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Dr. Laurent Josien, SUNY Plattsburgh

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CAN THE APPLICATION OF MACROMARKETING CONCEPTS ENHANCE THE CREATION, DELIVERING OF SATISFACTORY OFFERINGS, AND ECONOMIC GROWTH OF THE SUB-SHARAN AFRICAN COUNTRIES?

Akins Ogungbure, Troy University
Chinonye Onwuchekwa, Grand Canyon University
Charles Chekwa, Troy University
Conrad Francis, Bethune-Cookman University

ABSTRACT

The research seeks to explore how the application of macromarketing concepts can be utilized to enhance the creation and delivering of satisfactory offerings to the consumers in the Sub-Sharan African countries and promote better standard of living in these countries. The study discussed the importance of macromarketing and its significance to the Sub-Sharan marketing practitioners. The general theories of macromarketing are discussed and some proposals are offered. Theory can provide description of relationships between variables, enable prediction of important outcomes, and provide explanation of why variables are related in certain ways. Macromarketing is described as the influence marketing activities, policies, strategies, and objectives have on the entire economy of a nation and society at large.

This paper offers some proposals based on the understanding, explanation, and management of the relationship between marketing and society. The extant literature reviewed reveals that not enough attention to macromarketing concepts and its applicability exists when addressing the value creation, delivery, and economic growth in Sub-Sharan African economies.

Keywords: macromarketing, value creation, customer satisfaction, economic development, Sub-Sharan African countries.

EVOLUTION OF THE NASHVILLE HEALTHCARE INDUSTRY CLUSTER: AN ASSESSMENT

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ABSTRACT

While healthcare services have driven the development of different sectors of industry clusters, little attention has been paid to healthcare services as an industry cluster. This study analyzes the healthcare industry's evolution in the Nashville Metropolitan Statistical Area (MSA) through the framework of an industry cluster. The cluster evolution is evaluated by analyzing the presence of clustering antecedents and the regional economic benefits through economic data collected from 2004 through 2022.

Clustering antecedents are found in the Nashville healthcare industry (critical companies tied to each other economically surrounded by competing and cooperating companies, local research organizations, university-supported specialized and non-specialized labor pools, an entrepreneurial funding environment, and a commitment by either a local government or industry champion). We conclude that the healthcare industry in the Nashville MSA qualifies as a cluster and has provided increasing economic benefits to the region over the last 18 years.

The healthcare cluster has contributed significant jobs, business revenue, personal income, and state/local taxes to the regional economy, which has only grown over the study period. The number of healthcare establishments has doubled, providing an 80% increase in direct employment within the sector. Direct generated personal income improved by 106% from 2004 inflation-adjusted dollars, and business revenue injected into the regional economy increased to $36.8 billion, representing a 98% increase from 2004 inflation-adjusted dollars.

Industry clusters generally require a catalyst to form and sustain. In the case of the Nashville Healthcare Industry Cluster, uncharacteristically, the catalyst has not been a government entity but a local membership trade association serving as an industry champion (The Nashville Health Care Council - NHCC). The NHCC has supplemented the typical governmental role in developing industry clusters (e.g., government infrastructure development for logistics clusters) and has been a driving force facilitating networking, collaboration, and development, contributing to a self-sustaining entrepreneurial environment supported by venture capital and local universities providing specialized and nonspecialized labor forces.

This study identifies the Nashville MSA Healthcare Industry as an industry cluster that has provided significant benefits to the regional economy over the last 18 years. It also identifies the NHCC as the driving force behind developing an environment conducive to industry clustering. The success of the Nashville Healthcare Industry Cluster is supported by at least two other regional areas replicating the model with a Health Care Council organization.

ADDRESSING THE US LITERACY PROBLEM: HOW HIGHER EDUCATION CAN HELP

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ABSTRACT

Literacy rates in the US are below other developed counties and are falling. We know that literacy rates are related to individual and collective prosperity. As we expand the opportunities for people to attain a college education, more students on the lower end of the literacy scale are being given a chance to obtain a degree. Those of us in higher education have the opportunity, or perhaps the obligation, to improve the literacy of our students to maximize the potential gains to both the individuals involved and society. Whereas many higher education institutions have instituted writing across the curriculum programs, in this presentation we will explore ways to address literacy across the curriculum.

Key Words: Literacy, Writing Across The Curriculum, Higher Education

MATERIALISM AS A MEDIATOR BETWEEN VALUES AND AFFECT

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Robert Laud, William Paterson University
Bruce Diamond, William Paterson University

ABSTRACT

The consequences of human values are manifested in the vast array of phenomena that guide actions, attitudes, and judgements. In this project we examine how values lead to higher levels of negative affectivity. Negative affectivity is associated with a range of undesired emotions such as anger, contempt, distrust, guilt, fear and nervousness. We found that materialism mediates the relationship between values and negative affectivity. The implication is that by de-emphasizing the values that lead to materialism, we can reduce negative affectivity and increase life satisfaction and well-being.

Key words: Values, Materialism, Negative Affectivity, Well-Being

ARTIFICIAL INTELLIGENCE: INCREASING BUSINESS PROFITS AT THE EXPENSE OF CONSUMER PRIVACY

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ABSTRACT

Artificial Intelligence may be the most significant technological breakthrough since the development of computers. The promise of greater efficiency and effectiveness is very appealing, especially as that translates into more profitable businesses. The potential applications appear almost endless, crossing every industry and every form of business activity. The potential results cannot even be estimated.

However, in our rush to be the first and the best, we need to take a good hard look at what we are doing and why we are doing it. We need to pause to ask questions and evaluate the answers to those questions. One particularly important question is "How much of our privacy are we willing to give up?"

Artificial Intelligence can assist in detecting misinformation, but it can also assist in spreading misinformation when faulty algorithms collect incorrect data. An example of this occurs when customer demographic data mixes information from consumers with the same names. Persons who frequently relocate may also be more likely to have faulty consumer data collected by business research companies.

In this paper, the authors examine this fascinating emerging technology with a preview of the technology's business potential. We then raise some key questions that government, businesses, and ethicists should be addressing as this technology develops and expands.

<u>**Key words**</u>: artificial intelligence, data privacy, right to be forgotten, data repurposing

APPLYING TEXT MINING TO ASSESS CONSUMER PREFERENCES OF AMAZON HEADPHONE PRODUCTS

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Keh-Wen "Carin" Chuang, Purdue University Northwest

ABSTRACT

This study seeks to analyze the effectiveness of the text mining process. Customer review forums on Amazon headphones websites will be analyzed using text and data mining software. Data from feedback forums will be compiled and analyzed using a text miner software program. The relationships and patterns among keywords and their associations will be cluster-analyzed to gain a deeper understanding of the data.

This text mining offers a unique technique of utilizing customer reviews to analyze the perceived value offered by the Beats by Dr. Dre brand customers' opinions can be highly valued, but due to the large quantity of reviews for products it can be hard for businesses to analyze all of that information in a timely manner. The use of text mining will be used to cluster comments and user reviews to extract information which will produce our results set. The name of the product and price are offered below from the website Amazon.com. The results will then be analyzed and then interpreted to determine the effectiveness of the text and data mining process.

Key words: Text mining, Customer review, Amzon, Cluster.

INTRODUCTION

Online post-purchase customer reviews play a crucial role in influencing consumer buying patterns. E-commerce giants like Amazon, eBay etc. provide a platform to consumers to share their experience and provide real insights about the performance of the product to future buyers. In order to extract valuable insights from a large set of reviews, classification of reviews into positive and negative sentiment is required. The text mining approach that we have used allows a company to analyze the unstructured data through text analytics in order to provide better insight into the competitive advantages of the brand they have created positioned against multiple theoretical independent variables for analysis. Text mining Analysis is a computational study to extract subjective information from the text. By looking at these independent variables and assessing what these customer reviews represent it will allow management to make better strategic decisions in order to focus their marketing to the customers who are most likely to purchase the product. In the proposed case, this text mining offers a unique technique of utilizing customer reviews to analyze the perceived value offered by the Beats by Dr. Dre brand. Customers opinions can be highly valued, but due to the large quantity of reviews for products it can be hard for businesses to analyze all of that information in a timely manner. The text mining is used to cluster

comments and user reviews to extract information which will produce our results set. The name of the product and price are offered below from the website Amazon.com.

Beats by Dr. Dre have come onto the market in an accelerated and rapid pace due to the fame and popularity of rap producer Dr. Dre. These headphones are known for their recognized style and high popularity among celebrities and consumers. Once a consumer purchases the product from a source, in this case Amazon.com, they will be asked to fill out a review for the product they purchased. Once the review is filled the customer reviews are uploaded to the website and the next set of Beats purchasers have the ability to see what others have said about the product and these reviews have the potential to make or break a customer who wants to purchase these headphones. However, from a business standpoint these reviews are now seen as unstructured textual data that could be processed in order to help facilitate innovation or look into the spending habits of the customer. Our Text mining that we have developed allows a company to analyze the unstructured data through text analytics in order to provide better insight into the competitive advantages of the brand they have created positioned against multiple theoretical independent variables for analysis. By looking at these independent variables and assessing what these customer reviews represent it will allow management to make better strategic decisions in order to focus their marketing to the customers who are most likely to purchase the product.

Model	Manufacturer	Price
Beats Solo 2 Wired On-Ear Headphones	Beats by Dr. Dre	$149

The Amazon reviews obtained from these products are going to reflect the real opinions, thoughts and feelings expressed by thousands of customers who have not only purchased the product, but felt the need to express what they have to say about it. Once organized, classified and clustered into each specific category these words can be useful information that the business can utilize in order to make better decisions and improve customer experiences. Big Data analytics is a process that can be utilized to accomplish these goals and in this case text mining will be applied in order to analyze the vast quantity of data contained in these reviews. Dr. Dursun Delen (2015) wrote "Real-World Data Mining" a textbook that analyzes the different methodologies and approaches that can help improve the business model and create a more efficient and secure data application. Delen gives us insight into how big data analytics can be utilized to help promote a clear business need by stating that "business investments ought to be made for the good of the business, not for the sake of mere technology advancements. Therefore, the main driver for Big Data analytics should be the needs of the business, at any level: strategic, tactical, or operations" (240). Many businesses already contain all the information necessary to accomplish Big Data analytics, Delen explains that "data warehouses have provided the data infrastructure for analytics. Success requires marrying the old with the new for a holistic infrastructure that words synergistically" (241). In this case analysis, Amazon customer reviews are going to provide us with the data infrastructure background and theoretical demographic and socioeconomic backgrounds are going to be applied to each review based on the firms chosen target markets and customer base. A firm that successfully accomplishes a big data analysis of their data warehouse is going to be able to answer many questions they may have about their products that may have

been hidden or overlooked due to traditional data analysis methods. These customer reviews can address a large variety of business problems. Delen explains that each firm is going to be able to address this vast list of problems including:

- Process efficiency and cost reduction
- Brand management
- Revenue maximization, cross-selling, and up-selling
- Enhanced customer experience
- Churn identification and customer recruiting
- Improved customer service
- Identification of new products and market opportunities (244).

Our text mining process is going to provide a solution to these problems whilst creating a database to allow for easy access, searching, and discovery. Big data needs to be organized into functional descriptive, predictive and prescriptive analytics in order to address the problems of the firm today and into the future. Data mining is going to be capable of providing that solution and it may already be capable with the information that each business already has stored inside their data warehouses.

RESEARCH OBJECTIVES

The goals of this study to using text mining approach is created to extract, store, and analyze unstructured data from Amazon.com, then this information could be converted into useful intelligence applications that can help a company make better strategic and focused decisions relating to their customers. Specific objectives are as follows:

1. To understand what test mining is and see how many enterprises are gaining significant strategic insights from its application.
2. To gain hands-on experience in using and assessing text mining tools and software systems.
3. To understand how to validate and evaluate the results and make appropriate decisions.
4. To understand how a test mining exercise can fail, and what it takes to avoid costly failure.
5. To gain knowledge to tackle online customer review for decision making.

METHODOLOGY

The text mining is going to consist of a series of steps that are going to work together in order to retrieve, compile and process the unstructured customer review data from the website Amazon.com. A web scrapping program called WebHarvy will be configured to retrieve customer reviews based on a schedule designated by the user. Once the reviews have been pulled from Amazon.com they will be uploaded into a database where further processing can begin. The user now has two paths in which they can choose to take. The first path will run the entire database of customer reviews in order look at all of the information together using the software IBM SPSS

Modeler. The second path starts by using either an interface or SQL in order to choose the parameters that the business wants to specifically look at and evaluate. Once the parameters have been selected they can then be pulled from the database and run using IBM SPSS Modeler. From here Modeler can choose many different formats to present the data by either presenting the data in a Microsoft Excel table or by presenting the user with a graph output of the processed information. From here the business analyst can evaluate and interpret the results of the customer reviews which will allow management to make better decisions within the company.

