Company Stocks Total Returns.

Table 2b

Summary Statistics for various Retirement Saving Period Wealth Relatives from 1926-2013

These relatives are for lagged inflation and returns on Ibbotson T-bill Total Returns

	Retirement Savings Periods							
	40	35	30	25	20	15	10	5
Mean	465.49	286.89	171.99	100.84	57.50	31.35	15.74	6.21
Median	519.10	283.71	133.98	73.94	43.09	25.19	14.11	5.93
Standard Deviation	234.83	162.54	103.72	59.92	30.91	13.78	4.89	1.07
Range	667.07	458.18	301.93	173.96	99.02	50.34	20.88	5.63
Minimum	95.64	72.59	53.66	39.61	24.41	14.38	8.96	4.13
Maximum	762.70	530.77	355.59	213.57	123.43	64.72	29.84	9.76
Sum	22809	15492	10147	6454	3967	2320	1243	522
Count	49	54	59	64	69	74	79	84

Table 2c gives the summary statistics of retirement period wealth-relatives generated by increasing each year's nominal contribution rate by the Inflation series in Ibbotson (lagged one year) and investing in the 'market' as defined by the Large Stock Total Returns series from Ibbotson with a switch to T-bill returns in the last five years. There are no holding period horizons where you 'lohse it all.' However, when you get to the 10 year horizons you do wind up with less than if you had taken your contributions and put them into a safety deposit box, this occurred in the holding periods starting in 1928 &1929. The 5 year horizon is the same for Table 2b since you are in T-bills, and this occurred in 1928 through 1932. You do sacrifice the potential for much larger gains in your retirement account, and you don't remove the downside risk. The number of times that you would have been better off doing nothing is nine, ten and thirteen for the Switch portfolio, Large Stock Total Returns, and T-bills respectively.

Table 2c

Summary Statistics for various Retirement Saving Period Wealth Relatives from 1926-2013

These relatives are for lagged inflation and returns on Ibbotson Large Stock Total Returns

with a switch to T-bills for the last five years

	Retirement Savings Periods							
	40	35	30	25	20	15	10	5*
Mean	2155.24	1071.52	512.01	232.67	102.41	43.84	17.90	6.21
Median	2103.29	1005.74	475.71	221.94	99.67	41.08	17.54	5.93
Standard Deviation	598.76	364.27	207.58	91.46	38.76	14.80	5.18	1.07
Sample Variance	358512	132694	43089	8365	1502	219	27	1.14

Kurtosis	2.24	2.66	2.04	-0.57	-0.73	-0.64	0.60	2.01
Skewness	0.98	1.34	1.15	0.33	0.10	0.17	0.53	1.17
Range	3026.10	1861.76	1011.69	370.44	161.36	59.22	24.53	5.63
Minimum	1003.56	419.06	152.95	65.29	26.25	15.93	7.16	4.13
Maximum	4029.66	2280.82	1164.64	435.73	187.61	75.15	31.68	9.76
Sum	105607	57862	30209	14891	7066	3244	1414	522
Count	49	54	59	64	69	74	79	84

* Note that the last column is the same as for Table 2b

Table 3 lists the Coefficients of Variation (CV) for the three portfolio types in this study. The Coefficient of Variation is defined as the standard deviation divided by the mean. Some interesting results present themselves here. Using the CV as our measure of risk the Inflation/Large Stock Returns portfolio is safer than being in Inflation/T-bills until you get to the fifteen or fewer retirement horizons. The Switch portfolios have a lower CV than all the other combinations.

Table 3

Coefficient of Variation (Stdev/Mean) from 1926-2013

CV T-bills is for the inflation and T-bill portfolios, CV LG STK is for the inflation & Large Stock series and CV Switch is for the inflation & Large Stock series with a switch to T-bills for the last five years

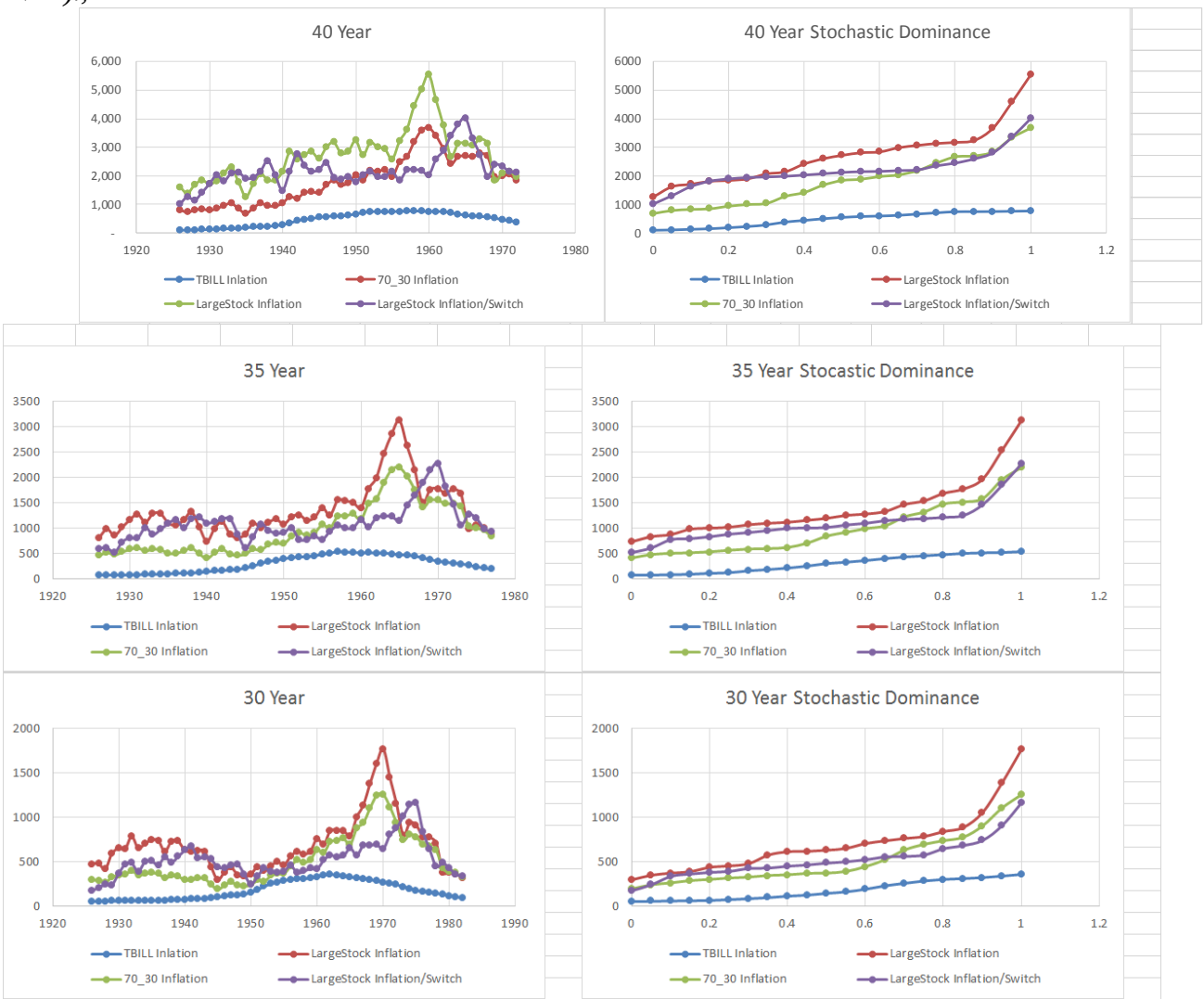
	Retirement Savings Periods							
	40	35	30	25	20	15	10	5
CV T-bills	0.504	0.567	0.603	0.594	0.538	0.439	0.311	0.172
CV Lg stk	0.342	0.387	0.467	0.551	0.495	0.461	0.366	0.274
CV Switch	0.278	0.340	0.405	0.393	0.378	0.338	0.289	0.172

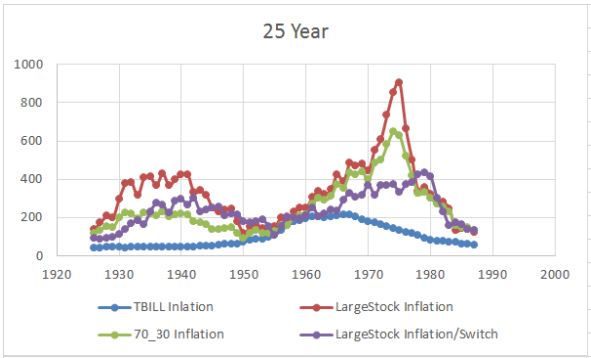
The following graphs that are on the left side of the groupings are plots of the Wealth Relatives (FVIF). Each point represents the ending WR for the holding period starting in that year. This illustrates the combined impact of disciplined systematic retirement savings with raises (and givebacks) based on the Ibbotson Inflation series and the market performance of the Ibbotson Large Stock Total Returns series, the Ibbotson T-Bill Total Returns series, and the Large Stock Ibbotson Total Returns series with a switch to T-Bills in the remaining five years of the holding period respectively, starting in 1926. Unfortunately for most who are reading this paper we didn't do nearly as well as those who started their careers earlier. One can ***see*** that the best time to retire (for all holding periods) would have been about the year 2000. The 1950's and the periods during the Reagan/Clinton bull market were truly phenomenal.