ANALYSIS

The text mining software, IBM SPSS Modeler. IBM SPSS Modeler has the ability to mine with algorithms that can discover new patterns and trends not seen within the large amounts of data without the assistance of a computer. Text mining has the ability to read a document and analyze the information contained within the document. It works by using Natural Language Processing algorithms, which can differentiate different words and phrases described in natural language. Text mining can also understand concepts within the text, extract them, and then categorize them in areas that make sense to the user. Words can be described as being qualitative data, by using a text miner that qualitative data can be converted into a type of quantifiable data that can be used to discover new patterns and concepts in order to facilitate better decision making. The community that can benefit the most from our Information System would have to be the research and marketing departments of a business. These departments would be able to apply our Text mining in the future in order to review all of the unstructured raw data coming in from the company website, surveys or sites like Amazon.com in order to see who is purchasing their products and what the customers are saying about their products. This business intelligence information can then be used to help focus innovation within

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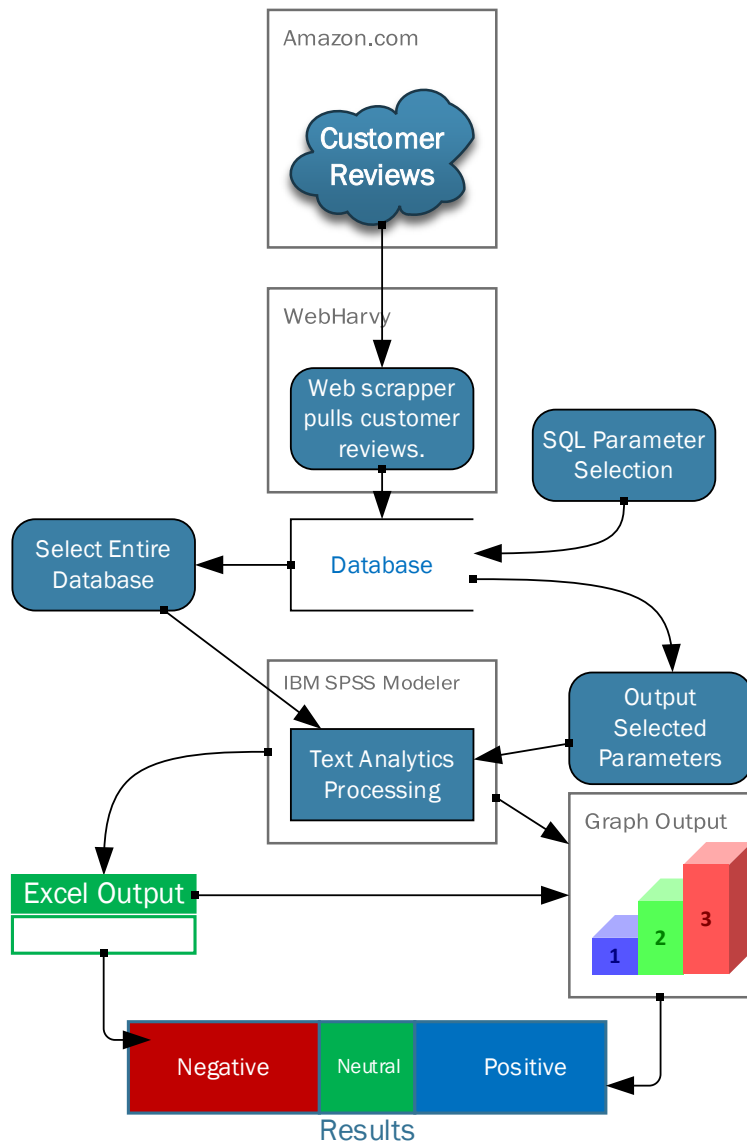
their products or develop new marketing strategies to save on mass marketing spending. The process shown in our system helps to facilitate better customer relationship management by focusing on the feedback aspect of unstructured data in order to create information that can provide better support for marketing and thereby increasing sales.

REFERENCES

Available upon request

THE EFFECT OF APPEARANCE WITHIN PROFESSIONAL JOURNALS ON CHOICE OF ACCOUNTING AS A PROFESSION: A STUDY OF DIVERSITY

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Rebecca Darden, Austin Peay State University

ABSTRACT

A leading source of information for accounting professionals and students stems from the professional accounting journals. Accounting revolves around constantly changing frameworks; therefore, staying up to date in this career field is dire. However, the images presented in these informative journals could have a lasting imprint on the diversity in the accounting profession as a whole. While still accounting students, these images could alter the choice of a profession if students do not see themselves represented in them. To address the importance the images presented could have on the potential job market, we conducted a content analysis that focuses on the primary accounting journals available to students. Then, we looked at the current diversity numbers for the profession. By using the Theory of Interactive Media Effects, also known as TIME, for our theoretical framework, we illustrated that the images presented in accounting journals directly correlated to the diversity in the profession. The information presented in this paper will help create a more inclusive work field needed in the accounting career path by creating an understanding of the images presented to potential employees.

A modern issue in the accounting profession relates to the lack of diversity located in the career paths. Throughout the past decade, the United States' diversity rose exponentially; however, the accounting profession appears to lack this same growth. According to recent studies, the overall number of minorities graduating with accounting degrees increased to 42% in 2020, yet the percentage of minorities working in CPA firms relatively stayed the same (Rosenstock & Shenkman, 2021). The lack of diversity growth in the field must have a cause. The research conducted throughout this paper illustrates that one of these causes could correlate to the images accounting journals present to students and potential employees like the theory of interactive media effects (TIME) justifies. Multiple other studies analyzed the impact of images within textbooks or books on diversity in other career fields like Susan Feiner's study in 1993 and Wendy Tietz's study in 2007; however, the information remains lacking for accounting within the journals the profession produces. The importance of gathering the effect of these journals stems from the exposure and audience they bring. Professional accounting journals typically include real accountants and people in the field; therefore, the impacts could have lasting effects on the readers.

Understanding diversity, equity, and inclusion (DEI) and the components that hinder it creates an important barrier that needs to be broken in the accounting world. Kimberly Ellison-Taylor (2023), a current CPA, states that within the field "there is a greater realization that DEI

is everyone's concern." Ellison-Taylor pleads with the public accounting world to finally take action change concerning inclusion problems. Ignoring the issues no longer can be an option. She further explains that, "Race, gender, how you worship, your age, who you love, and socioeconomic status remain conscious and unconscious biases," (Ellison-Taylor, 2023) highlighting how these elements of people still play a role in accounting world's perspective of individuals. Overall, using a TIME justification and trying to understand the images presented to the potential employees could help the accounting world face the diversity problems in their field.

THE SHRINKING OF ACCOUNTING MAJORS

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ABSTRACT

Accounting is vital business: it interprets financial information used in the decision-making process; records and analyzes company data; and ensures compliance with tax code and other governmental regulations. Without some form of accounting businesses would cease to exist. However, as important as accounting is to and in the business world, fewer students are choosing to major in accounting.

Upon reviewing aspect literature on accounting majors, we have found various reasons that students initially choosing majors other than accounting or change after starting the accounting major. Much research is available on numbers of majors and why they are chosen. The research mainly used surveys to determine specific demographic markers while also determining what major the students wanted to study. Researching this topic would include gathering data, including demographics, to see if students are not choosing accounting to begin with or changing from accounting, and the reasons why. While many ways are available to research this topic, the methodology used in this paper is an analysis of real life surveys. The theoretical framework used is the social influence theory which is the arguing factor for this research.

Accounting has a large impact and importance in the world, but the lack of interest in accounting as a major is concerning. Many theories address the lack of accounting majors: the level of difficulty, GPA requirements, the changes in business environment, and financial reasons. The 150 required credit hours could also be a large contributor to the lack of accounting majors.

After understanding the importance of accounting, it is important to understand the effects of demographics of accounting majors. According to research, gender and age can affect the number of accounting majors. Some sources suggest that the younger the student is the less likely they will be interested in accounting as a major due to claims of the courses being too hard and time consuming. When surveyed the results were skewed between genders with females having a higher percentage than males when it came to majoring in accounting. Research has also shown a lack of racial diversity among accounting majors. Research indicates that students choose to major in accounting mostly based upon their knowledge and familiarity of the subject or career field. Some studies revealed that students found the major accounting intimidating and that it was possibly a reason less students are choosing to major in it.

With the decline in accounting being chosen as a major, many universities struggle to fill their accounting classes. This is not caused by just one reason. Research shows multiple reasons students choose to not be an accounting major. The decrease in accounting majors is a big problem for the accounting programs in universities, for the accounting firms, industry, and others recruiting accounting majors, and for the future of the profession. With less accounting majors there will be less accountants in the world. With the lack of accounting majors, businesses will begin to lose the older generation as they retire and will be left with few to choose from.

MODELING AIR PASSENGER MARKET DEMAND VOLATILITY FOR LARGE AIRPORT HUBS IN THE UNITED STATES

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ABSTRACT

This paper studied the passenger demand volatility for top, middle and low-ranking large airport hubs in the United States using econometric time-series modeling. We model volatility using a generalized autoregressive conditional heteroscedasticity (GARCH) model. For valid comparisons among airports of different rankings, we standardized the volatility measures for both domestic and international revenue passenger miles. Our findings indicate that top-ranking airport hubs such as Atlanta Hartsfield–Jackson International Airport shows more stable revenue passenger mile compared to middle and lower-ranking airports hub such as Tampa and Orlando international airports. In the past decade, airports of all rankings seem to experience less volatility compared to the beginning of the decade. This may be due to better travel experience due to improvements in flight-related technology and better airport management practices. The middle and low-ranking airports also indicate high volatility for international revenue passenger miles possibly due to capacity issues and being near to international destinations where most air travels are leisure related. On the contrary, top-ranking airport shows relatively high volatility for domestic revenue passenger miles. This is mainly due to the existence of domestic market competition among airlines operating in these large hubs.

Key words. Airport, Demand Forecasting, Volatility of Passenger Air Demand, Large Airport Hubs

INTRODUCTION

This study examines the air travel market demand volatility for large American airport hubs. We focused on the top, middle and low-ranking large airport hubs in the United States using econometric time-series modeling in order to make a comparison and explain the determinants of volatility differences. Market demand analyses are vital for airport managers as many strategic marketing plans depend on the details of expected passenger flows and revenue mileage. Mainly due to increasing world population and global income rise, it is expected that the global aviation traffic will increase steadily in the upcoming decade both in the United States and globally. Yet, there are small number of studies that explore the underlying dynamics and a wide variety of factors that may influence how the airport demand is observed. This is not ideal particularly for

understanding the demand for the U.S. airport hubs, as we expect higher instability in developed markets (Chai et al., 2014).

REVIEW OF LITERATURE

Srinidhi and Manrai (2013) categorize factors that influence air travel demand under two types; the economic factors which involve commercial, industrial and cultural activities and service dependent factors that mainly deal with quality, airfare, schedule frequency, delay and other technology utilization related factors. As part of basic infrastructure, airport hubs involve movement of goods and people as a necessary means for economic growth. High initial capital investments and long operational cycles which result in significant barriers to entry characterize hub and spoke systems. As a consequence, hubs are a key element of a wider functioning economy and customer demand for airport hubs are expected to be relatively inelastic within traditional economic cycles (Foundation and Endowment Money Management, 2014). Corrrenti et al. (2006) adds that as a consequence of increasing demand for air transportation, airport congestion pushes air traffic control and safety to the limits and delays are observed. Therefore, air transport demand analyses are needed in order to foster regional economic development.

Current business environment is further complicated with recent trade tensions between US and China, underperforming emerging economies, overall stalled global economic growth, political uncertainties, and currency volatility (Friedman, 2019). Therefore, we believe all of these add to the complicated nature of air transportation demand. Overall, the competition in the aviation industry is highly competitive which translates into unpredictability and the consequent volatility (Dimitriou, 2018). While there are studies that looked at air transport demand using econometric series modeling, time series and regression methods, no studies addressed the effects of volatility. We aim to address this gap in the literature and try to address how the effects of volatility is observed for top, middle and low-ranking large airport hubs in the United States.

METHODOLOGY

Adrangi, Chatrath and Raffiee (2001) studied the US airline industry's service demand and found that GARCH models are useful in analyzing the US airline industry's service nonlinear series where GARCH models outperform autoregressive models. Likewise, in order to measure the volatility of the revenue passenger mile (RPM) for each airport of different size, we used a generalized autoregressive conditional heteroscedasticity (GARCH) model. Proposing the GARCH model, Bollerslev (1986) suggests that the conditional variance of a time series depends upon the squared residuals of the process. By modeling the conditional variance in this manner, the author introduces heteroscedasticity to the conditional variance. Extending the earlier work, Bollerslev et al. (1992) introduce a time-varying conditional variance, GARCH (p, q). In general, a macroeconomic variable, y_t, can be modeled as GARCH (p, q), as follows:

$$y_t = \mu_t + \varepsilon_t \qquad (1)$$

$$\varepsilon_t | \Omega_{t-1} \approx N(0, h_t) \qquad\qquad (2)$$

$$h_t = \sigma + \sum_{i=1}^{p} \beta_i h_{t-i} + \sum_{j=1}^{q} \alpha_j \varepsilon_{t-j}^2 \qquad (3)$$

where μ_t the mean of y_t is conditional on the information set Ω_{t-1}. To ensure that the conditional variance, h_t, is positive, the following inequality restrictions are imposed: σ > 0, β$_i$ ≥ 0, and α$_j$ ≥ 0. Theoretically, the GARCH-type modeling of volatility offers a more precise measure of volatility since it allows time dependence of the second moment of a random variable. This is specifically relevant with clustering time series. However, the application of the GARCH-type modeling to measure volatility requires high-frequency observations and long time series.

Individual volatilities of revenue passenger miles (RPM) for each airport (low, medium and large size) are estimated using the standard GARCH (1, 1) modeling technique. The volatility that is constructed using GARCH (1, 1) is subsequently be standardized as follows:

$$Std_{RPM} = \sum_{i=1}^{3} \left(\frac{V_i - \bar{V}_i}{\delta_i} \right) \qquad\qquad (4)$$

Where, V_i and $\bar{V}_i$ represents volatility measure of RMP for each airport size (*i*) and its respective mean. δ_i is the standard deviation of individual volatility. The standardization procedure is necessary for comparing the volatility of airports with different size.

RESULTS AND DISCUSSION

The chart below for Atlanta airport (top-ranking larger hub) shows the revenue passenger mile for domestic flight is following the same trend in the past decade. However, the international domestic revenue passenger mile shows signs of stability since 2006. It shows no difference whether we standardize the volatility measures or not. Compared to domestic flights, international flight shows more stability since local demand fluctuates in response to domestic competitions and other forms of travel opportunities which are close substitutes.
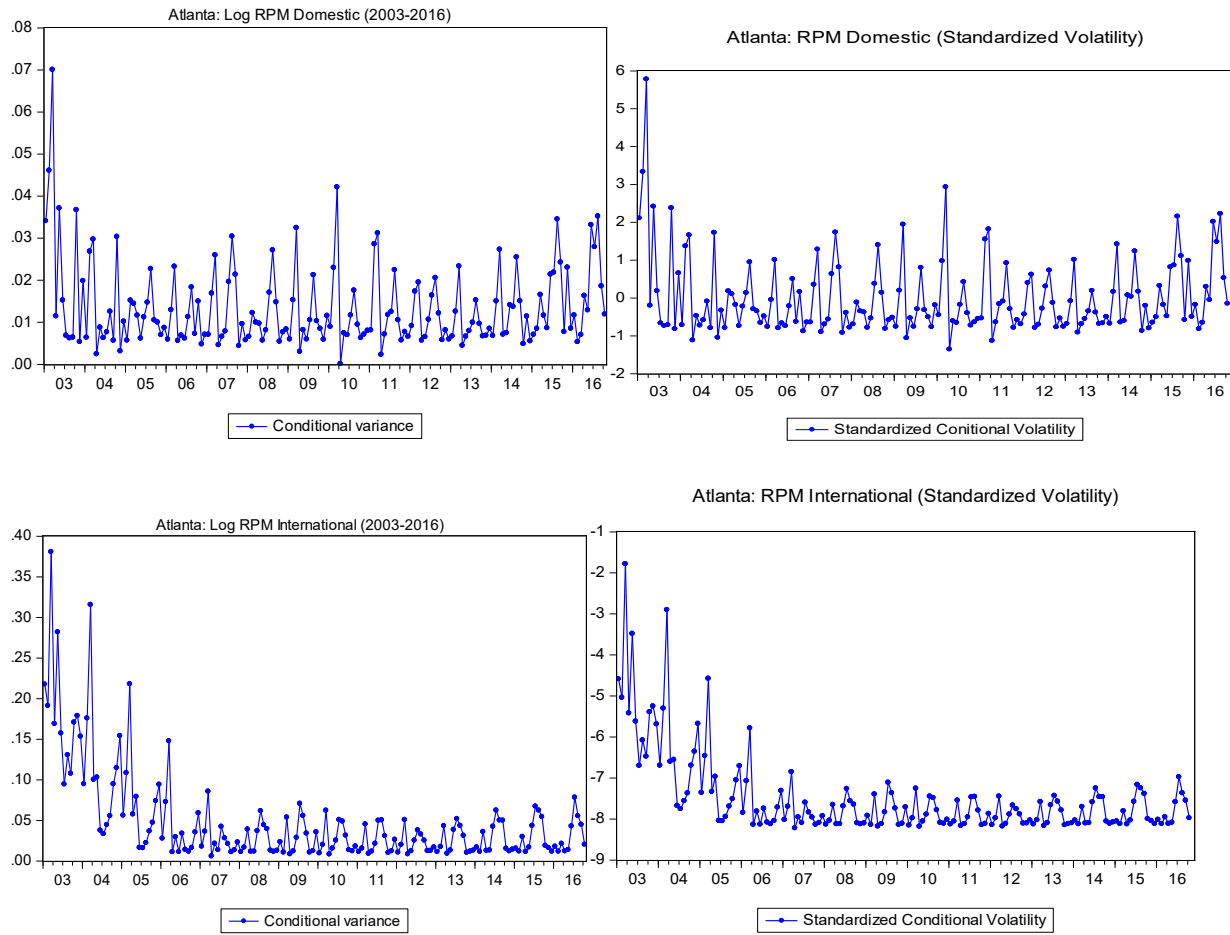
The charts below show results of the revenue passenger mile volatility for mid and low-ranking large hubs. Both airports suffer from a high international flight volatility in recent times. Compare to other hubs, the low-ranking airport hub (Orlando) experiences the highest volatility for international revenue passenger miles signaling smaller airports are more susceptible to higher volatility that needs to be properly managed. These results are consistent with previous studies airports worldwide experience a significant degree of seasonality, and larger airports are less affected (Dobruszkes et. al, 2022). On the one hand, diverse travel purposes related to larger cities, sphysical geography, remoteness and appropriate weather throughout the year induce stable seat capacity.

Tampa: Log RPM Domestic (2003-2016)
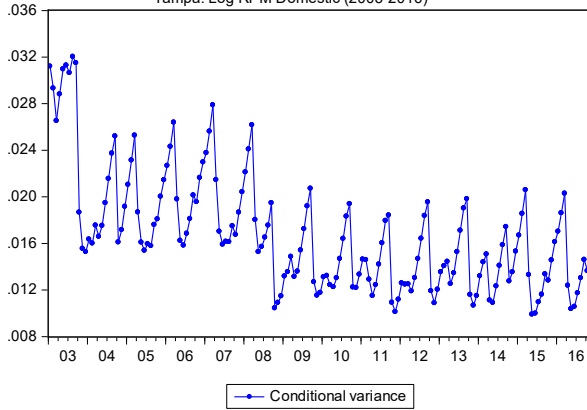
Tampa: RPM Domestic (Standardized Volatility)
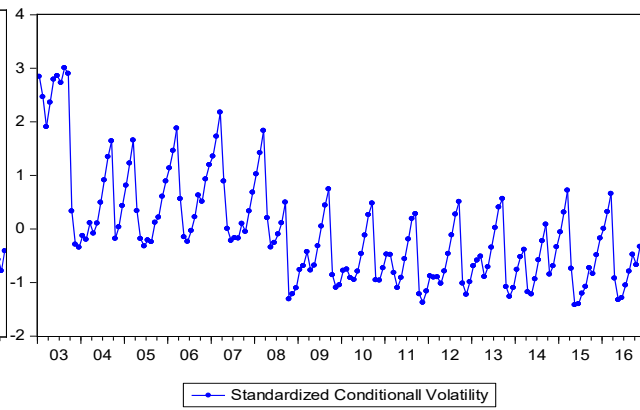
Tampa: Log RPM International (2003-2016)
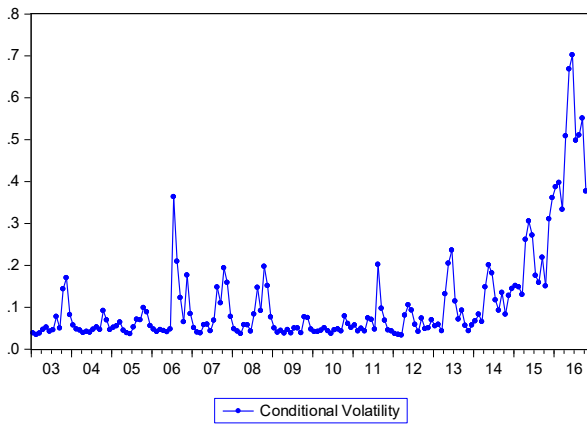
Tampa: RPM Intenational (standardized Volatility)
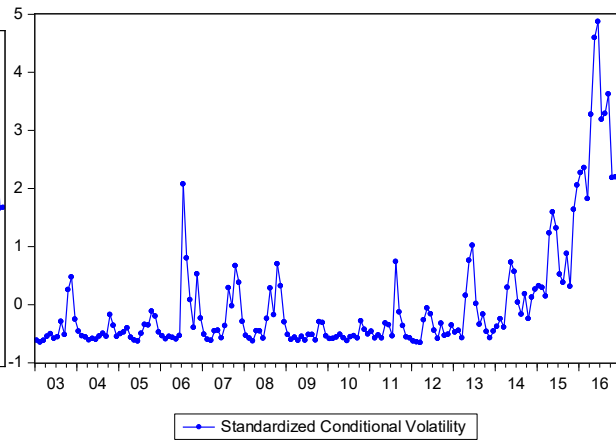
Orlando: Log RPM Domestic (2003-2016)
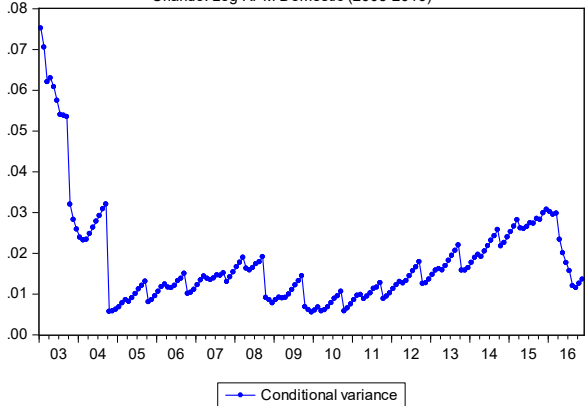
Orlando: RPM Domestic (Standardized Volatility)

Orlando: RPM International (Standradized Volatility)

Orlando: Log RMP International (2003-2016)

Conditional variance

Standardized Conditional Volatility
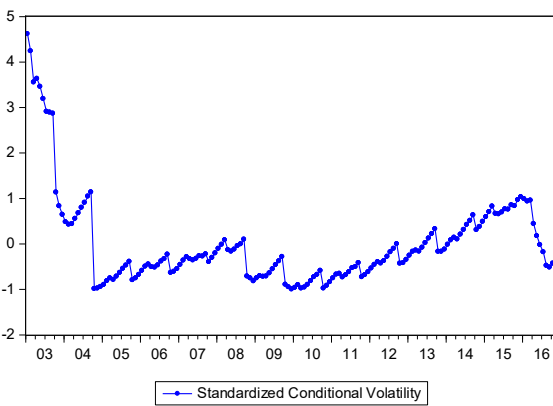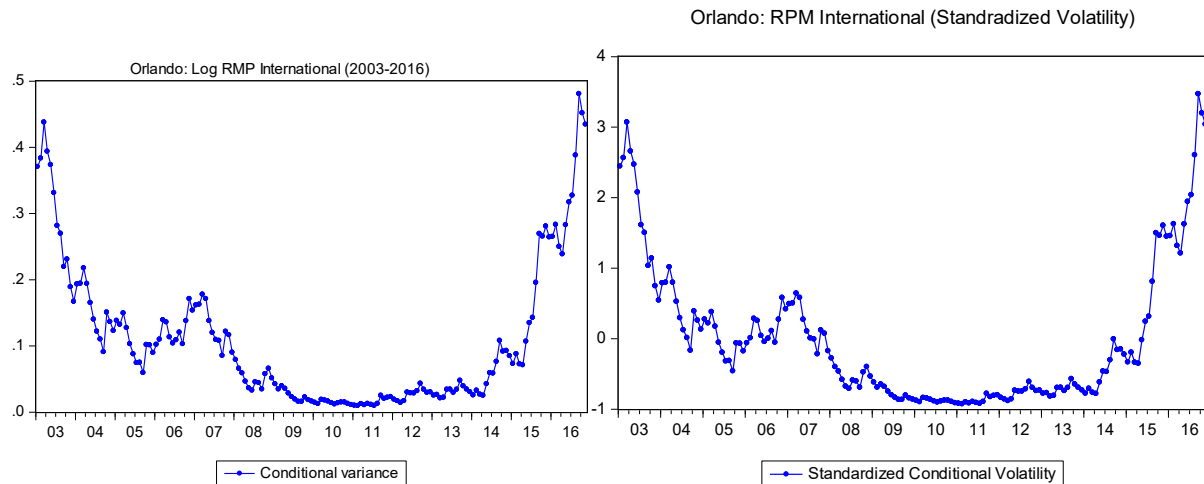
CONCLUSION

We employed the econometric time series modeling and explored both standardized and non-standardized volatility measures for top, mid, and low-ranking large hubs in the United States. We found that top-ranking airports experience less significant air travel demand volatility compared to mid and low-ranking airports. More importantly, larger airports enjoy more international demand stability due to the diverse travel purposes in large hubs. Comparatively, mid and low-ranking experience better demand stability for domestic travel demand.

We also note that in the past decade, airports of all rankings seem to experience less volatility compared to the beginning of the decade. This may be due to better travel experience due to improvements in flight-related technology and better airport management practices. The middle and low-ranking airports also indicate high volatility for international revenue passenger miles possibly due to capacity issues and being near to international destinations where most air travels are leisure related. On the contrary, top-ranking airport shows relatively high volatility for domestic revenue passenger miles. This is mainly due to the existence of domestic market competition among airlines operating in these large hubs. These results can be used for better revenue management among various airports by focusing on their comparative advantages based on demand stability.

REFERENCES

Adrangi, B., Chatrath, A., & Raffiee, K. (2001). The demand for US air transport service: A chaos and nonlinearity investigation. Transportation Research.Part E, Logistics & Transportation Review, 37e(5), 337-353. Retrieved from https://www.proquest.com/scholarly-journals/demand-us-air-transport-service-chaos/docview/218530246/se-2

Chai, Jian, Zhong-Yu Zhang, Shou-Yang Wang, Kin Keung Lai, and John Liu (2014), "Aviation Fuel Demand Development in China", *Energy Economics*, 46, 224-235

Correnti, Vincenzo, Matteo Ignaccolo, Salvatore Capri, and Guiseppe Inturri (2006), "Regional Air Transport in Europe: The Potential Role of the Civil Tiltrotor in Reducing Airside Congestion", *Journal of Air Transportation*, 11(1), 27-49.

Dimitriou, D. J. (2018). Comparative evaluation of airports productivity towards tourism development. Cogent Business & Management, 5(1) doi:https://doi.org/10.1080/23311975.2018.1464378

Friedman, A. (2019). Why global air freight demand continued to descend in august. Sourcing Journal (Online), Retrieved from https://www.proquest.com/trade-journals/why-global-air-freight-demand-continued-descend/docview/2306009656/se-2

Pita, J. P., Barnhart, C., & Antunes, A. P. (2013). Integrated flight scheduling and fleet assignment under airport congestion. Transportation Science, 47(4), 477-492. Retrieved from https://www.proquest.com/scholarly-journals/integrated-flight-scheduling-fleet-assignment/docview/1462506623/se-2

Srinidhi, S., & Ajay K. Manrai (2013) "A Conceptual Model for Demand Forecasting and Service Positioning in the Airline Industry", *Journal of Modelling in Management*, 8(1), 123-139. doi:http://dx.doi.org.ezproxy.brenau.edu/10.1108/17465661311312012

THE EFFECT OF PATIENT'S OPINIONS ON THE FINANCIAL CONFLICTS OF INTEREST IN CANCER RESEARCH TRIALS

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ABSTRACT

Clinical trials during the testing of medication are a necessary procedure to validate the efficacy of and safety of new medications. The authors of this research seek to determine patient's opinions about the financial conflicts that may arise from this procedure with a view to with a view to determine if the clinical trials are affected by financial conflicts of if they are influenced by them.