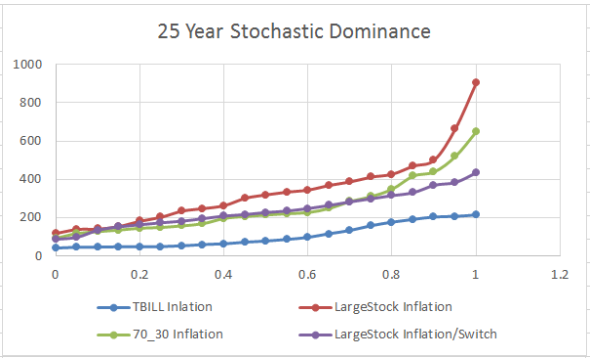
Furthermore, stochastic dominance tests were done for the four portfolios for all of the holding periods. Each holding period will be discussed.

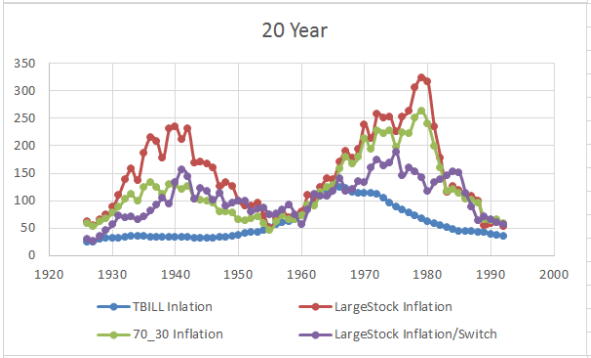
40, 35, 30, and 25 Year Holding periods. It is difficult to see, but the Large Stock with inflation portfolio is dominant. The switch portfolio dominates the T-Bill with inflation portfolio.

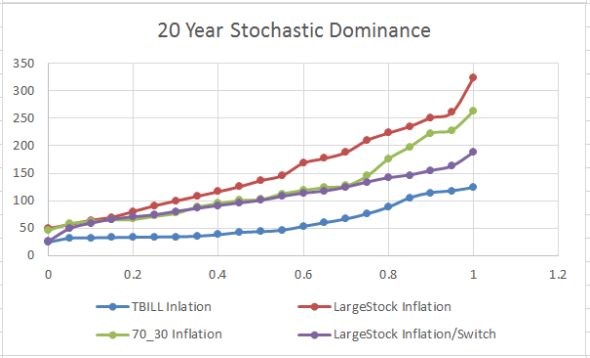
20, and 15 Year Holding periods. The Large stock with inflation portfolio is no longer dominant. The switch portfolio dominate the T-Bill with inflation portfolio. The two stock portfolios are better than the T-Bill most of the time.
10 Year Holding period. Interestingly, the Large Stock again dominate the Switch and T-Bill portfolios.
5 Year Holding period. No portfolio dominates.
For the following figures, the one on the right is a plot of stochastic dominance. *However, the horizontal axis is the cumulative probability while the vertical axis is the wealth relative (FVIF).*,




25 Year
TBILL Inlation
LargeStock Inflation
70_30 Inflation
LargeStock Inflation/Switch


25 Year Stochastic Dominance
TBILL Inlation
LargeStock Inflation
70_30 Inflation
LargeStock Inflation/Switch


20 Year
TBILL Inlation
LargeStock Inflation
70_30 Inflation
LargeStock Inflation/Switch


20 Year Stochastic Dominance
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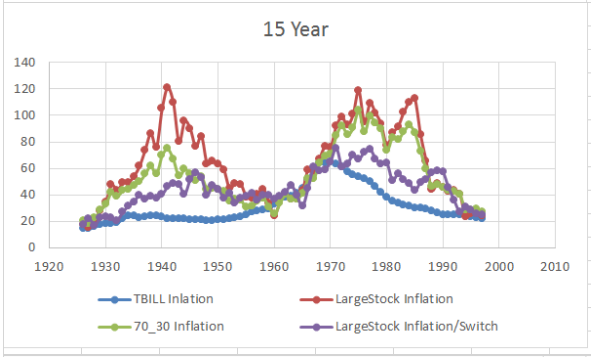
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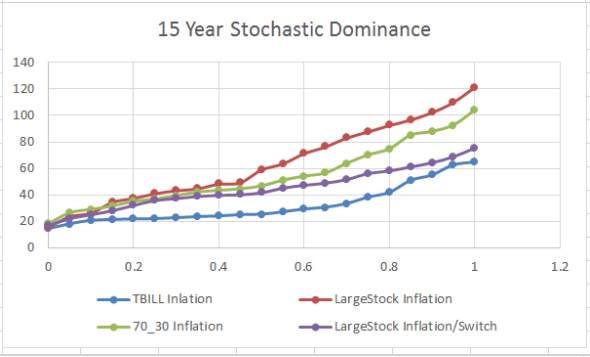
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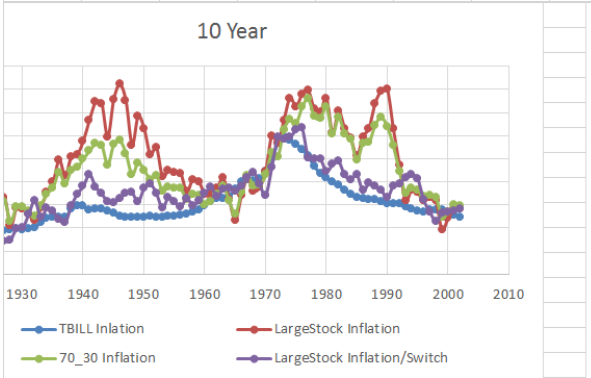
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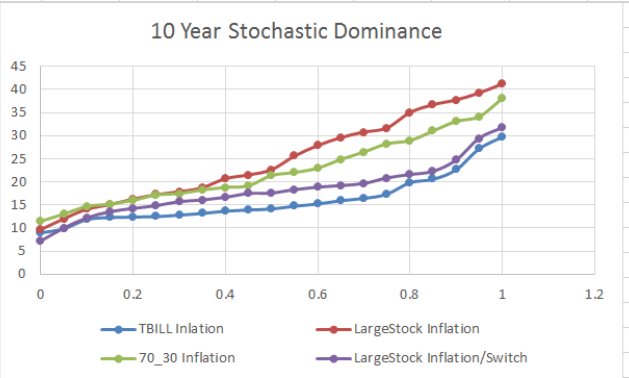
10 Year Stochastic Dominance
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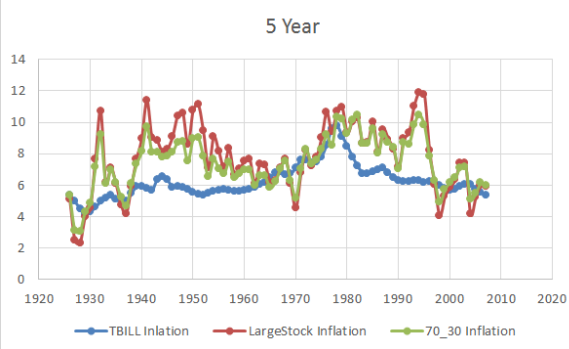

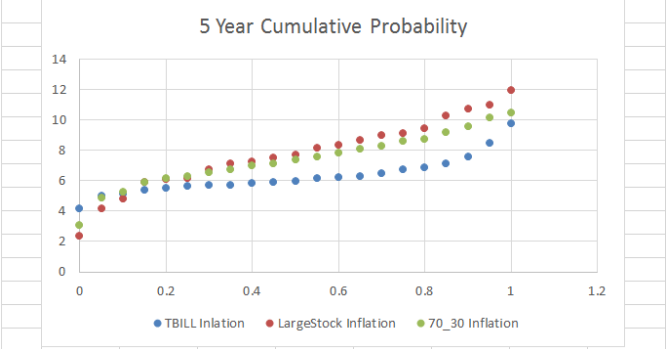

SUMMARY

Table 1 showed that the decades of 1930 and 2000 were the worst decades for the time period of this study. Table 1 also shows the decades starting in 1950, 1980 and 1990 were the best for the time period of this study. For many readers of this paper, we have had the two best and worst decades for our retirement accounts. Table 2a and b, and the graphs suggest that for normal retirement saving horizons (15 years or more) one would have done fine. Even with the first decade of the second millennium, nothing suggests that we shouldn't save for retirement.