AN ANALYSIS OF THE EFFECTIVENESS OF CHATGPT AND ITS IMPACT ON ENTREPRENEURSHIP EDUCATION

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ABSTRACT

Every so often the field of higher education is taken over by a new "storm", the last three being the emergence of online education compared to traditional brick and mortar education, the impact of remote learning forced by Covid-19, and the latest one, the emergence of Artificial Intelligence (AI) as seen in ChatGPT and its impact on education. This paper focuses on the potential impact of ChatGPT or other AI in entrepreneurship education by using ChatGPT and ascertain its entrepreneurial abilities compared to students' work.

INTRODUCTION

The field of higher education is a field that is not known for is rapid change to a changing environment and as a result tends to have strong reactions when new technologies emerge which could have an impact on the field. The first introduction of a different teaching model can be traced to the early 1800's when the University of Chicago started to offer distance education for teachers and learners, who were at different locations (Mclsaac & Gunawardena, 1996). With the development of technology, the first fully online course was offered in 1981, and the first online program was established by the Western Behavior Sciences Institute in the following year (Harasim, 2000). The advent of the World-Wide Web (WWW) in 1991 was a powerful catalyst for moving distance education forward and resulted in the rapid expansion and growth of online teaching and learning (Sun & Chen, 2016). Since then, colleges and universities both in the United States and around the world have offered not only just online courses but entire degree programs online as well (Wallace, 2003). As a result, there have been many vigorous debates and thorough studies on the differences between online and face-to-face classroom teaching (Sun & Chen, 2016).

The newest issue that is currently developing is the advent of artificial Intelligence (AI), where a learner can go online and have an AI creating work on their behalf, where basically, the AI do the homework for the learner. AI is a machine's ability to perform the cognitive functions we associate with human minds, such as perceiving, reasoning, learning, interacting with an environment, problem solving, and even exercising creativity. AI have been around for a while now, voice assistants like Siri and Alexa are founded on AI technology, as are some customer service chatbots that pop up to help you navigate websites. However, these were limited in what they could offer. Lately, the new AI machines like ChatGPT or Bard, take thing even further and has become an issue in higher education. As a result, a flurry of reactions was seen from all over the higher education field, for example, the University of Alberta, Statements of Expectations

(Syllabus), gives an overview of writing a syllabus statement and examples of four different approaches: "AI Use Integrated into Course"; "Community of Learners Agreement AI Use"; "Instructor-Specified AI-Use"; and "No AI Use Allowed." Many more university have created their own input about how AI should or shouldn't be used in their campuses:

COMPENSATION DISCLOSURE AND FIRM MARKET PERFORMANCE WITH THE MODERATING EFFECTS OF CORPORATE GOVERNANCE: EVIDENCE FROM SWITZERLAND

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Sergey Komissarov, University of Wisconsin La Crosse

ABSTRACT

Research Question/Issue: The paper examines association between compliance with compensation disclosure regulations and firm's market performance under the moderating effects of corporate governance.

Findings: We document a positive association between compensation disclosure transparency and Market to Book value. CEO duality has an adverse effect on this positive relationship. We also document a significant moderating effect of larger board sizes on the positive association between compensation disclosure transparency and Market to Book value.

Theoretical/Academic Implications: The main contributions of this paper are two-fold. First, we create a valid and reliable compensation disclosure index. Second, we find a moderating variable, helping to reconcile conflicting findings in the extant literature. This study is the first one measuring moderating effects of corporate governance on disclosure and firm performance.

Practitioner/Policy Implications: The result is significant for policy makers and executives because it explains the impact of corporate governance on firm's future market performance. This paper also contributes to our understanding of the consequences of compensation disclosure regulations in Switzerland.

Key words: Executive compensation disclosure, firm performance, corporate governance, agency theory and positive accounting theory.

THE IMPACT OF GAAP GUIDANCE ON ASSET RETIREMENT OBLIGATIONS: AN INVESTOR PERSPECTIVE

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ABSTRACT

We evaluate the value relevance of financial reporting following implementation of Statement of Financial Accounting Standards No. 143, Accounting for Asset Retirement Obligations and Financial Interpretation No. 47, an implementation guidance for Statement No. 143.

We use a sample of companies that adopted either FIN 143 or the subsequent Interpretation 47, when they became effective. Successive issuance of Interpretation 47, following issuance of FIN 143, created a natural experiment, which we exploit in order to evaluate effects of authoritative guidance.

We document results consistent with diminishing value relevance of financial reporting following implementation of the financial reporting guidance contained in ASC 410 with respect to former SFAS 143 and FIN 47. These results provide quantitative evidence relevant to the debate over complexity of US GAAP and rules-based versus principles-based reporting standards.

Key words: asset retirement obligations, authoritative guidance, ASC 410, FIN 143, Interpretation 47, principles-based reporting.

ANTECEDENTS OF CULTURAL INTELLIGENCE OF UNIVERSITY EMPLOYEES: DEVELOPING CULTURAL INTELLIGENCE IN HIGHER EDUCATION

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ABSTRACT

Description: A survey of non-faculty staff at a small private university using the 20-item Cultural Intelligence (CQ) scale (Van Dyne, Ang, and Koh, 2008) revealed that younger (<46 years old) age and more frequent contact with diverse populations of students are associated with higher levels of Cultural Intelligence.

Key words: Cultural Intelligence, marketing of higher education, management of higher education, antecedents of Cultural Intelligence.

EXTENDED ABSTRACT

Research Question

Cultural intelligence (CQ) is defined as "an individual's capability to function and manage effectively in culturally diverse settings" (Ang and VanDyne, 2008, p. 3). Cultural intelligence is not a personality trait, but a skill (Ang & Van Dyne, 2008) that can be developed by any psychologically healthy adult who has the motivation and the opportunity to learn. Empirical research demonstrated that cultural intelligence of employees is linked to better performance of organizations along multiple dimensions. For example, Fujimoto and Presbitero (2020) have demonstrated a positive relationship between perceived supervisor CQ and intercultural cooperation within an organization. Zhang et al. (2022) found evidence of positive effects of CQ on knowledge management in multinational corporations.

Fostering the development of employees' cultural intelligence in higher education takes on additional significance in light of increased diversity on American campuses. Our study contributes to understanding of antecedents of cultural intelligence. Even though it appears that with age, individuals have a chance to develop greater cultural intelligence, making age an antecedent of cultural intelligence (Ang and Van Dyne, 2008), this study seeks to explore the possibility of the generational effects that might modify or even counter the effect of age on cultural intelligence. Specifically, we propose that older age does not automatically translate into greater individual cultural intelligence. Rather, the accumulation of intercultural skills will occur only if an individual has a motivation and an opportunity (through frequent and prolonged contact) to interact with the representatives of other cultures. Development of cultural intelligence, as

discussed earlier, requires the accumulation of specific knowledge and skills as well as the development of a specific mindset.

Specifically, we set forth two formal hypotheses and one research question:

H1: Younger respondents will score higher on cultural intelligence compared to the older respondents.

H2: Employees who frequently and closely interact with the students will have higher cultural intelligence scores compared to the employees who maintain limited contact with the students.

Additionally, this study seeks to explore the reliability of CQ Scale (Van Dyne, Ang, and Koh, 2008) for assessing the employees' cultural intelligence at a higher education institution.

RQ1: Does CQ Scale generate acceptable levels of statistical reliability and is it suitable for assessing employees' levels of cultural intelligence at a higher education institution?

Method and Data

The data were collected in a small religiously affiliated private university in the Pacific Northwest of the United States. An invitation to participate in the online campus climate survey was sent to the employees via a university-wide e-mail. The data collection for this study was done using the opportunity to "piggyback" on a university-wide campus climate survey. To maximize the response rate, the organizers of the survey, including one of the co-authors, sent two reminder e-mails urging the employees to participate. The incentive to participate was a chance to win an iPad. The response rate in this survey was 56 percent which resulted in 306 usable surveys.

While racial diversity was not a characteristic trait of our sample (90.5 percent of respondents described themselves as Caucasian, see Table 1), cultural diversity of our respondents likely stemmed from the variety of the religious traditions they were adhering to as well as from the differences in their education, sexual orientation, and life experiences (e.g., age range). Women comprised the majority of the respondents (63.7 percent, see Table 1).

Table 1: Demographic characteristics of the sample

Demographic variable	Number of respondents	Percentages
Gender		
Female	195	63.7
Male	82	26.8
Age		
25 and under	8	2.8
25-35	62	22.1
36-46	71	25.4
47-65	127	45.4
66 and older	12	4.3
Demographic variable	**Number of respondents**	**Percentages**
Race		

White	248	90.5
Multiracial	14	5.1
Hispanic/Latino	4	1.5
Asian	4	1.5
American Indian	2	.7
African American	2	.7
Education		
High school or less	10	3.6
Some college	34	12.1
Associate degree	19	6.8
Bachelor's degree	103	36.8
Graduate or postgraduate degree	114	40.7
Disability status		
Not disabled	264	95.3
Disabled	13	4.7
Sexual orientation		
Heterosexual	271	97.1
LGBT	8	2.6
Religion		
Catholic	97	36.3
Protestant	59	22.1
Other Christian	49	18.4
Buddhist	3	1.1
Latter Day Saints (LDS)	2	.7
Jewish	1	.4
No organized religion	36	13.5
Atheist or agnostic	20	7.4

Table 2 breaks down the participants by their job status (managerial vs. non-managerial positions) and by the type of the work they performed for the university. The respondents' term of service at the university ranged from 1 month to 35 years, with the average of 9.1 years.

Table 2: Work-related characteristics of the sample

Job status		
Managerial positions (manager, director, or supervisor)	93	33.6
Non-managerial positions	184	66.4
University divisions		
Administration, planning & finance	94	35.7
Academics	80	30.3
Student life	46	17.4
Athletics	14	5.3

All subscales of the CQ Scale have demonstrated sufficient reliability in our sample. Cronbach alphas for all subscales exceeded the generally recommended minimum level of .7

(Nunnally, 1978). The means, standard deviations, and Cronbach alpha coefficients for each subscale and for the composite CQ scale are reported in Table 3.

Table 3: The means, standard deviations, and Cronbach alpha coefficients for the Cultural Intelligence Scale and for its subscales

CQ subscales	Mean	Standard Deviation	Cronbach alpha
Metacognitive CQ	17.52	3.29	.796
Cognitive CQ	19.85	6.14	.913
Motivational CQ	22.79	3.98	.801
Behavioral CQ	20.68	4.54	.855
Overall CQ Scale	81.31	14.91	.933

Summary of Findings

Hypothesis 1 predicted that younger respondents will have higher CQ scores compared to the older respondents. To test H1, we transformed the Age Group variable (see Table 1) into the new variable with two categories: "45 and younger" and the "over 45 years-of-age" (139 and 134 respondents, respectively). The reason behind the decision to recode the Age Group variable was that, at the time of conducting the survey, the 45 years threshold was approximately corresponding to the split between the older generations (Baby Boomers and the Silent Generation) and the younger generations (Gen X-ers and Millennials) represented in the workforce. The "over 45" age group, thus, represented the age cohorts that came of age of when American society was less ethnically diverse. In contrast, Gen X-ers and Millennials grew up while interacting with people of various ethnic backgrounds.

To test H1, we ran the independent samples T-test with the CQ Scale and the four CQ subscales as dependent variables and the 2-category Age Group variable as the grouping variable. The results are largely supporting H1. The overall CQ scores ($t(272)=2.14$, $p<.05$), the Metacognitive subscale scores ($t(270)=4.59$, $p<.05$), the Cognitive subscale scores ($t(269)=1.69$, $p<.09$), the Motivational subscale scores ($t(271)=1.85$, $p<.07$), and Behavioral subscale ($t(271)=3.02$, $p<.05$) were all higher for the younger age cohort than for the older (the "over 45 group") employees. Even though this difference only reached borderline significance for the Cognitive and Motivational subscales, the overall pattern was very consistent for all dimensions of cultural intelligence.

Recall that H2 states that the employees who frequently and closely interact with the students have higher cultural intelligence scores compared to the employees who interact with the students on a less frequent basis. To test for H2, we divided all employee categories (see Table 2) into two types. The Academics, Student Life, and Athletics employees are engaged into more frequent and close contact with the students as part of their daily duties (teaching, advising, counselling, and coaching). Administrative staff was assigned to another category since their duties do not result in everyday contact with the students. The CQ scores for these two categories were compared using the independent samples T-test. The results largely supported H2 across all dimensions of CQ. The employees engaged in a regular contact with the students scored significantly higher on the overall CQ scale (the sum of the 4 CQ subscales), specifically,

t(256)=2.82, p<.01). Likewise, the Cognitive scores (t(253)=2.65, p<.01) and Motivational scores (t(255)=2.55, p<.05) were significantly higher for the "frequent contact" category of employees, while the Metacognitive scores (t(254)1.86, p=.06) and Behavioral scores (t(255)=1.85, p=.06) were marginally significantly higher for the "frequent contact" employees.

Key Contributions

Overall, our study provided yet another empirically tested confirmation of the reliability of the 20-item Cultural Intelligence scale (Van Dyne, Ang, and Koh, 2008) and of its subscales on a sample of university staff members. Cronbach alpha values for the overall CQ scale and for all four of its subscales (Metacognitive, Cognitive, Motivational, and Behavioral) exceeded .7, indicating sufficient levels of reliability (Nunnally, 1978).

The overall CQ scores (t(272)=2.14, p<.05), the Metacognitive subscale scores (t(270)=4.59, p<.05), the Cognitive subscale scores (t(269)=1.69, p<.09), the Motivational subscale scores (t(271)=1.85, p<.07), and Behavioral subscale (t(271)=3.02, p<.05) were all higher for the younger age cohorts than for the older (the "over 45") employees. Even though this difference only reached borderline significance for the Cognitive and Motivational subscales, the overall pattern was very consistent for all dimensions of cultural intelligence. This pattern supports our view of the younger, more diverse generations of Americans, as the ones possessing higher levels of cultural intelligence. Another finding of our study supports the view of Cultural Intelligence as of an individual capacity that is enhanced by practice. The hypotheses predicting that respondents who frequently interact with diverse student populations would exhibit higher levels of cultural intelligence was largely supported. Cognitive and Motivational scores, in particular, were significantly higher for the "frequent contact" category of employees.

Any educational institution, by nature of working with increasingly diverse populations should be interested in fostering high levels of cultural intelligence in its employees to ensure better performance. To approach this process strategically, an institution will need to start by assessing CQ of its employees. We advocate for the wider use of the 20-item Cultural Intelligence scale (Van Dyne, Ang, and Koh, 2008) by educational institutions for this purpose. The scale is easy to administer and score. It has a proven record of validity and reliability. One of the most obvious advantages of the 20-item CQ scale is that it yields not just the overall CQ score but also more granular data on employees' Metacognitive, Cognitive, Motivational, and Behavioral scores. We advocate for conducting regular assessments of university employees' cultural intelligence. Future research is needed to design the most efficient training for each type of CQ deficiency that might be revealed through assessment. Other directions for future research in the area might include exploring and measuring the most direct impact of cultural intelligence on employee performance specifically in higher education.

REFERENCES

Available upon request.

THE IMPACT OF COVID ON FIRM PERSONNEL POLICIES

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ABSTRACT

In 2023, MTSU's BERC released a survey of hundreds of businesses concerning the wages and benefits that they offered. This survey covered the 40 counties of the Middle Tennessee region. This is a biannual project for the BERC, with the previous study released in 2021. The major intervening event was, of course, COVID. This paper uses these survey results to investigate how COVID impacted company practices. We examine changes in the location of work and scheduling, pay practices, employee turnover and absenteeism, and COVID-related healthcare, among other challenges. How did businesses adjust or change their operations to deal with one of the biggest disruptions that most of them had ever seen?

RELIGION'S IMPACT ON FINNISH ACADEMIC DISHONESTY: BEHAVIORS AND ATTITUDES

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Marty Ludlum, University of Central Oklahoma, USA

ABSTRACT

The current project examines Academic Dishonesty (AD) beliefs and behaviors in an underexamined population, Finnish business students. Finland provides a unique example because of having a national religion (Evangelical Lutheran) that is heavily intertwined with their culture and public education. We surveyed undergraduates (n=136). We used two scales, one of ethical attitudes, one of ethical behaviors, both of which had high reliability. We reduced the items through factor analysis and found three facets of religion impacted academic ethics: denomination, intensity, and level of participation.

DO COMMUNITY BANKS IN FAST-GROWING METROPOLITAN AREAS OUTPERFORM RURAL COMMUNITY BANKS?

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ABSTRACT

Prior research found that community banks in rural areas outperformed community banks in metropolitan areas in terms of pre-tax return on assets and the variables contributing to it. However, a study on community banks by the FDIC in 2020 mentioned that community banks in the fastest growing metropolitan areas from 2010 through 2020 performed better than those in other metropolitan areas without comparing that performance to rural community banks. This study addresses that gap using a 2014 dataset and finds that, on average, community banks in the fastest-growing metropolitan statistical areas do not outperform rural community banks. The summary data suggests that high cost of operations, likely labor and real estate, offset higher net interest margins and fee income in those fast-growing areas.

INTRODUCTION

Despite declining numbers, over 15,000 to under 6,000, since deregulation of the US banking system begun over 30 years ago, community banks still play an important role in the US economy because of the portion of local microenterprise businesses they fund through lending. Small businesses employ most of the people in the US and community banks are also local small businesses whose shareholders are also residents of the areas they serve. Prior studies on community banking such as the 2012 FDIC Community Banking Study failed to provide an accurate representation of community bank profitability and risk because those studies grouped rural community banks (RCBs) and metropolitan community banks (MCBs) together. Morrison and Escobari (2020) demonstrated that rural community banks, which rarely have nationwide megabanks operating in their geographic area, are more profitable than MCBs where those banks compete directly with megabanks for both deposits and creditworthy borrowers. The updated 2020 FDIC Community Banking Study did examine metropolitan banks separately and reported that community banks in the fastest growing metropolitan areas (FGMCB) between 2010 and 2020, which also had significant inflows of younger individuals, outperformed MCBs in the stable or declining metropolitan areas. However, that study failed to examine if FGMCBs were more profitable than RCBs. The McAllen-Edinburg-Mission metropolitan statistical area (MSA) is one of the top 20 fastest growing MSAs during that period. This study uses the December 2014 FDIC dataset to compare RCBs, MCBs, and FGMBs on the variables contributing to community bank profitability.

DESCRIPTION OF DATA

This study uses the annualized values from the FDIC dataset for the fourth quarter of 2014. It contains the entire population of FDIC insured banks operating in the US, which was 6,518 banks. The variables in the dataset are equivalent to the quarterly or year-end financial reports for a publicly traded company but with variables specific to banking. While most community banks are not publicly traded, all FDIC insured banks must provide reports on specific financial variables every quarter to the FDIC and those reports are available for public review via the FDIC website. While Morrison and Escobari provided their dataset from the 2020 publication which covered 2000 through the end of 2014, they did not retain the specific MSA code variable, only that it was a rural or metropolitan bank. However, since the original conference version covered from 2000 through 2013, they did have the original 2014 FDIC dataset that was added to the prior data, and it does have the specific MSA code needed for this study. Given that December 2014 is in the middle of the 2010 to 2020 period of interest and sufficiently far enough away from the Great Recession to not have the large fluctuations seen during that period, I use that dataset for this study.

The main dependent variable of interest in this study is Return on Assets (ROA); which is a ratio of net profit to total assets. Almost all assets on a bank's balance sheet are the loans extended to borrowers and the owner's equity is a much smaller percentage of assets when compared to traditional businesses, so for banks ROA is a better measure of performance than return on equity. Because about one-third of community banks are Type-S corporations (FDIC, 2012), where the bank does not pay income tax but passthrough those profits to shareholders who pay the income tax as individuals, pre-tax ROA, FDIC variable *roaptx*, is used to measure Type-S and Type-C banks on an equivalent measure. I also examine the main variables contributing to ROA in the banking industry as dependent variables. Banks generate income by taking in deposits from customers and then lending it out to borrowers. The difference in the interest paid to depositors and the interest charged to borrowers is known as the Net Interest Margin, FDIC variable *nimy* with the *y* indicating the annualized value as opposed to the quarterly value. Banks also generate non-interest income from fees charged for services such as overdraft fees, fees for wire transfers, or letters of credit and this is FDIC variable *noniiay*. Like all businesses, banks pay employees, rent, and operational costs, and things like insurance. These are non-interest expenses, FDIC variable *nonixay*.

The dataset contains 6,518 banks. Since this study focuses on community banks, I dropped 481 non-community banks with the value of 0 in the variable CB which denotes if a bank meets the FDIC definition of a community bank. The FDIC dataset contains a field (*cbsa_metro*) with the government assigned metropolitan statistical area (MSA) code for banks located in one. If the field is null, it is a rural bank. I used this field to populate a new variable *rural_metro_fmetro* with 1 for rural banks and 2 for metropolitan banks. I then used a list of the MSA codes for the Top 20 fastest growing metropolitan areas from the 2020 Census to replace *rural_metro_fmetro* with 3 for those 20 MSAs. This resulted in *rural*=1, *metro*=2, and *fmetro*=3. From summary data, rural makeup 47.5% with metro constituting 45.8% and fast growing metros (fmetro) from those 20 metro areas representing only 6.6% of all community banks.

Using the STATA summary command, I viewed a summary of the variables of interest and identified minimum and maximum values that were extremely out of the expected range. Because these are ratio values, this occurs with new banks, called *de novo* banks, failing banks, and can also be the result of data errors. For example, while one expects minimum and maximum values

in a range of negative to positive low double digits, there were maximum values between 300 and 500. I first dropped 26 *de novo* banks that started after 2009 and then dropped 2 banks that had values over 25 for ROAPTX. This resulted in 6009 observations with minimum and maximum values that fall within the expected ranges and Table 1provides the summary values.

Econometric Model

I first review the summary data for the variables sorted by category, see Table 1.

Table 1				
Summary Data				
Rural Banks				
Variable	Mean	Std. Dev.	Min	Max
roaptx	1.094549	0.758344	-6.48334	12.08246
nimy	3.694875	0.731275	0.304466	9.045261
noniiay	0.641451	1.023456	-1.10461	41.09481
nonixay	2.85046	1.10367	0.33536	39.92768
Metro not Fast Growing				
Variable	Mean	Std. Dev.	Min	Max
roaptx	0.87638	0.965497	-9.42628	7.852003
nimy	3.638243	0.81361	0.121266	14.36196
noniiay	0.792428	1.543881	-2.43719	38.45153
nonixay	3.175234	1.603931	0.146892	38.16859
Fast Growing Metro Areas				
Variable	Mean	Std. Dev.	Min	Max
roaptx	0.962454	1.226437	-7.67198	11.42867
nimy	3.945849	0.959267	0.1484	11.17814
noniiay	0.921839	1.775414	-0.55404	23.65819
nonixay	3.485738	2.235913	0.128972	34.48099

I then regress *nimy*, *noniiay*, *nonixay* and *rural_metro_fmetro* on *roaptx* and check for heteroskedasticity by plotting the residuals and running the Breusch-Pagan test using the STATA *estat hettest* command. The plot shows the residuals tightly grouped and the result of the Breusch-Pagan test ($X^2(1)=1031.03$, $p=0.000$) indicate that one cannot reject the null hypothesis of constant variance.

Figure 1.
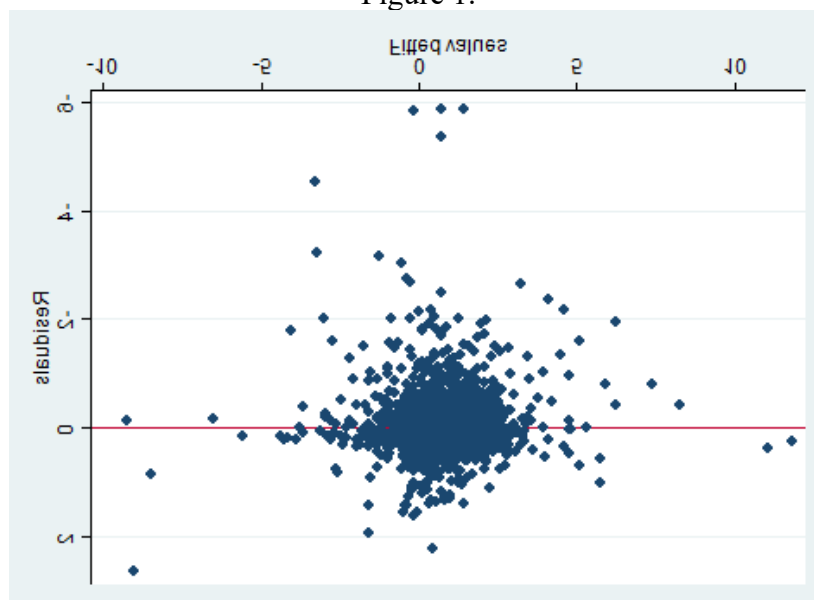
Therefore, for the analysis I run the regression with the robust option.

Eq. 1.: $roaptx = \beta_0 nimy_i + \beta_1 noniiay_i + \beta_2 nonixay_i + \beta_3 rural\_metro\_fmetro + \alpha$

RESULTS

The signs of the coefficients are as expected. Both *nimy* and *noniiay* are positive because they are income and have a positive contribution to *roaptx* while expenses, *nonixay*, reduces *roaptx*. Although the positive coefficients for both MCBs and FGMCBs is positive, indicating higher roaptx than RCBs, neither coefficient is statistically significant at the 5% level. Therefore, the conclusion is that FGMCBs do not perform better than RCBs.

A review off the summary values of the variables provides some insight. They reveal that income, both the net interest margins (nimy) and non-interest income (noniiay), are higher for FGMCBs than both RCBs and MCBs. However, the non-interest expenses (nonixay) are also higher for FGMCBs. The variable roaptx is a ratio of net income to assets. Since net income is income minus expenses, if the expenses of FGMCBs proportionally equally or exceed the expenses of RCBs or MCBs then they will offset the additional income.

Table 2						
Robust Linear Regression Results						
roaptx	Coef.	Rob. Std. Err.	t	P>t	[95% Conf. Interval]	
nimy	0.802924	0.0132081	60.79	0	0.777032	0.828817
noniiay	0.987902	0.0137132	72.04	0	0.961019	1.014785
nonixay	-1.01637	0.0137282	-74.03	0	-1.04328	-0.98945
rural_metro_fmetro						
2	0.008242	0.009522	0.87	0.387	-0.01042	0.026908
3	0.035072	0.0181914	1.93	0.054	-0.00059	0.070733
_cons	0.391267	0.0410337	9.54	0	0.310826	0.471708
Obs.	6009	F(5, 603)	1331	R-Squared	0.8504	

CONCLUSION

The results indicate that community banks in fast growing metropolitan areas do not outperform community banks operating in rural communities. The summary data indicates that, on average, the income variables (*nimy*, *noniiay*) for community banks in the fastest growing metropolitan areas are higher than those for both rural community banks and banks in the other US metropolitan areas. However, the same is true for expenses. Therefore, the higher expenses offset those increases in income for interest and fees. Given the publicity about the extraordinary increases in both real estate and labor cost in the fast growing Texas cities of Austin, Dallas, Houston, and San Antonio, all of which are among the fastest growing US metros of the last decade with Austin being number one, it is not surprising that it costs more to operate a bank in a fast growing metropolitan areas. Banks require an educated work force trained in accounting, finance, and information systems and these are the same skills that the firms leading the economic expansion in those cities require and this drives wages higher. Banks also need branches near the areas where the new businesses build and the employees live, so it requires rent or investment in the high-cost areas of the city.