Tables 2a, 2b, 2c, 2d, and 3suggest that there is little merit for shifting all or some of your portfolios out of the higher-risk asset into a less risky asset—the Large Stock portfolio is better for most periods since 1926. The tables and the graphs indicate that for most saving horizons, there is hardly anything to be gained and much to be lost by being invested in something other than the stock market (using the Ibbotson Large Stock Total Returns series). This is consistent with the works cited in this paper and an earlier version of this study that used the Dow 30. While many financial planners recommend that you should subtract your age from 100 (some recommend an age of 110 or 120) to determine the mix of stocks vs. bonds, Eugene Fama has a different take on this. In an interview in Barron's (22 September 2014) he is quoted as having said: "I have a capitalization-weighted portfolio of all traded stocks. I don't fool around with bonds. I'm a tenured professor; the university issued me a bond." While most investors aren't tenured university professors, if they have a secure job and a defined-contribution plan, they have a similar situation.

One surprising fact is that for the holding periods of 20 through 40 years the inflation stock portfolios were the 'safer' than the inflation adjusted T-Bill portfolios using the coefficient of variation as a measure for risk. And in all holding periods, the inflation adjusted Switch portfolio was the safest.

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EPISTEMIC PROCESSING OF COMMUNICATION AND OPENNESS TO DIVERSITY PREPARING STUDENTS FOR A GLOBAL SOCIETY

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ABSTRACT

In this study, we examined the relationship between ways of knowing and students' openness to cultural diversity. Two hundred and eleven Business majors completed measurements of Connected Knowing (CK), individuals try to understand other's perspectives; Separate Knowing (SK), individuals play the devil's advocate; and diversity appreciation. CK, SK, gender, cultural status, and age served as potential predictor variables in a series of regressions. CK, SK, gender, and cultural status predicted three indicators of openness to diversity including: (a) valuing diversity education, (b) interacting personally with different cultures, and (c) reacting to the concern that diversity education may diminish a sense of commonality among Americans and class time used to teach the basic core knowledge.

INTRODUCTION

Research on epistemological beliefs examines individuals' beliefs about the nature of knowledge and learning. Initially the study of epistemic beliefs involved the study of students' views about knowledge (e.g., the source, certainty, justification of knowledge), knowledge acquisition (e.g., the speed of learning, and the ability to learn), and epistemic processing of communication (e.g., judging the veracity of information with perspective taking or counter-arguing) (Schommer-Aikins & Easter, 2008; 2009). The preponderance of our research examined the relationship among epistemic beliefs about knowledge, knowledge acquisition, and students' academic skills, which revealed the direct and indirect effects of epistemic beliefs on academic learning, such self-monitoring of one's comprehension, and valuing of education (Schommer-Aikins, 2004). As important as these basic academic skills are in today's society, it's critical that students develop communication skills and the necessary competencies to interact in a diverse and global society (DelGuidice, 1997; Dembner, 1995).

Therefore, teaching cross-cultural competencies in International Business and Management education coupled with integrating diversity in the content, materials, and course curriculum, would better prepare students for global management (Ramburuth, Welch, 2005). Students need to be prepared to embrace a world beyond their town, beyond their state, and beyond their country. They need to negotiate, conduct business, and develop relationships with people that are very different from themselves. For these reasons we chose to focus on epistemic processing of communication and openness to diversity.

Perry (1968) was one of the first researchers to investigate epistemic beliefs. He interviewed Harvard undergraduates about the views of education. He found that as freshmen most of them assumed the knowledge was simple, certain, and handed down by authority. However, seniors believed that knowledge was complex, tentative, and derived from empirical research and sound reasoning. These contrasting views had important implications for student learning. Subsequent research revealed that these beliefs affected comprehension and the self-monitoring of one's own comprehension (Schommer-Aikins, 2004). Students who believed knowledge is complex and tentative are better able to comprehend difficult text and are accurately estimated their understanding of challenging text (comprehension monitoring).

Thirty years after Perry's work, another group of researchers took note that Perry's work was conducted primarily with men (Belenky, Clinchy, Goldberger, & Tarule, 1986). Belenky, et al. (1986) conducted a seminal study of 100 women. They interviewed these women and generated a theory of ways of knowing. The purpose of this study was to investigate two different ways that individuals actively process and come to understand the communication of others. These two ways are Connected Knowing (CK), where individuals try to understand another's perspective before making an evaluative judgment, and Separate Knowing (SK), where individuals challenge other's perspectives before making an evaluative judgment (Belenky, Clinchy, Goldberger, & Tarule, 1986). Researchers have found that men tend to have higher SK scores and women have higher CK scores (Clinchy, 2002). Although an individual may have a propensity toward either SK or CK, both men and women are capable of both ways of knowing. Indeed, the most mature thinkers are assumed to use both ways of knowing by carefully balancing which way of knowing should be emphasized at any particular time. Much like a judge in a courtroom needs to listen and understand the perspective of the witness, yet carefully judge the veracity of the testimony (Schommer-Aikins, 2004).

The nature of ways of knowing continues to be explored. For example, Ryan and David (2003) wanted to determine if ways of knowing were domain general (the same propensity in across all situation) or domain general (the degree of SK and CK varying depending upon the situation). They asked groups of students to either think of people very much like themselves (in-group priming condition) or very different from themselves (out-group priming condition). Then the students' ways of knowing were assessed. When students had their in-group in mind, their CK was significant higher than their SK. When students had their out-group in mind, their CK scores were similar to the SK scores. These results were true for both men and women. Take note that this was a between-group design. Two different groups experienced either the in-group or out-group condition. Hence, this study did not necessarily reveal that students literally change their propensity of ways of knowing when the situations changed.

Schommer-Aikins and Easter (2014) tested the malleability of ways of knowing more rigorously by using a within-subject design. Students first experienced and in-group priming condition with a subsequent ways of knowing assessment. After completing a brief filler task, students experienced and out-group priming condition with subsequent ways of knowing assessment. Order of priming was counterbalanced so that half the

students received out-group priming first. The results replicated Ryan and David's (2003) results. CK scores dropped to low levels in the out-group condition. SK scores remained the same in both priming conditions. Schommer-Aikins and Easter (2014) speculated that what they might be seeing was a withdrawal of perspective taking when students had out-groups in their mind. And if this speculation were accurate, it would have important implications as to how students work and live in a diverse, global society. The openness to diversity has important value in today's higher education goals (Globetti, Globetti, Brown, & Smith, 1993).

Many academic institutions are embracing cultural diversity as a disposition to impress upon students (King, Perez, & Shim, 2013). Lewis & Nakagawa, 1995 projected that by the year 2020, 39 percent of all school-age children will come from minority groups. Many studies estimate that the White majority will become the minority (Mosley-Howard, Witte, & Wang, 2011; Moule, 2012) by 2050. The changing demographics are an impetus to develop a workforce who understands and appreciates diversity. Simply having a highly diverse student body, however, does not guarantee that students will learn global lessons or that they will engage with each other in a positive manor (Chang, Denson, Sa'enz, & Misa, 2006). It is important that students find value in interacting with people different from themselves (Mosley-Howard, et al., 2011).

Antonio, Chang, Hakuta, Kenny, Levin, and Milem (2004) and Levine and Ancheta (2013) argue that racial diversity in the college classroom enhances complex thinking, while Chang, et al., (2006) provide evidence that diversity interactions improve critical thinking, and problem solving. Potential contributors to diversity openness need to be identified. Ideally, these contributors can be taught in schools. Ways of knowing is a likely candidate. Openness to diversity requires a willingness to take someone else's perspective relates to CK (Todd, Bodenhausen, Richeson, & Galinsky, 2011). Furthermore, as a motivation for individuals to be open to changing their own views of the world, a willingness to step back and examine ideas objectively helps individuals reevaluate their own thinking, which relates to SK.

Mosley-Howard, et al. (2011) designed the Miami University Diversity Awareness Scale (MUDAS) to assess the status quo of college students' awareness and appreciation of diversity. They developed a 37-item survey through a series of analyses, e.g., exploratory factor analyses, instrument refinement, and faculty reviews. This instrument measures five factors that assess valuing diversity, seeking out general knowledge of diversity, having personally interacted with different cultures, seeing the need for social justice, and seeing the need for professors to have knowledge of diversity. In the third phase of their study, they found that first-year female students' scored significantly higher on value/appreciation, learning/knowledge, intercultural interaction, and discipline practice. Additionally, diversity ratings were highest among students majoring in the Arts and Sciences and least among students majoring in Business. Diversity ratings were highest among Latino/Hispanic students, followed by Black, Asian American, multiracial, Native American, White, and international students. The question is what factors may contribute to the variability of openness to diversity among students?

The purpose of this study was to determine if CK and/or SK relate to students' valuing diversity. Students completed measurements of ways of knowing and diversity awareness and appreciation. Ways of knowing, gender, cultural status, and age served as potential predictor variables in a series of regressions.

METHOD PARTICIPANTS

Two hundred and eleven business majors with an average age of 25 (*SD* = 6.02) participated in this study. There were 117 men and 94 women. Five participants did not report their gender. The students were Euro-American (*n* = 69), Asian American (*n* = 70), Hispanic (*n* = 42), Middle East (n = 15), African American (*n* = 11), Mixed, (*n* = 4), Native American (*n* = 1). The majority of students were upper division undergraduates (freshmen = 3; sophomore = 11, junior = 125, senior = 61, graduate student = 1). Students were given class credit for participating in this study.

MEASUREMENTS

Ways of Knowing were measured with the Galotti, et al. (1999) 20-item questionnaire, Attitudes Toward Thinking and Learning Survey (ATTLS). Separate scores for SK and CK were obtained, 10 items each. Students responded to SK and CK statements such as: It's important for me to remain as objective as possible when I analyze something. And "I try to think with people instead of against them." On a Likert scale from 1 (strongly disagree) to 7 (strongly agree), Inter-item correlations from each scale are .83 (CK) and .77 (SK). Details of psychometric properties and instrument development can be seen in (Galotti et al., 1999).

The 37-item Miami University Awareness Scale (MUDAS) (Mosley-Howard, et al, 2011) measured awareness and appreciation of diversity. Students responded on a 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree) to statements such as: "I seek to learn about different cultures." V*alue/Appreciation;* "I would welcome the opportunity to work in an urban community." *Learning/Knowledge;* "I seek opportunities to interact with people from different countries." *Intercultural Interactions;* "I realize that if I commit to promoting social justice, I too must change." *Social Justice;* and "Professors should receive training in working with students that have diverse needs." *Professional Practice*.

PROCEDURE

Students completed the ATTLS, MUDAS, and basic demographic questions with online surveys. The order of measurements was counterbalanced resulting in half the students taking ATTLS first and the remaining students completing MUDAS first. At the end of the survey, basic demographic questions were completed.

RESULTS

Scores for each measure were calculated by summing items that composed each measure and obtaining the mean. Examination of Cronbach alphas indicated that the measures of

ways of knowing were acceptable (CK alpha = .75; SK alpha = .71). However, MUDAS factors varied in acceptability, i.e., alphas ranged from .46 to .75. Exploratory factor analyses were conducted to identify the MUDAS factors most meaningful to students in this study. Examination of eigenvalues, scree plots, and meaningfulness generated three MUDAS factors; *Diversity Education is Important (DEI)* (9 items, alpha = .88), *I Seek Diversity Interactions* (SDI) (5 items, alpha = .73), and *Diversity Education Diminishes Basic Education* (DEDB) (2 items, alpha = .66). The items in the DEDB factor expressed concern that diversity education can diminish important core knowledge and a sense of commonality among Americans. Specifically, the items were, "The American public school system's curriculum should concentrate more on our common American identity rather than on specific ethnic groups." And "Stressing different cultural customs and traditions tends to reduce learning the basics (reading, writing, and mathematics) in schools today." Descriptive statistics of these measures are shown in Table 1. Zero order correlations among key variables are shown in Table 2.

Table 1: Descriptive Statistics for Overall Scores

Variable	Mean	*SD*
CK	5.38	0.78
SK	4.74	0.91
Diversity Ed. Important	4.90	0.77
Seek Diversity Interactions	4.78	0.75
Diversity Ed. Diminishes Basics	3.00	1.25

Table 2: Zero-Order Correlations Among Key Variables

	CK	SK	DEI	SDI
SK	.30			
Diversity Educ. Imp.(DEI)	.49	.11		
Seek Diversity Inter. (SDI)	.49	.29	.41	
Div. Ed. Dim. Basics (DEDB)	-.19	.13	-.38	-.16

Note. Correlations of .16 or higher are significant at $p < .05$.

To determine if ways of knowing and demographic variables predict openness to diversity, a regression for each of the three MUDAS factors as dependent variables was conducted. CK, SK, age, gender, and cultural status (dominant versus non-dominant) served as predictor variables in step-wise regression. Only variables that were significant at the .05 level were allowed to enter the equation. Summary statistics for these regressions are shown in Table 3.

Table 3: Summary of Regressions for Significant Variables Predicting Openness to Diversity

Criterion Variable	Predictor Variable	*b*	*B*	R^2 Change	F Change	p
Diversity Ed. Imp.	CK	.48	.48	.23	60.88	.001
	Cultural Status	.42	.26	.06	17.94	.001

	Gender	.33	.21	.05	13.60	.001
Seek Diversity Inter.	CK	.46	.48	.23	58.83	.001
	Gender	.28	.19	.03	9.25	.003
	SK	.16	.05	.03	9.22	.003
Diversity Dim.	Ed.CK	-.30	-.18	.04	7.26	.008
	SK	.29	.10	.04	9.26	.003

Overall CK was the strongest predictor of all MUDAS variables. CK, cultural status, and gender predicted valuing diversity education. The more students in this study adhered to CK (R^2 = .23), the culturally non-dominant students (R^2 = .06), and female students (R^2 = .05), were more likely to value diversity education. CK, gender, and SK predicted seeking diversity interactions. Female students were more likely to seek intercultural interactions (R^2 = .03). In addition, the more students adhered to CK (R^2 = .23) and SK (R^2 = .03), the more likely they were to seek intercultural interactions. CK and SK predicted opposing reactions to the concern that diversity education would diminish time spent on basic education and commonalities among Americans. The more students adhered to CK (R^2 = -.04), the less they agreed that diversity education is problematic. In contrast, the more students adhered to SK (R^2 = .04), the more they agreed that diversity education could diminish time spent on basic education

DISCUSSION

These results provide evidence that epistemic communication issues, in particular CK, appear to be an important component of valuing diversity. Higher scores in CK predicted valuing diversity education and actively seeking interactions with others who are different from themselves. Higher SK scores predicted actively seeking interactions with diverse populations as well. Women had a stronger belief than men that diversity education and interactions with diverse populations are important. Cultural and gender difference findings are similar to previous research (Mosley-Howard, et al., 2011) in which women and culturally non-dominant students had more intercultural interactions and saw the need for social justice and diversity being taught in the classroom.

Factor analyses replicated two of Mosley-Howard, et al.'s (2011) factors, which are importance of diversity education and seeking diversity interactions. However, for students in this study, a third factor emerged which expressed concern that diversity education takes away from teaching fundamental concepts, such as reading and mathematics and a sense of commonality among Americans. Interestingly, both CK and SK significantly predicted these concerns, with strong CK students disagreeing with the concerns and strong SK students agreeing with the concerns. These results suggest that students with a strong propensity to CK are open to diversity education and interactions. Nevertheless, if students have a strong propensity to SK, they may have concerns or fears that a sense of common national identity is being lost and important class content is not being provided.

What remains difficult to interpret is the concern that strong SK believers have over the potential negative effects of diversity education. Recall, that strong SK believers did indicate that they seek diversity interaction. So the question remains, is the link between SK and concern about diversity education simply healthy skepticism, or is it failure to embrace the perspectives of people different from themselves? Future research with more proximal measures would enhance our understanding of this finding.

The overall findings are important for several reasons. First, simply having a diverse campus, does not guarantee a positive ambience (Chang, et al., 2006). It is important to determine what factors will facilitate valuing of diversity and positive interactions among a diverse student body. Second, research indicates that classroom diversity enhances critical thinking, complex thinking, and problem solving (Antonio et al, 2006; Chang, et al., 2006; Levine & Ancheta, 2013). These results suggest the indirect effects of CK and SK on learning. Third, with the uncovering of the concern of potential negative implications of diversity on education, campus administration and faculty should consider policies, procedures, classroom activities, and extracurricular activities that prevent potential pitfalls.