This study uses data from the 2014 calendar year; therefore, these results may not be representative of the entire period from 2010 through 2020. A future study should cover that entire period. Beyond performance based on ROA, the summary data indicating that FGMCBs have higher net interest margins raises another possibility for future research. Rates paid for deposits do not normally fluctuate greatly across banks; however, interest rates charged for loans vary based on risk. Are the FGMCBs increasing their net interest margins by making higher risk loans?

REFERENCES

FDIC CBS. (2012). FDIC Community Banking Study. Washington D.C.: Federal Deposit
 Insurance Corporation.

FDIC CBS. (2020). FDIC Community Banking Study. Washington D.C.: Federal Deposit
 Insurance Corporation.

Magee, L. (2007). F tests and t test with Dummy Variables. Retrieved from:
        https://socialsciences.mcmaster.ca/magee/761_762/Stata%20Examples/F%20test%20handout.pdf

Morrison, R. & Escobari, D. (2020). US community bank profitability: A cross-sectional and
        dynamic panel analysis of rural and metropolitan banks. Global Journal of Accounting and Finance,
4(1), 158-177.

A REVIEW OF MACHINE LEARNING APPLICATIONS: EMERGING TRENDS AND CHALLENGES IN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

This paper examines Machine Learning's role in supply chain management, including emerging trends, applications, and implementation challenges in a business context. It explores Machine Learning applications across various supply chain functions: demand planning, inventory management, route optimization, supplier selection, and risk management, drawing from both literature and real-world examples. In addition to discussing applications, the paper addresses implementation barriers, managerial implications, and research challenges that hinder its business adoption. Machine Learning's relationship with supply chain management gives rise to key propositions: digitization and Big Data driving its advancement, Machine Learning technology surpassing traditional methods, and evaluation of implementation costs and entry barriers. These propositions find support in academic and business contexts. This paper serves as a literature review, outlining Machine Learning's current status in business applications, identifying gaps, and emphasizing its necessity to streamline diverse supply chain processes.

INTRODUCTION

The business landscape has undergone significant transformation due to the digital age, giving rise to powerful forces that shape it. In the 21st century, the prominence of big data has become crucial, with modern firms accumulating more data than they can effectively manage. To make sense of this deluge of information, modern businesses and supply chains are increasingly integrating Machine Learning (ML). This involves leveraging artificial intelligence and statistical modeling to process vast datasets and unveil hidden patterns (Barzizza 2023). ML algorithms hold remarkable capabilities, automating descriptive, prescriptive, and predictive analytics processes (Barzizza 2023). Notably, ML surpasses human capacity in performing complex analyses and predictions with greater accuracy (Tirkolaee 2021; Cadavid 2018). However, despite its potential, the full spectrum of ML's applications remains largely untapped due to its nascent stage (Cadavid 2018; Barzizza 2023). When delving into the fundamentals of ML, its value becomes evident, particularly in enhancing supply chains through improved readability. This pertains especially to collaborative planning, forecasting, and replenishment. ML plays a pivotal role in predicting sales and demand, facilitating replenishment scheduling, and providing insights for informed collaborative strategies. The integration of ML models into these key activities within the Collaborative Planning, Forecasting, and Replenishment (CPFR) framework leads to a significant

enhancement in supply chain efficiency and risk mitigation. The predictive power, computational prowess, and automated analytics of ML position it as an indispensable tool for elevating supply chain operations.ML's efficacy in the supply chain is propelled by three influential factors: digitization, the Internet of Things (IoT), and substantial disruptors like COVID-19. IoT has notably addressed the challenge of managing big data by electronically connecting once-static supply chain components and channeling copious data into the ML pipeline. IoT's applicability spans various facets of the supply chain, transmitting measurements, time series data, and manufacturing outputs, among other data types. Meanwhile, digitization has been a steady catalyst for supply chain evolution since the inception of the internet. The advent of COVID-19, coupled with its disruptive impact, spurred an accelerated development of ML capabilities, as seen in the "bullwhip" effect. This literature review aims to shed light on gaps in the existing literature concerning ML adoption, emerging trends, and implementation challenges. In an era characterized by frequent disruptions, ML's predictive capabilities hold the potential to enhance supply chain efficiency. Despite its potential benefits, ML remains underutilized due to implementation costs and a lack of understanding. Moreover, inadequate implementation stemming from insufficient IT infrastructure, organizational buy-in, or subject matter expertise is a common hurdle. The proposition is that increased research and development focused on enhancing ML model accuracy and understanding their collaboration-facilitating potential can empower supply chains to navigate disruptions more effectively. This paper will expound on ML and its relevance to supply chain management, profile pioneering companies in the field, underscore the superiority of ML algorithms and outline the barriers that currently hinder its full realization.

LITERATURE REVIEW

The extant literature is rapidly growing on the use cases for ML in the supply chain (Wenzel 2021; Tirkolaee 2021). Given how innovative this technology is, research has drastically increased in the past decade. ML is said to be a pillar of a future-proof supply chain and an excellent tool for predicting and mitigating disruptions. Growing research highlights ML's ability to augment various factors of the supply chain like supply chain risk, supplier selection/reliability, demand planning, and inventory management (Shroeder 2021; Wenzel 2021; and Aamer 2021).

As the business world evolves, executives are looking for new ways to better serve the customer. ML can help accomplish this goal specifically in supply chain management, by decreasing stock-outs and costs simultaneously. Fierce competition, heightened customer demand, big data, IoT, and an ever-growing need to produce more supply chain efficiency and sustainability are creating an environment for ML to flourish (Tirkolaee 2021; Barzizza 2023; Aamer 2021 and Wenzel 2021). The current landscape is filled with the application of ML in the supply chain, 78% of companies are using ML in areas like demand planning, routing, supplier selection, risk mitigation, and warehouse management (Taylor 2023).

Large corporations like Target, Walmart, and Amazon are leading the space with tools developed in-house, but companies like Amazon, IBM, and Google offer third-party solutions (Ashcroft 2023; Verma 2022). An increasingly competitive market means meeting the heightened demands of the modern consumer, which is exactly why Target has invested $100M into its supply

chain (Zimmerman 2023). These companies are constantly searching for new and innovative supply chain solutions and ML is the answer (Monaghan 2023). ML is significantly more accurate and autonomous, which could replace knowledge workers with less error (Aamer 2021). A unique aspect of an ML model is it can be trained, deployed, updated, or iterated on as needed to suit business needs (Sacolick 2023). PepsiCo for example, utilizes predictive ML models to manage stockout events and trigger replenishment (Olavsrud 2022).

ML provides companies with an important and valuable trait, supply chain visibility (Woodie 2022). This visibility is a serious component of the AWS offering mentioned earlier, Amazon has found a way to use its ML software to harmonize different silos of data, allowing for better collaboration within a supply chain (Woodie 2022). Innovations such as these have led to unprecedented accuracy in things like forecasting, inventory management, and supply chain visibility (Verma 2022; Woodie 2022; Olavsrud 2022). Businesses leveraging ML benefit greatly from sharing data, as the more data an ML model is fed, the more accurate it potentially becomes (Hanavec 2023). These two aspects aren't all, as ML is viewed by 50% of executives as a way to create a more resilient and robust supply chain (Howells 2023).

ML handles Big Data far better than humans (Tirkolaee 2021; Barzizza 2023). Big Data has come as a result of supply chain 4.0 and digitization, producing data faster and more abundantly than ever before, so much so that the current non-ML-powered analytical tools cannot keep up (Tirkolaee 2021; Barzizza 2023). When looking at current ML models being used, a software suite used by UPS crawls 5.3 petabytes per week (Olavsrud 2022). A petabyte is 1024 terabytes worth of information, or 1 million gigabytes (Olavsrud 2022). This flood of data has been overwhelming but with intelligent ML integration a company can find new ways to improve their offering. The large volume of data proves incredibly difficult for modern businesses to handle and analyze when using traditional methods (Tirkolaee 2021). The following proposition is offered in regards to ML and its unique advantage regarding Big Data:

> **P1:** *As supply chains increase in complexity ML technology is likely to be needed to help handle large volumes of data.*
>
> **P1a:** *Current methods of analysis are human-powered and cannot learn from or handle large amounts of data.*
>
> **P1b:** *ML technology is automated and can learn from large amounts of data.*

The relationship between Big Data and ML is interdependent and must be facilitated by the entire organization (Hanavec 2023). While businesses have access to unprecedented amounts of data, data quality continues to be a problem (Barzizza 2023; Wenzel 2023). When addressing data quality, the largest problem is data that is presenting misinformation or incomplete, also known as dirty data (Curoe 2021). Dirty data can include extreme outliers, redundant features, missing values, or incorrect formatting (Curoe 2021; Wenzel 2023). Dirty data can derail an ML approach and result in poorly informed decisions (Wuest 2016). This point further emphasizes the importance of collaboration to encourage the flow of clean data, and as a result, make ML a powerful part of a supply chain strategy (Hanavec 2023).

Supply chains continue to face Big Data head-on and their success is dependent on ML, as 78% utilize AI or ML technology (Taylor 2023). ML is unique in its handling of highly dimensional and complex data to solve difficult problems (Wuest 2016). The availability of Big Data has been synergistic in driving innovation surrounding ML technologies (Wuest 2016). Big Data is a computer-generated and dominated phenomenon, as high-powered computers are needed to handle the volume, velocity, and variety of information (Barzizza 2023).

Along with handling large amounts of data, ML does so with superior efficiency and accuracy (Barzizza 2023; Aamer 2021; Cadavid 2018; and Monaghan 2023).

With such an abundance of data, ML is being used for far more than demand planning and inventory management (Gupta 2023). Models are now making previously intuition-driven decisions like supplier selection, routing, and evaluating supply chain risk (Tirkolaee 2021). With enough creativity and subject matter expertise, even more impressive uses of ML have been developed, such as Project44's Movement GPT (Project44 2023). This technology was developed with enormous amounts of context-specific high-quality data, being trained on data from 1 billion shipments across the globe (Project44 2023). Movement GPT and this new generation of ML innovation are positioned to augment existing supply chain systems as they work towards an autonomous supply chain (Project44 2023). Movement GPT is unlike other innovations in the space, it is positioning itself to be an AI assistant that can consult on supply chain problems (Project44 2023). Generative AI such as Movement GPT gives a glimpse into the future of ML and AI in business, specifically an autonomous supply chain (Project44 2023). GPTs such as Movement are incredibly powerful and require lots of resources to develop (Project44 2023). Movement GPT was built using an ML model called a neural network, in which there are thousands of artificial "neurons" that represent basic mathematical functions (Muehmel 2023). These neurons are linked on a weighted scale, and this model is built and trained on the data, which provides the result, Movement GPT (Muehmel 2023). Large language models like Movement GPT are unique in the sense they can answer questions, they use historical data to form sentences with proper grammar (Muehmel 2023). GPT and large language models are the epitome of complex ML technology, as their neural networks are comprised of millions of neurons and billions of connections, with a unique architecture (Muehmel 2023).

GPT's applications to business and potential impact on a firm are monumental (GEP 2016; Newton 2023). GPT can automate email exchange, perform data analysis similar to other ML models, and even provide customer support in real time in a multitude of languages (Newton 2023). GPT can provide stakeholders with key information surrounding supply chain visibility, data visualizations, and generating reports in a more user-friendly manner (GEP 2023). GPT harbors many benefits but has a few key downsides hindering its use (Rampton 2023; Wen 2023). One of the biggest downsides is not being able to verify GPT's output as unbiased and accurate (Rampton 2023; Wen 2023). In addition, GPT can only provide a certain amount of granularity in its answers, which will hinder its ability to solve problems (Rampton 2023). Lastly, GPT cannot interpret context similarly to other ML technologies, meaning it may confidently provide an incorrect or irrelevant answer to queries (Rampton 2023).

A key component of GPT is the communication it offers, as it delivers all of the same benefits of traditional ML technologies, but is far easier to access by both the supply chain

professional and customer (Armisael 2023; GEP 2023). GPT streamlines knowledge sharing, and communication across cultures, and will likely lead to freeing up human workers to focus on more complex tasks (Armisael 2023). In a way, GPT represents the power of ML technology when barriers to entry are stripped away such as having resources the subject matter expertise to build a model.