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PROSPECTIVE CHANGES IN CONSOLIDATION RULES: SHOULD WE STILL BE TEACHING THE POOLING AND PURCHASE METHODS?

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ABSTRACT: In this paper we address the issue of changes in accounting principles that are not required to be retroactively applied. Accounting rules regarding business combinations were modified in 2001 and 2007, eliminating the prior Pooling and Purchase methods in favor of the new Acquisition Method of presenting consolidated financial statements. Neither pronouncement required retroactive elimination of the old methods. Therefore, all three methods are still being currently used. Despite this, accounting curricula largely ignore the Pooling and Purchase methods and materials addressed by the CPA exam have stopped covering the two prior methods. Keyword searches of The SEC's EDGAR database showed that a substantial number of currently reported consolidations are still valued using these "legacy" methods. We review current Advanced Accounting textbooks to provide guidance for professors wishing to continue at least some coverage of the Pooling and Purchase methods.

INTRODUCTION

In June 2001, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards No. 141, *Business Combinations* (FASB, 2001). The issuance followed years of heated debate over the elimination of the Pooling Method of accounting for business combinations. Before that date, consolidation standards required companies to apply either the Purchase Method or the Pooling Method, depending upon the facts and circumstances of the combination transaction. The major controversy at the time had to do with the recording, and subsequent amortization, of goodwill. Under the Purchase method, goodwill had to be recognized as an asset equal to the excess of the transaction's purchase price over the fair value of the identifiable assets of the acquired subsidiary at the date of purchase. This intangible asset was then amortized to income over its useful life, not to exceed 20 years (reduced from 40 years under prior standards). It was this amortization "earnings drag" under the Purchase method that caused much of the controversy and made the Pooling Method a popular option, since Pooling used the subsidiary's existing book values to record the transaction. Hence, no goodwill or amortization needed to be recorded if the combination was deemed to qualify as a Pooling of Interests. The FASB had desired to eliminate Pooling for quite some time and, in an eventual compromise with objecting entities, agreed to rescind the goodwill amortization requirements of the Purchase Method in exchange for the elimination of the Pooling Method. Instead, recorded goodwill is now subjected to an elaborate test for "impairment" of its value annually, or upon certain triggering events. If the value of goodwill is deemed to have declined, the intangible is written down and an impairment loss is recorded.

However, FASB No. 141 did not require retroactive application of its new requirements. Therefore, any pre-existing business combinations accounted for under the

Pooling Method prior to 2001 would continue to be accounted for under this method in consolidated statements thereafter. Subsequently, in December 2007, the FASB issued FASB Statement No. 141R, *Business Combinations* (FASB, 2007), which revised and replaced FASB No. 141. The major change was the introduction of the new Acquisition Method. While the Acquisition Method retained the essential requirements of the Purchase Method, at least five substantive differences are noteworthy.

First, the costs of any consolidation consultants (direct combination costs) were capitalized as part of the purchase price of the subsidiary under the Purchase method. These costs are now charged to expense under the Acquisition Method. Second, in a "Bargain Purchase" situation where the purchase price of the subsidiary is actually less than the fair value of the subsidiary's net assets (sometimes referred to as "negative goodwill"), the Purchase method mandated that this bargain purchase be used to first write down any long-term assets, excluding certain long-term investments. If these asset write-downs did not absorb the entire bargain purchase amount, an extraordinary gain was recognized. Under the Acquisition Method, the entire bargain purchase amount is immediately recognized as an ordinary gain without writing down long-term assets.

Third, if the purchase price of the subsidiary includes any contingent purchase price considerations based on future outcomes, the Acquisition method requires an estimation of the contingencies to be added to the computed purchase price. Under prior Purchase rules, these contingencies were not estimated up front, and were included only upon resolution of the contingencies and realization of actual amounts. Fourth, if an unrecorded asset for in-process research and development (IPR&D) conducted by the subsidiary was deemed to be part of the value paid by the parent company, prior Purchase Method rules required this amount to be recognized as an asset and immediately written off to expense since Generally Accepted Accounting Principles (GAAP) require R&D costs to be expensed when incurred. Under the new Acquisition method, IPR&D can be capitalized as an intangible asset and amortized over its estimated useful life. Fifth, when the parent company acquires less than a 100% ownership share of the subsidiary, significant differences exist between the methods regarding the valuation of the subsidiary's assets in consolidation. Under the Purchase method, any mis-valued subsidiary assets (or liabilities) were written up or down for only the portion owned by the parent. Under the Acquisition Method, these items are written up to 100% of their fair values at the date of acquisition. Essentially this allows the write up of even the portion of the subsidiary's assets owned by the noncontrolling (i.e., minority interest) shareholders. For instance, assume that the parent acquires 80% of a subsidiary. Further assume that the subsidiary's building account has a book value of $100, but a fair value on the acquisition date of $150. Under the new Acquisition Method, buildings will be included in the consolidated balance sheet at $150. In contrast, the prior Purchase Method would have valued the building at only $140 (i.e., $100 plus 80% of $50 excess value). This difference in write-up also would cause differences in subsequent amortization expense calculations for years to come.

Because of these major changes, substantially different carrying amounts and expenses can be experienced between the old and new accounting methods still allowed under FASB 141 and FASB 141R. Again, FASB 141R did not require retroactive application of its new provisions. Therefore, in the population of companies that prepare consolidated financial statements, there are three distinctly different methods currently being applied.

The purpose of this paper is to quantify empirically the mix of methods being used on currently-reported consolidated financial statements and to measure the coverage of the legacy consolidation methods in current editions of Advanced Accounting textbooks. Should the proportions of consolidations that are still being reported under the Pooling and Purchase Methods be substantial, a case can be made that we, as educators, should still be addressing all of these combination methods in our course materials. Accordingly, the following two research questions are addressed:

> **Research Question #1:** How many companies that currently prepare consolidated financial statements still use the Pooling and Purchase Methods?
>
> **Research Question #2:** What coverage of the Pooling and Purchase methods is offered by current Advanced Accounting textbooks?

METHODOLOGY AND RESULTS

In their annual 10K filings with the SEC, publicly-traded companies must disclose their significant accounting policies used in preparing financial statements. Using the keyword search capabilities of the Securities and Exchange Commission's (SEC) EDGAR database for 10K's filed during the period 1/1/2013 through 4/26/2013, we determined the number of companies that used the phrase "principles of consolidation" in their significant accounting policies footnotes.

Table 1
Proportions of Consolidations Using Different Methods

Total Publicly-traded Companies at 12/31/2013:			
NYSE		3,268	
NASDAQ		2,685	
AMEX		458	
		6,411	
Companies reporting consolidation principles in significant accounting policies footnotes to financial statements (86% of Public Companies)	(100%)	5,500	
Companies reporting pooling of interests as a method of consolidation	(4%)	221	
Companies reporting purchase method as a method of Consolidation	(55%)	3001	
Companies using acquisition method (derived)		(41%)	2,289

As seen in Table 1, this search yielded 5,500 instances. Given that this represents approximately 86% of the roughly 6,400 publicly-traded companies in the U.S., consolidation accounting is clearly a very important reporting issue. A similar search for the words "pooling of interests" yielded 221 filings. Thus, it appears that approximately 4% of reported consolidations still employ the Pooling Method. Repeating the procedure

using the words "purchase method" produced 3,001 matches, indicating that 55% of all currently-reported consolidated financial statements must have been consummated prior to 2007 and still utilize the Purchase Method.

Table 2 presents a summary of the coverage provided concerning the Pooling and Purchase methods in the latest editions of the most-commonly-used Advanced Accounting textbooks. Most of the latest editions of Advanced Accounting textbooks examined have eliminated any substantial discussion of the Pooling and Purchase Methods. Similarly, The CPA Exam began exclusively testing the Acquisition Method beginning in 2011. Thus, students currently taking Advanced Accounting classes will generally not be exposed to the old, but still relevant, methods of consolidation. Table 2 provides a summary of coverage provided by these texts.

Table 2
Coverage of the Pooling and Purchase Methods in Latest Editions of Advanced Accounting Textbooks

1. Advanced Accounting, Hoyle, Schaefer & Doupnik (12th)
In Chapter 2, good discussion of these "legacy" methods. Numeric examples provided and problems included in end-of-chapter materials dedicated to Pooling and Purchase methods.

2. Advanced Accounting, Beams, Anthony, Bettinghaus & Smith (12th)
Brief discussion of history of Pooling method. More detailed coverage of Pooling relegated to electronic supplements to book. No discussion of Purchase method. No problems on Pooling or Purchase methods in text.

3. Advanced Accounting, Halsey & Hopkins (2nd)
Appendix to Chapter 3 discusses Pooling method and a numerical example compares Pooling to Acquisition method. No discussion of possibility of pre-existing Purchase method consolidations. Two problems on Pooling included in end of chapter materials.

4. Advanced Accounting, Hamlen, Hefner & Largay (2nd)
Good discussion of differences between Pooling and Purchase methods including numeric example. No problems addressing either Pooling or Purchase methods.

5. Advanced Accounting, Fischer, Taylor & Cheng (11th)
Brief discussion of history of methods in chapter 1. No examples of prior methods or problems addressing these methods.

6. Advanced Accounting, Christensen, Cottrell, Baker (10th)
Discussion of Pooling and Purchase methods in Chapter 1. The end-of-chapter problems include coverage of Purchase and Pooling methods.

SUMMARY AND DISCUSSION

This paper addresses the educational issue of whether and how accounting curricula should address accounting principle changes that are not required to be applied retroactively. Specifically, the FASB issued FASB No. 141 in 2001 and FASB No. 141R in 2007 that eliminated the Pooling and Purchase methods of accounting for business combinations in favor of the new Acquisition method. However, these pronouncements did not eliminate Pooling and Purchase accounting retroactively. Therefore, all business combinations that were consummated prior to 2007 are still potentially accounted for using the selected methods for subsequently-filed financial statements. Despite this, most textbooks provide sparse coverage of these topics and the CPA exam has stopped testing these prior methods. We discuss the substantive differences between these methods to motivate the need to continue their coverage in our Advanced Accounting curriculum.

Keyword searches of the SEC's EDGAR database of filings for publicly-traded companies showed that approximately 4% of reported business combinations during 2013 (for calendar 2012) still utilize the Pooling Method and 55% of existing consolidations were accomplished prior to 2007 and still apply the Purchase Method. Thus, apparently well over half of current consolidations are valued using accounting methods that our students potentially no longer study in college classes or in preparation for the CPA exam. Clearly, these percentages will dwindle over time. However, it seems quite likely that current graduates entering the public accounting profession will at some time encounter audit clients that use either or both of the replaced methods and may be ill-equipped to understand them.

For professors interested in continuing at least some coverage of the Pooling and Purchase methods, our review of current textbooks showed that the Hoyle, Schaefer and Doupnik *Advanced Accounting* 10th edition or the Christensen, Cottrell, Baker *Advanced Accounting* 10th edition appear to be the best options.

One might argue that the low percentage of consolidations still using Pooling justifies the lack of coverage of the topic in the classroom. However, since the pooling requirements are so different than the other methods, a working knowledge of these differences is essential should the method be encountered by our graduates in practice. Also, some of the largest, and most prominent, prior consolidations (e.g., Exxon-Mobile, Pfizer-Warner Lambert, Pepsi-Quaker Oats) still use Pooling. Regarding future research, the same potential knowledge gap might apply to other accounting principle changes that are not required to be retroactively applied.

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TEACHING STATISTICS IN A CASINO MANAGEMENT CLASS

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ABSTRACT

The race to the bottom of the education scale for math and science has slowly infected many colleges and universities and hence hospitality programs. The overall perception is that students learn less in high school than they used to and therefore we must lower our expectations of their achievement in college. This guarantees the downward slide will continue. The overall lack of math skills should be of particular importance to hospitality programs in which math skills have already taken a back seat to areas such as food production, convention planning or front desk operations. However, at the base of all of these classes is math: the math of food proportions, the math of large conventions, or the math of room occupancy. The paper analyzes casino classes and concludes nowhere is the need to understand math and statistics more important than in casino management.

Keywords:
Independent event, dependent event, distribution, population, roulette.

INTRODUCTION

We as college educators have heard or read the reports of how American high school students are continuing their race to the bottom of the industrialized nations' education scale. According to the Third International Mathematics and Science Study (TIMSS) involving a half-million students in 41 countries, the United States continues its educational decline. Some educators contend that these studies suffer from selection bias and statistical misrepresentation. This study was conducted with oversight groups that included not only the world's leading experts on comparative studies of education systems, but also experts in assessment design and statistical analysis. So where do we stand? For grade 4 we rank in the middle, by grade 8 we have fallen to the bottom third and by the end of grade 12, where it really counts, we are last in math and science.

This race to the bottom of the education scale for math and science has slowly infected many colleges and universities and hence hospitality programs. The overall perception that since students have learned less in high school, we must lower our expectations of their achievement in college. This guarantees the downward slide will continue. The overall lack of math skills should be of particular importance to hospitality programs in which math skills have already taken a back seat to areas such as food production, convention planning or front desk operations. However, at the base of all of these classes is math: the math of food proportions, the math of large conventions, or the math of room occupancy. However, nowhere is the need to understand math and statistics more important than in casino management.

JUSTIFICATION

We have seen in the news recently that over the last few months 4 major casinos in Atlantic City dealt their last blackjack hands. The proliferation of casinos across the nation has forced all casinos to watch/understand every penny. The "eye in the sky" cannot catch bad planning or a lack of statistical understanding. It is now more critical than ever that students of casino management classes understand and embrace statistics. The vast majority of casino classes offered in hospitality

programs do not require a statistics class as a pre-requisite. The need to teach the elementary statistics of gaming now falls on us.

We must begin with an understanding of why gambling attracts so many patrons. If you can count and divide, you can calculate the odds of rolling a seven or having that blackjack or even drawing to an inside straight. The true allure of gambling is that while the house can predict with 99.99% accuracy the number of sevens rolled or blackjacks dealt or double 00's hit in a thousand tries, no one can predict what the next roll, spin or card will be. The chance of rolling a seven, having a blackjack, or hitting a double zero are all individually independent and random events, and yet taken over time in groups of 1000's or 10,000's, they are predictable. This is a very important concept because while the individual gambler fixates on the probability of a large gain, casinos are for the most part unconcerned about the individual gambler: they are very concerned about the 100,000 gamblers over the course of the next month.

I can say with absolute certainty that there is a 16.67% chance that the next roll will be a seven. With that predictability combined with thousands and thousands of rolls, I can say with a high degree of certainty that over the next day, week, or year, a 7 will be rolled 16.67% of the time; what I cannot say or predict is what is the next roll is going to be.

This paper approaches the teaching of casino statistics as a hands-on exercise. As the students become actively involved as the test subjects of our "casino labs/experiments," they learn by doing.

Professor Bob Heiny combines his passion for sports with mathematical concepts to track the progress of college and professional sports teams. College football power ratings developed with two other statistician. They developed all five division rankings of all college football teams on a weekly basis. For 46 years, Professor Heiny has been bringing statistics to real world application in classes and developing models for predicting outcomes, especially in sports. Students from other disciplines are very successful if they come to class and stay connected with the material. A lot of people tried to beat the casinos system. What they don't realize is the casino do not have to cheat since all games odds are set in the casino's favor (Heiny, 2014)

BASIC STATISTICS

For this class, as with any other class, we must start with the basics. While the vast majority of the statistics within a casino management class can be related to simple probability, with a concentration on understanding concepts such as central tendency, the average or mean, and dispersion measures such as standard deviation, we can examine the majority of casino statistics. There are a few applications for which we will enter into discussions of t-statistics or f-statistics or confidence intervals. We offer a 2-3 class review of basic statistics: however, our statistics principles are reinforced by the gaming labs we have created.

CLASS 1 Definitions

Population. The complete set of all occurrences. EXAMPLE The population of die throws at a craps table for a 7 day period. If on average it takes two minutes for the pit to pay off all bets and for the bettors to lay down new wagers and for the roller to roll the dice, the population of dice rolls at a craps table for a 7 day period would be 30 X 24 X 7 =5040.

Sample. A sample is just a subset or part of a population; if our sample size taken from the above population was one day it would have 720 (30X24) rolls of the dice. As can be seen, as the size

of the sample becomes larger, two days, three days and so on, the closer the sample will be to the population.

Distribution. The distribution of any population simply consists of all the possible outcomes. Considering the above example of rolling dice, the distribution is made up of two through 12 (2-12). No other rolls are possible. However, the odds of rolling a two may be very different from those of rolling a seven, which we sill address later..

Independent Events. The outcome of one event has no influence on the outcome of a subsequent event. Example: every time you roll a die the outcome is an independent event. Every time you pick a card from a deck of 52 cards and then replace the card "with replacement" the next pick remains an independent event.