With the benefits of ML integration being quite clear in the literature, companies like Amazon Web Service and Aera Technology are now offering third-party ML-powered applications to handle simple reporting and analytics as well as assist in complex decision-making (Banker 2023). Aera Technology has been developing ML to be used for "decision intelligence." These decision-making algorithms represent a fast-growing ML sector of tailored third-party offerings (Banker 2023). Aera Technology combines domain knowledge with a custom solution to solve a variety of business problems (Banker 2023). This is an important step by Aera to increase the effectiveness of their technologies and reduce the risk of developing an inaccurate model (Banker 2023; Wenzel 2021). To illustrate the gap in the power of ML methods and traditional analytics, the following proposition is provided:

> *P2: With intelligent ML deployment, various aspects of the supply chain will be augmented, beyond what current methods such as time series forecasting, and heuristic grid models can provide.*

> *P2a: Traditional analyses like time series methods and heuristic grids are not easily adapted to complex problem-solving, gathering, and processing large amounts of data; making them obsolete for modern supply chains.*

> *P2b: ML technology is likely better suited for supply chain management due to its ability to process Big Data and its applications in routing, demand planning, inventory management, risk management, and supplier selection.*

ML has been found to increase demand forecast accuracy across a multitude of industries and be less computationally expensive (Aamer 2021). It was also found that when combined across various service sectors and healthcare ML could provide better collaborative planning, forecasting, replenishment, and responsiveness to events like COVID-19 (Aamer 2021). Big supply chains are catching the trend, Amazon Web Service now offers a third-party ML software suite, illustrating a need (Woodie 2022). Not only that, but these ML systems are showing the potential to make better decisions than trained human counterparts (Banker 2023). It is noted that ML technologies are underutilized in various sectors; namely services and agriculture, two places they show incredible potential (Aamer 2021). When applied to agriculture, ML shows great promise for forecasting demand, which doubles as a sustainability initiative due to reducing waste (Aamer 2021). Unknown disruptions like COVID-19 caused a huge uptick in the development of more complex data-driven supply chain solutions from companies such as Walmart, Kraft-Heinz, and Kroger (Verma 2022). ML deployment has revolutionized inventory management, with Walmart reporting it increased its forecasting accuracy to nearly 90% (Verma 2022). Walmart accredits this improvement to ML technology as it pulls in variables such as weather data to predict pie sales (Verma 2022). This is a common theme to be found in the supply chain and ML relationship, faster and more accurate replenishment resulting in massively increased efficiency (Aamer 2021).

ML harbors various limitations and roadblocks including the unpredictable nature of supply chains, lack of personnel training, over-fitting or under-fitting of ML models, poor data quality, and incorrect model selection (Wenzel 2021). A huge issue unique to ML models is choosing the incorrect model, overfitting, or underfitting a model (Wenzel 2021). In development, overfitting or underfitting both lead to inaccurate predictions, as the model is overfitted to the training data and is biased to that dataset, or the model is underfitted and too general in its assumptions (Wenzel 2021).

ML's full potential is currently hampered due to its complex nature and the lack of knowledge in this emerging field (Barzizza 2023). Another thing holding ML back is the lack of information sharing and collaboration between departments or supply chain partners (Hanavec 2023). Notably, ML is incredibly expensive to implement, needs to be strategically aligned, outputs interpretable results and sophisticated IT infrastructure is required (Barzizza 2023). Lastly, ML is interdisciplinary and requires lots of collaboration to generate the proper insights from various departments; Mathematics, Computer Science, and various Engineering disciplines share involvement (Wuest 2016). With these barriers between businesses and this powerful technology, it is clear that ML is a demanding endeavor and a high-risk/high-reward business tool, which entices the following proposition:

> **Proposition 3:** *Given the amount of capital, subject matter expertise and IT infrastructure required, ML is likely to be harder to implement than traditional analytical methods.*
>
> **P3a:** *ML is incredibly difficult to implement and harbors high cost/risk to establish.*
>
> **P3b:** *The cost of not implementing ML would harm the business far more due to losses in efficiency.*

To better grasp the concepts related to Supply Chain and ML the following table is provided. The terms section lists terminology used throughout the paper that intersects between the two areas. The pro/con sections are used to list the benefits and drawbacks these frameworks, technologies, and tools have on supply chain management.

Table 1 is not only used to gain a better understanding of currently established supply chain management but also describes the Pros and Cons of different areas of ML about supply chain management. The table is important to understand that there is no one-size-fits-all solution for every business, and different frameworks, technologies, and tools have related benefits, implications, and interactions with ML.

Table 1 highlights many different factors affecting a company's decisions to utilize ML for supply chain management. Two of the most prominent issues with the implementation of ML include the models being naïve to the context of many problems and the large resources needed to implement such a change are large. ML does not just require large amounts of capital, but it also requires collaboration, large amounts of high-quality data, adequate information technology infrastructure, and skilled personnel (Baier 2019; Barzizza 2023; Hanavec 2023; Wenzel 2021 and Wuest 2016). This commonality places further emphasis on the risk taken in implementing ML technologies, executives must decide if the potential benefit outweighs the high risk (Wenzel 2021). As the literature continues to grow, the risk of ML implementation will become less daunting (Barzizza 2023).

ML has been found to increase efficiency of the supply chain operations in areas like supplier selection, supplier segmentation, supply chain risk prediction and mitigation, demand planning, inventory management, transportation, sustainable initiatives, and circular economy (Tirkolaee 2021). The proposed way forward is to utilize ML to augment existing collaborative planning, forecasting, and replenishment practices in a supply chain, as it shows tremendous promise in this area (Cadavid 2018). While ML has numerous barriers to entry, the hope is that many of these are overcome due to the developing research (Barzizza 2023). The incredibly accurate predictions of a well-trained model can facilitate collaboration that we otherwise cannot achieve (Wenzel 2021). Through the integration of machine learning, high-level collaboration is enabled, forecast accuracy is enhanced, and inventory management becomes more robust. The hope is that as ML continues to drive innovation more companies will be able to properly roll out ML technology. The connection between usable ML case studies for companies to understand ML applications is barren in the literature, meaning a lack of understanding halts further development and use (Barzizza 2023).

TABLE 1 – SUPPLY CHAIN AND ML TERMINOLOGY

Terms	Pros	Cons
CPFR	Increase efficiency of key supply chain activities (planning, forecasting, and replenishment)	Relies heavily on collaboration, communication, and high-quality data access
ML Software Suites (Third Party Provider)	Powerful predictions and insights, less resource-intensive than in-house models	Not as powerful as custom fit solutions, not a one-size-fits-all all solution
IoT	Capture lots of data and increase supply chain visibility	Requires lots of capital and a means of processing and analyzing data.
Supply Chain Responsiveness	Increased ability to respond to disruption	Requires capital, data, planning, and collaboration
IT Infrastructure	Increase efficiency and collaboration of supply chain, allow for sharing of data, allow for easier rollout of new technologies.	Requires lots of capital, skilled professionals, and high levels of collaboration/communication.
Supervised Learning	Draw accurate insights on past data, very interpretable output, and the easiest to implement	Use-cases are limited to numerical data and must use past data which can make data access a challenge, and very easy to under or overfit.
Unsupervised Learning	Draw accurate insights on data that is not labeled. Is not limited to numerical data, use cases are much more vast.	Output is less interpretable, more complex models that are hard to understand and harder to implement.

Source: Aamer (2021), Banker (2023), Barzizza (2023), Hanavec (2023), Jenkins (2023), Shroeder (2021), Verma (2022), Wenzel (2021), Wuest (2016)

MANAGERIAL AND RESEARCH IMPLICATIONS

The extant literature illustrates that ML is a sound solution for dealing with Big Data and is synergistic with both Big Data and the digitized modern supply chain (Barzizza 2023; Cadavid 2018; Gupta 2023; and Monaghan 2023). ML provides enhanced supply chain visibility and enables high levels of collaboration among business partners and between supply chains (Hanavec 2023; Wuest 2016). ML has thus far proved itself to be an innovative business tool, especially when supported with the proper IT infrastructure (Baier 2019; Barzizza 2023). ML deployment and continued development are incredibly resource-intensive, which is why many supply chains haven't gotten on board (Baier 2019). Even a company with adequate capital, IT infrastructure, and large amounts of high-quality data could be limited by the subject matter expertise of its workforce and the number of departments involved in model development (Baier 2019; Wuest 2016). This development has led many companies to outsource this capability using offerings developed by AWS and others (Banker 2023; Project44; and Woodie 2022). Unfortunately, the difficulty of implementation only serves as another reason why ML is often neglected as an alternative to less accurate traditional methods surrounding forecasting sales or demand, supplier selection, route optimization, and inventory management (Aamer 2018; Shroeder 2021; Szopa 2023; Tirkolaee 2021). The neglect of this technology is a crucial mistake, as companies are missing out on more intelligent decision-making, lower labor costs in the long term, incredibly accurate predictions, and an increase in supply chain visibility (Aamer 2018; Banker 2023; Olavsrud 2022; Szopa 2023; Verma 2022).

Given how new ML is in regard to supply chain management, the current body of research is only a decade old. Regardless, new innovative use cases are convincing more companies to make the switch (Jenkins 2021; Olavsrud 2022; Taylor 2023; Woodie 2022; and Zimmerman 2023). ML has been well-researched in certain areas of forecasting, supplier selection, supply chain risk mitigation, and inventory management. However, the use of ML in certain industries such as agriculture, healthcare, or renewable energy has yet to be fully actualized, this is due to a lack of data analytics focus (Aamer 2021; Tirkolaee 2021). Seeing how applying different algorithms to industry-specific issues in the service sector would further ML adoption. A lack of adoption also stems from a huge gap in ML education and the absence of subject matter experts (Barzizza 2023; Sacolick 2023).

ML is affected by numerous limitations that currently hamper its development as a business tool. Executives are hesitant to make the upfront investment in the personnel, resources, and time required for model development (Sacolick 2023). It is left up to data professionals to put complicated concepts regarding model development into simple-to-understand terminology to gain executive support (Sacolick 2023). This is likely the largest barrier ML faces today, as there is a lack of trust in all stages of the ML life cycle (Baier 2019; Sacolick 2023). Executives have trouble placing trust in these new technologies, as the investment before seeing business value is so large, and even after development, 67% say they do not feel comfortable with results or decisions made by ML (Thurai 2022). This lack of trust pervades the business landscape, as 42%

of data scientists reported their findings aren't considered by business leaders (Thurai 2022). This lack of trust in ML at all levels is likely the biggest implication for the evolution of the industry.

Data drift is another common phenomenon derailing many ML projects, specifically, data deriving from the COVID-19 pandemic (Sacolick 2023). Different from over or undertraining a model, data drift perfectly encapsulates the perishability of ML models, as times can change drastically and completely invalidate an otherwise high-performing model (Sacolick 2023). Changing economic tides and consumer behaviors often cannot be foreseen, which is a key contributor to data drift (Sacolick 2023).

Ongoing validation is a challenge faced by ML professionals when testing and deploying models (Baier 2019). ML professionals must continue to ensure their results are accurate using manual sanity checks, which are a combined effort between data personnel and subject matter experts (Baier 2019). An example of a sanity check would be developing a confusion matrix to evaluate model performance (Brock 2019).

Model validation is an ongoing and iterative process that can be confusing when discussing the autonomous nature of ML models (Baier 2019; Brock 2019). The iterative nature of ML projects and the inevitable degradation of models highlights how labor-intensive they can be (Brock 2019). Regardless, this does not take away from the astounding power of ML models in handling large amounts of data and generating valuable insights.

Irrespective of the high cost and risk, ML in a supply chain context will likely continue to vastly improve the customer experience (Siegel 2023). PepsiCo uses ML for CPFR activities due to the cost savings and lowering stock-outs (Olavsrud 2022). Stockouts are a leading cost of lost sales and can even result in a permanently lost customer (Yeung 2023). Supply chain traceability is in high demand, and UPS delivers on this promise with its ML suite called Harmonized Enterprise Analytics Tool or HEAT (Olavsrud 2022). HEAT allows UPS and its customers to track and predict the arrival times of packages, it is a highly complex model trained on lots of historical data (Olavsrud 2022). Pfizer underwent a digitized supply chain overhaul, the use of analytics tools and ML allowed for enhanced collaboration, resulting in a more patient-focused supply chain (Olavsrud 2022). These case studies illustrate how ML can vastly improve customer service with lower transit times, and increase supply chain visibility, traceability, and efficiency (Siegel 2023; Olavsrud 2022; Woodie 2022).

The consumer goods space is leading the ML movement with industry giants Proctor & Gamble and Unilever investing heavily in ML technology (Dominguez 2022; Olavsrud 2023). Unilever has multiple highly sophisticated models to streamline a variety of functions such as efficient manufacturing, customer service, and marketing efforts (Olavsrud 2023). While Unilever keeps many of the specifics of their ML technology under wraps, it was disclosed that they utilize AI & and ML for over 300 different use cases across their supply chain and product innovation (Stewart 2023). One such application includes using satellite imagery to detect changes in tree cover in their agricultural supply chain (Stewart 2023). Proctor & Gamble is utilizing ML far more in their supply chain and manufacturing processes, with an emphasis on creating better quality products and sustainable manufacturing practices (Dominguez 2022). The consumer goods industry is primed for ML-driven transformation; as they have large amounts of data, serve a global consumer base and provide a wide variety of products (Dominguez 2022; Olavsrud 2023). Likely,

industries that are "bullish" on ML and Big Data will convince others to follow suit, as Proctor & Gamble trails behind Unilever in their use of ML (Dominguez 2022; Stewart 2023; Olavsrud 2023).

An area seldom explored when discussing ML applications in the supply chain is the facilitation of sustainable practices in industries such as renewable energy and crude oil (Puranik 2023; Tirkolaee 2021). Industries prone to disruption such as crude oil show great potential for ML utilization (Puranik 2023). ML algorithms are being utilized by Exxon to improve operations, reduce waste, predict equipment malfunction, weather forecast, and even more complex processes such as carbon sequestration (Puranik 2023). Demand forecasting applications can reduce food waste and lower costs, this is a vitally important area to research given the current lack of analytics driving business decisions in agriculture (Aamer 2021). Holistically, ML can be a powerful tool in creating sustainable supply chains via optimizing various processes such as transportation planning, forecasting, and benchmark reporting (Stühler 2021). ML is unique in its potential to drive profound innovations sustainably due to its use of data (Stühler 2021). The application of ML cannot be understated as many supply chains are struggling to lower carbon emissions and lack the visibility to enforce sustainable initiatives (Stühler 2021).