Dependent Event. The outcome of the second or combined event is dependent on the outcome of the first event. Example: in a single deck card game your first card dealt is an ace; what is the probability of being dealt an ace on the second card: From above we know that if we replace the first ace, the odds are unchanged; however, if we keep the first ace we now have only a 3 out of 51 chance of being dealt the second ace. Even if we were not dealt an ace as the first card, the second event remains dependent on the first since we now have a 4 out of 51 chance of being dealt an ace for the second card. . The outcome of the second event is dependent on the first.

Simple Probability

On average, flipping a coin or rolling a die or even drawing a card from a deck of cards all have associated probabilities. Flipping a head (1/2 or 50%), rolling a 3 (1/6 or 16.67%) or pulling the ace of hearts from a deck of 52 cards, (1/52 or 1.9%) . However, the majority of casino games are more complicated than rolling one die or picking one card. One game, roulette, has a simple single probability for each spin of the wheel.

LAB # 1

This experiment is the shortest and easiest to understand and only takes a few minute at the beginning of class. We distribute a simple form "Flipping Experiment" and request the students to flip a coin 50 times and record each flip as an H or a T. Students intuitively

TABLE # 1

Flipping Experiment							
Results are H for Heads & T for Tails							
Flip	Result		Flip	Result		Flip	Result
1			18			35	
2			19			36	
3			20			37	
4			21			38	
5			22			39	
6			23			40	
7			24			41	
8			25			42	
9			26			43	
10			27			44	
11			28			45	
12			29			46	
13			30			47	
14			31			48	
15			32			49	
16			33			50	
17			34				
Heads _____			Tails_____		Runs_____		

understand that the distribution will be close to 50/50 which is posted each week on their websites. This is true for the class overall, bu the studentst are amazed at the differences recorded student by student. In addition to individual flips we also explain what a run is and ask the students to identify the longest runs and record that number. At this point students are again intrigued by the fact that before the experiment, we discuss what they believed the longest run would be.

This experiment allows us to show the students that while many individuals can deviate from the 50% heads 50% tails outcome, the overall class is usually very close with deviations of only 1 or 2 percent. During the next class we review the combined statistics. The results from the last class showed that there were 25.56 heads and 24.44 tails out of 50, with 34 students and 50 flips per student; the sample size was 1700. However, we had 1 student with 35 heads and only 15 tails and another student with 17 heads and 33 tails, so the subsequent distribution was fairly wide.

The results of the runs test were even more enlightening to students in that before the experiment students were asked what they thought would be the longest strike of heads or tails in the class would be and the average reply was 3-4. The results showed that more than half the class had at least one run of 5 or more with the longest run (uninterrupted streak of heads or tails) a 9 with one student flipping 6 head,s then a tail, then 6 more heads.

In Teaching Statistics; A Bag of Tricks by Geliman and Nolan use what they call the magic trick to demonstrate that most people don't have a good intuition for what real randomness looks like. Students are divided into two group; one group was told to flip a coin 100 times and write down the sequence of heads and tail. Tthe other group was told to invent a sequence of ones and zeros that should look like as much as possible like the sequence a of Fairpoint's without using any randomness device. The instructor leaves the room while the students generate this sequence and writes them down without identifying which sequence was the real randomness sequence . Once they are finished, the students invited the teacher back into the classroom. The teacher then looks at the blackboard and, if everything goes as expected, immediately points to the true random sequence. It looks like magic but it's convincing and memorable, proof that almost everyone believes that randomness looks more regular and less clumpy than it actually does. The fake sequence is likely to switch from heads to tails far more often, while the true random sequence has more long repeated runs of heads or tails (Geliman, 2002).

This now becomes a perfect example of engaged learning: students have become active participants in the experiments. It is now an easy transition from a simple flip of a coin to the roll of a die. If you roll a single die this is again a simple probability with six possible outcomes as opposed to flipping a coin with just two possible outcomes. However, each outcome is an independent event and equally likely: heads or tails for a coin or 1 through 6 for the die. However, if you roll the two dice separately, that is you roll one die then subsequently you roll the second

die, the probability of any total is dependent. The total of the two independent events is dependent on the number you rolled on the first die, i.e. the total of the two dies is no longer independent. The first roll is independent, the second roll is independent: however, the total of the two dies is dependent. On the other hand, if you roll both dice at once, the trial is independent since the result of the next roll of two dice is not impacted by the first roll of 2 dice. Over the long term, the probabilities of any outcome of two dice is listed below.

TABLE 2

2 Die Total	Number of Combinations	Numeric Chance	Probability
2	1	1/36	2.78%
3	2	2/26	5.56%
4	3	3/36	8.33%
5	4	4/36	11.11%
6	5	5/36	13.89%
7	6	6/36	16.67%
8	5	5/36	13.89%
9	4	4/36	11.11%
10	3	3/36	8.33%
11	2	3/36	5.56%
12	1	1/36	2.78%
	36		100.00%

LAB # 2

This experiment is also completed during the first part of class and then we discuss individual results such as did anyone roll the same number twice in a row, or what number did you roll the most often. While these results tend to be all over the board on an individual basis, when the individual reports are combined and loaded into Excel , a completely different picture emerges.

TABLE # 3

Dice Experiment

Results are H for Heads & T for Tails

Roll	Result		Roll	Result		Roll	Result
1			18			35	
2			19			36	
3			20			37	
4			21			38	
5			22			39	
6			23			40	
7			24			41	
8			25			42	
9			26			43	
10			27			44	
11			28			45	
12			29			46	
13			30			47	
14			31			48	
15			32			49	
16			33			50	
17			34				
Totals	2____		3____	4____	5____	6____	7____
	8____		9____	10____	11____	12____	

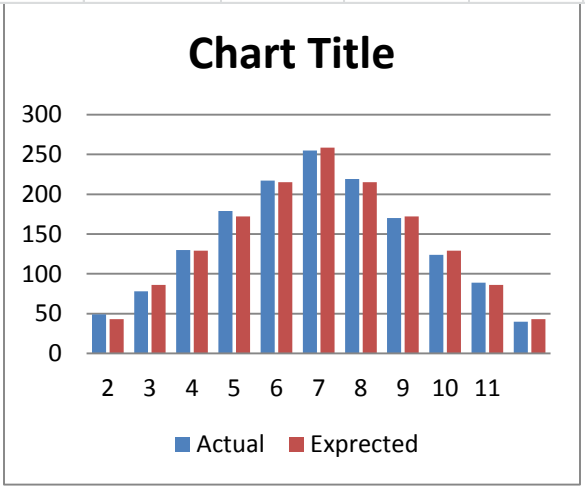
Table 1 below reports the theoretical probability of each number being rolled, i.e. there is only 1 combination out of a possible 36 different combinations that will result in a 2 being rolled, or 6 different combinations that will allow a 7, so it has a 16.667% chance of being rolled.

Table #3 and Graph # 1 below report both the theoretical, statistically expected, and actual lab experiment results.

TABLE 3

Roll	Probability	Expected	Actual	Difference
2	2.78%	43	49	6
3	5.56%	86	78	-8
4	8.33%	129	130	1
5	11.11%	172	179	7
6	13.89%	215	217	2
7	16.67%	258	255	-3
8	13.89%	215	219	4
9	11.11%	172	170	-2
10	8.33%	129	124	-5
11	5.56%	86	89	3
12	2.78%	43	40	-3
	100.00%	1550	1550	

Chart # 1



It should be noted that while each toss of the dice is an independent event, the probability of rolling each number is different because of the possible combinations of dice for each number. There is only 1 combination of the dice that make 2 or 12, while there are 6 combinations of the dice to make a 7.

Lab # 3

While studying the concept of simple probability, we have progressed from flipping a coin to rolling a pair of six-sided dice, from 2 possible outcomes to 11 possible outcomes. All of these outcomes have been independent trails and we have seen that as the number of outcomes increases, so does the distribution of the results. We will now examine the game in a casino with the greatest number of possible outcomes that still employsthe use of simple independent trails. With no casinos offering a coin flipping game and the dice game of craps having a number of statistically complex bets, one game also provides the clearest example of casinos "playing the odds" and over the long term always winning: roulette.

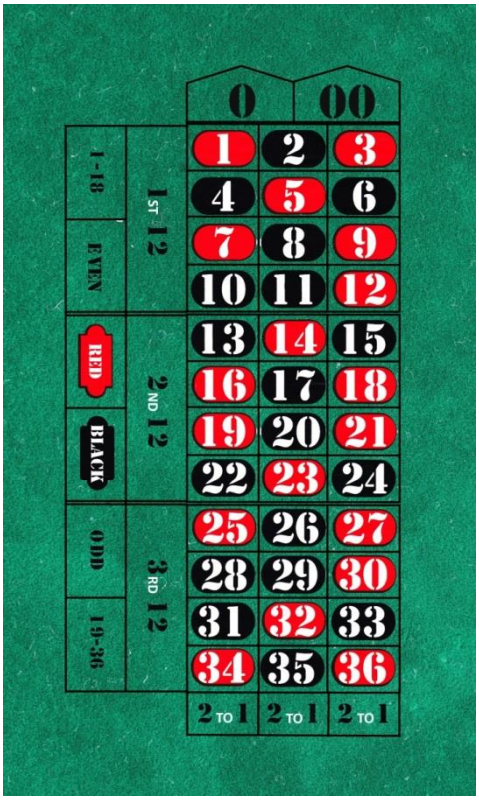
Roulette Wheels

First, can you tell the difference between the two roulette wheels shown above? The difference is important from both the perspective of the casino and the perspective of the player. The wheel on the right, also known as a European roulette wheel, has the standard 1-36 slots alternating red and black and 1 green slot for 0. The roulette wheel on the right also has the standard 1-36 slots alternating red and black but has 2 green slots for 0 and 00. The problem is that both wheels pay out the same or 36 to 1 for a single number bet.

Each spin of the wheel and ball is an independent event so the casino over the long term is guaranteed to win with either wheel. The European wheel guarantees the casino a win percentage of 2.78% or 1/37. The American wheel guarantees the casino a win percentage of 5.26% or 2 /38.

Roulette Table with associated Payouts

Double-Zero Roulette			
Bet	Pays	Probability \	House Edg
Red	1	47.37%	5.26%
Black	1	47.37%	5.26%
Odd	1	47.37%	5.26%
Even	1	47.37%	5.26%
1 to 18	1	47.37%	5.26%
19 to 36	1	47.37%	5.26%
1 to 12	2	31.58%	5.26%
13 to 24	2	31.58%	5.26%
25 to 36	2	31.58%	5.26%
Six line (6 numbers)	5	15.79%	5.26%
First five (5 numbers	6	13.16%	7.89%
Corner (4 numbers)	8	10.53%	5.26%
Street (3 numbers)	11	7.89%	5.26%
Split (2 numbers)	17	5.26%	5.26%
Any one number	35	2.63%	5.26%



To better understand the payout and statistics of roulette we have two examples.

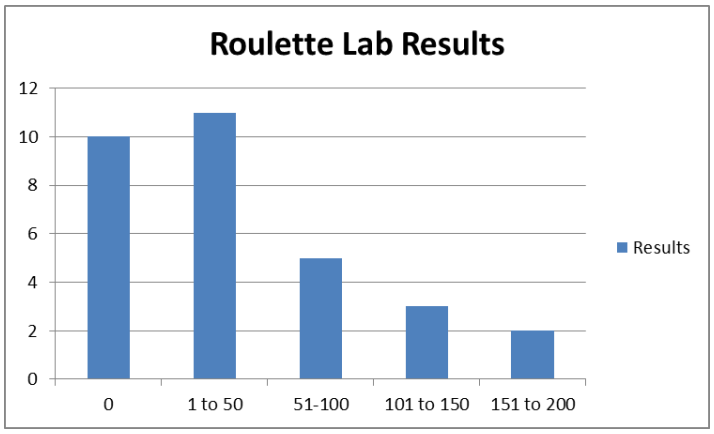
EXAMPLE 1. Assume you have 38 players each betting $1.00 on a different number. All single number outcomes have now been covered. At this point the casino has $38.00 on the table, but with every number covered there is a 100% probability that someone will win. If there is a 100% probability of a winner, how does the casino make money? The casino will pay the winner $35.00 or 35 to 1 and the player also keeps his original bet of $1.00: $38.00 were wagered; the casino is left with $2.00 or a profit of 2/28 or 5.26% .

EXAMPLE 2. Assume you have two players; one bets on red the other on black and each bet pays out 1 to 1. How does the casino make money? While 36 out of 38 times the bets will simply offset 2 out of 38 times, the color green winson 0 and 00. Again the casino has a guaranteed profit of 2/38 or 5.26%

HTMG3055 Casino Management
Lab # 2, Roulette Play
Limit one bet per spin, Limit 3 chips per spin

Spin	Bet, Straight, two, three, four… even, odd, black, red	Win Num	Your Payout	(+) Win (-) Loss	Running Total (50)
1					
2					
3					
4					
5					
6					
7					
8					
9					
	Rows 10 to 25 eliminated for space				
26					
27					
28					
29					
30					

For this lab we have a small roulette wheel that the instructor uses in the front of class. Each student is given the report to the left and the payoff table above. We do limit the possible bets to single numbers, red or black, and even or odd. Players start with 50 chips and can bet only 1 bet per spin and a limit of 3 chips per spin. If you lose all of your money before the 30 spins are up, you are out. At the end of class the instructors collects all of the bet sheets and then we enter the data into an Excel spreadsheet so that the reports can be distributed during the next class.



Results	End Amount
0	10
1 to 50	11
51-100	5
101 to 150	3
151 to 200	2
Average	46.96
STD	50.11

The above results indicate that while many people lost everything, 10/31, a few people won big. However, the averages again work out. With an average of $46.56 out of the original $50.00, the loss was $3.04 out of $50.00 or 6.08%. This is very close to the statistically expected loss of 5.3%. In addition this also shows that with large possible payouts and a range of outcomes from 0 to 194, the standard deviation is the largest we have seen.

The next section of statistics we enter is conditional probabilities and this lab deals with blackjack. We picked blackjack for a number of reasons: it is easy to learn and the payoff table is also very easy. In addition, this game, if played correctly, has the lowest odds in the casinos favor, hence the resultant average and standard deviation should be in stark contrast to the roulette game we just completed. Up to this point the house edge or percentage has been fairly easy to calculate; however, with the many variations of the blackjack rules such as paying only 6 to 5 and not the historic 3 to 2 for black or the use of an 8 deck shoe instead of a single deck to change the odds more in the houses favor, the house advantage is more difficult to calculate. However, for the purposes of this lab we are using a single deck, paying 3 to 2 and with no splits and double downs the odds in the houses favor should be about .6% if the player follows some simple playing strategy rules such as standing on 13 if a dealer has a 5 or 6 showing. This comes back to our conditional probability concept but is additional work for the student who is just playing with fake money.

Lab # 4

HTMG3055 Casino Management
Lab # 1, Blackjack Optimal Play
(dealer stands on all 17's, no surrender, no insurance)

Hand #	Dealer Up Card	Initial total and H for hit or S for Stand	Record card of the hit	Player Total Hand B for Bust	(+) Win (-) Loss	Running Total (50)
1						
2						
3						
4						
5						
6						
7						
8						
9						

10

Rows 11 to 30 eliminated for space

31
32
33
34
35

For this lab we broke the class into 7 member groups; this corresponded to 6 players and a dealer. The dealer position rotated around after each 5 hands; this allowed each player to play a minimum of 30 hands. Again each player was given a mythical $50.00 to start with and instructions that each bet must be $2.00. This allowed for an easy calculation of the blackjack payoff odds of 3:2.

The results listed below indicate that starting with $50.00 no one lost all of their money. The lowest was $35.00 and no one made more than $25.00 Out of the 30 students, 13 ended up within the plus or minus $5.00 range.

Ending Dollars	Number of Students
35-45	8
46-55	13
56-65	7
65-75	2

Class average	$49.30
Standard Deviation	$ 9.02

On average losing $.70 out of $50.00 translates into an average loss of 1.4% which, considering the experiment, is well within the acceptable range. This also shows that when the casino has a low win percentage the players usually do not win big or lose big.

CONCLUSION

Casino games of any kind usually capture the attention of our students and adults alike. For the games of roulette and craps the rules are spelled out and each player's performance is based upon the individual strategies within the guidelines of these rules. Games always include an element of chance whether cards or dice or the wheel, and there is always a winner. The basic rules of any game and the statistics involved and the degree of certainty provide a learning experience for all those participating. All casino games are now developed by mathematicians and time-tested to include the statistical advantages for the casino. MGM Grand, Caesar's Palace, and the Wynn wouldn't exist if they did not have this advantage. Learning takes place when the student becomes involved in the logistics of the game and understands the secret advantage statistics provides each of these games. Besides learning the statistics, understanding the fundamentals ensures understanding that the house always wins in the long run.

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