Examining the extant literature, ML is well researched when applied to mathematically driven supply chain problems (Aamer 2021; Barzizza 2023; Cadavid 2018; Tirkolaee 2021 and Olavsrud 2022). However, the application of ML technology in more softly structured problems, ones that don't possess definitively correct answers, demands more attention in the research (Tirkolaee 2021). This avenue is not inaccessible, especially with the introduction of large language models like Movement GPT and the aforementioned case study on Aera Technology showing the potential of ML-backed decision intelligence (Banker 2023; Tirkolaee 2021; Siota 2023). Research is needed on picking the correct ML technology for a given problem (Wenzel 2023). The lack of subject matter expertise and large amounts of collaboration needed only further exacerbate this gap in the literature (Baier 2019; Hanavec 2023; Wenzel 2023; Wuest 2016). Lastly, there remains a gap in the literature on the reliability of successful models and ML models providing long-term solutions (Baier 2019). This is a particularly important area to further the use of ML in the supply chain and gain executive trust (Sacolick 2023; Thurai 2022).

REFERENCES

Armisael. (2023, June 12). *Chat GPT: Impactful communication*. Medium. https://medium.com/@cartierBUGATTI/chat-gpt-impactful-communication-b90f5fcbf5b8

Banker, S. (2023, March 31). *Is the "Autonomous Supply Chain" A pipe dream?* Forbes. https://www.forbes.com/sites/stevebanker/2023/03/24/is-the-autonomous-supply-chain-a-pipe-dream/?sh=ee5af95feacf

Baier, L., Jöhren, F., & Seebacher, S. (2019a). Challenges in the Deployment and Operation of Machine Learning in Practice. *ECIS 2019*, *27th European Conference on Information Systems*.1-15.

Barzizza, E., Biasetton, N., Ceccato, R., & Salmaso, L. (2023). Big Data Analytics and machine learning in Supply Chain 4.0: A literature review. *Stats*, *6*(2), 596–616. https://doi.org/10.3390/stats6020038

Brock, J. (2019, February 8). *Strategies for sanity-checking machine learning models - blackberry*. Blackberry. https://blogs.blackberry.com/en/2019/02/strategies-for-sanity-checking-machine-learning-models

Cocchi, G. (2023, February 8). *The use of machine learning for demand forecasting in a volatile market*. Supply & Demand Chain Executive. https://www.sdcexec.com/software-technology/emerging-

technologies/article/22697822/intuendi-the-use-of-machine-learning-for-demand-forecasting-in-a-volatile-market

Curoe, M. (2021, August 6). *Does your supply chain have dirty data?*. Redwood Logistics. https://www.redwoodlogistics.com/does-your-supply-chain-have-dirty-data/

Dominguez, L. (2022, June 9). *P&G levels up manufacturing with machine learning and ai*. Consumer Goods Technology. https://consumergoods.com/pg-levels-manufacturing-machine-learning-and-ai

Gupta, S. (n.d.). *Benefits of Artificial Intelligence in Supply Chain Management*. nasscom. https://community.nasscom.in/communities/ai-inside/benefits-artificial-intelligence-supply-chain-management

Hanavec, J. (2023, January 4). *Don't Fear open data: Why data sharing helps smooth your supply chain*. Supply & Demand Chain Executive. https://www.sdcexec.com/software-technology/supply-chain-visibility/article/22631324/world-wide-technology-dont-fear-open-data-why-data-sharing-helps-smooth-your-supply-chain

Jenkins, M. (2023, April 5). *Walmart accelerates investment in Supply Chain Technologies*. RIS News. https://risnews.com/walmart-accelerates-investment-supply-chain-technologies

Juan Pablo Usuga Cadavid, Samir Lamouri, Bernard Grabot. Trends in Machine Learning Applied to Demand & Sales Forecasting: A Review. *International Conference on Information Systems, Logistics and Supply Chain*, Jul 2018, Lyon, France. ⟨hal-01881362⟩

Monaghan, J. (2023, March 20). *Council post: Three ways to future-proof your supply chain management*. Forbes. https://www.forbes.com/sites/forbesbusinesscouncil/2023/03/17/three-ways-to-future-proof-your-supply-chain-management/

Mukherjee, A. (2023, May 3). *Machine learning techniques in Supply Chain Management*. Recently Filed RSS. https://www.scmr.com/article/machine_learning_techniques_in_supply_chain_management

Newton, E. (2023, May 18). *6 ways CHATGPT can enhance supply chains*. Digital Commerce 360. https://www.digitalcommerce360.com/2023/05/11/6-ways-chatgpt-can-enhance-supply-chains/

Olavsrud, T. (2022, February 22). *Supply Chain Analytics: 3 success stories*. CIO. https://www.cio.com/article/305002/supply-chain-analytics-3-success-stories.html

Olavsrud, T. (2023, May 19). *Unilever leverages GPT API to deliver business value*. CIO. https://www.cio.com/article/464190/unilever-leverages-chatgpt-to-deliver-business-value.html

Prentezis, A. (2023, June 22). *Ai + SCM: A formula for automation and optimization*. SupplyChainBrain RSS. https://www.supplychainbrain.com/blogs/1-think-tank/post/36704-ai-scm-a-formula-for-automation-and-optimization

Project44 unveils "Movement gpt" providing first-ever... project44. (2023, April 26). https://www.project44.com/press-releases/project44-unveils-movement-gpt-providing-first-ever-generative-ai-assistant-for-supply-chain

Puranik, R. (n.d.). *Machine learning has potential to transform oil and gas industry, says GlobalData*. automation.com. https://www.automation.com/en-us/articles/may-2023/machine-learning-transform-oil-gas-industry, 1-7.

Rampton, J. (2023a, April 27). *The advantages and disadvantages of chatgpt*. Calendar. https://www.calendar.com/blog/the-advantages-and-disadvantages-of-chatgpt/#:~:text=The%20Disadvantages%20of%20ChatGPT,the%20internet%2C%20as%20in%202021.

Sacolick, I. (2023, March 13). *How to explain the machine learning life cycle to business execs*. InfoWorld. https://www.infoworld.com/article/3689701/how-to-explain-the-machine-learning-life-cycle-to-business-execs.html

Schroeder, M., & Lodemann, S. (2021). A systematic investigation of the integration of machine learning into Supply Chain Risk Management. *Logistics*, *5*(3), 62. https://doi.org/10.3390/logistics5030062

Solutions, S. by J. G. (2023, April 24). *A big rethink: Reimagining and Reshaping Supply Chain Planning*. SupplyChainBrain RSS. https://www.supplychainbrain.com/articles/37101-a-big-rethink-reimagining-and-reshaping-supply-chain-planning

Stewart, R. (2023, June 29). *Unilever says the "jury is out" on Generative AI, for now*. Adweek. https://www.adweek.com/brand-marketing/unilever-says-the-jury-is-out-on-generative-ai-for-now/

Stühler, G. (2021, January 19). *Council post: How ai is paving the way for more sustainable supply chains*. Forbes. https://www.forbes.com/sites/forbestechcouncil/2021/01/20/how-ai-is-paving-the-way-for-more-sustainable-supply-chains/

Szopa, D. (2023, June 14). *Supply chain forecasting: The Machine Learning Revolution*. SupplyChainBrain RSS. https://www.supplychainbrain.com/blogs/1-think-tank/post/37259-supply-chain-forecasting-the-machine-learning-revolution

Taylor, G. (2023, May 3). *Disruption scared half of supply chain execs into investing to "weather the storm."* Yahoo! News. https://news.yahoo.com/disruption-scared-half-supply-chain-190121899.html

The impact of CHATGPT on supply chain efficiency and agility. GEP Blogs. (2016, March 18). https://www.gep.com/blog/strategy/impact-of-chatgpt-on-supply-chains

Thurai, A., & McKendrick, J. (2022, March 23). *Overcoming the C-suite's distrust of ai*. Harvard Business Review. https://hbr.org/2022/03/overcoming-the-c-suites-distrust-of-ai

Tirkolaee, E. B., Sadeghi, S., Mooseloo, F. M., Vandchali, H. R., & Aeini, S. (2021). Application of machine learning in Supply Chain Management: A comprehensive overview of the main areas. *Mathematical Problems in Engineering*, *2021*, 1–14. https://doi.org/10.1155/2021/1476043

Verma, P. (2022, November 24). *Sam's Club's AI knows how much Pumpkin Pie you'll eat this holiday*. The Washington Post. https://www.washingtonpost.com/technology/2022/11/24/thanksgiving-pumpkin-pie-ai-walmart-sams-club/

Wen, J., & Wang, W. (2023). The future of chatgpt in academic research and publishing: A commentary for *clinical and Translational Medicine*. *Clinical and Translational Medicine*, *13*(3). https://doi.org/10.1002/ctm2.1207

Woodie, A. (2022, December 5). *Inside AWS's New Supply Chain Planning Offering*. Datanami. https://www.datanami.com/2022/12/05/inside-awss-new-supply-chain-planning-offering/

Wuest, T., Weimer, D., Irgens, C., & Thoben, K.-D. (2016). Machine learning in manufacturing: Advantages, challenges, and applications. *Production & Manufacturing Research*, *4*(1), 23–45. https://doi.org/10.1080/21693277.2016.1192517

Yeung, A. (2023, May 2). *What are stockout costs and how do you avoid them?*. ThoughtSpot. https://www.thoughtspot.com/data-trends/analytics/stockout-costs

Zimmerman, S. (2023, February 22). *Target plans $100M investment to expand next-day delivery*. Supply Chain Dive. https://www.supplychaindive.com/news/target-100m-next-day-delivery-sortation-centers-fulfillment/643256/

FIVE CORPORATE SOCIAL RESPONSIBILITY FACTORS ON EMPLOYEE JOB SATISFACTION: A STUDY OF EMPLOYEE GENERATION DIFFERENCES

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ABSTRACT

This research explored Corporate Social Responsibility (CSR) factors on employee job satisfaction. Our study contributes to the literature by developing a theoretical model and testing the links between five CSR factors of environment, human rights and labor, product responsibility, community engagement, and corporate governance on job satisfaction using multiple regression analysis for Gen X, Gen Y, and Gen Z employees. A survey was distributed to 621 working employees aged 18-55 through Amazon Mechanical Turk and college students in a public university, resulting in the sample data (N = 546). Findings identified CSR significance on job satisfaction were the environment, human rights and labor, and product responsibility for Gen X; for Gen Y, human rights and labor, product responsibility, and environment for Gen Z, human rights and labor and environment. Community engagement and corporate governance-related CSR factors were not significantly related to job satisfaction for the three generations. The research provided insight into which CSR variables impact job satisfaction most and what CSR initiatives were valued most by Gen X, Y, and Z.

Key words: Job Satisfaction, Corporate Social Responsibility, Employee Generations, Environment, Human Rights and Labor, Product Responsibility, Community Engagement, Corporate Governance

INTRODUCTION

The growing awareness of corporate social responsibility (CSR) has raised questions about how the behavior of firms may affect employees' job satisfaction. Job satisfaction can be defined as the emotional state of individuals, resulting from their perception of their job and the degree to which there is a good fit between individuals and the organization (Jehanzeb & Mohanty, 2018).

Employee job satisfaction influences organizational commitment, motivation, and productivity and increases employee creativity. Furthermore, job satisfaction improves cost-effectiveness and corporate profits. Therefore, a satisfied employee can help the organization achieve its internal and external strategic goals (Jehanzeb & Mohanty, 2018).This study examined the impact, order of significance, and differences of five CSR factors: Environment, Human Rights and Labor, Product Responsibility, Community Engagement, and Corporate Governance between Baby Boomers, Gen X, Y, and Z, on job satisfaction.

Studies have shown that when employees and organizations share common values and beliefs, positive behavior will occur through improved organizational commitment, lessened turnover rates, and improved task performance. CSR has positively affected employee attitudes and work-related behaviors (Wisse, 2014). Jehanzeb and Mohanty (2018) determined that employee commitment, workplace harmony, productivity, creativity, and innovation positively correlate with job satisfaction.

Research studies have identified the positive impact of each independent CSR factor of environment-related, human rights and labor, product-responsibility, community engagement, and governance on employee job satisfaction (Akabanda et al., 2017; 2019; Frey et al., 2013; Lewin et al., 2020; Marshall, 2020; Mascarenhas et al., 2020; Newsham et al., 2018; Pinzone et al., 2019; Regmi et al., 2009; Sharma & Mani, 2012; Singhapakdi et al., 2019). In addition, researchers have identified Baby Boomers, Gen X, Gen Y, and Gen Z generational differences in each independent CSR factor of environment-related, human rights and labor, product-responsibility, community engagement, and governance CSR factors on employee job satisfaction (Al-Tawil et al., 2021; Becchetti et al., 2017; Cunha da Silva et al., 2015; Jain, 2018; Lup & Booth, 2019; Ng & Salamzadeh, 2020; McGlone et al., 2011; Partouche et al., 2020; Reisenwitz & Iyer, 2009; Shams et al., 2020; Tafolli & Grabner-Krauter, 2020; Valentine & Godkin, 2016; Wisse et al., 2018; Xie et al., 2020; Zainee & Puteh, 2020).

However, few research studies have explored how all five factors combined– environment, human rights and labor, product responsibility, community engagement, and corporate governance-related CSR- affect employees' job satisfaction. Furthermore, few studies have examined the differences of such impacts of the five factors among three generations – Gen X, Gen Y, and Gen Z employees.

Five central hypotheses were developed based on the reviewed literature to create a survey instrument aligned with the hypotheses. We use regression analysis to perform statistical analysis on the survey data collected from Amazon Mechanical Turk in August 2020 and college students in a public university. The empirical study investigated the impact of five CSR factors on employee job satisfaction and the generational differences in employees' job satisfaction regarding the five CSR factors. The findings of this research add to the body of knowledge in management literature and can assist organizations with prioritizing CSR factors that impact employee job satisfaction across generations.

REFERENCES

Akabanda, F., Hlortsi, E., & Owusu-Kwarteng, J. (2017). Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. *BMC Public Health*, *17*(40), 1-9. DOI:10.1186/s12889-016-3986-9

Al-Tawil, T. N., Gantasala, V. P. & Younies, H. (2021). Labour-friendly practices and value maximization: A SEM approach. *International Journal of Law and Management*, *63*(5), 498-516. DOI: 10.1108/IJLMA-12-2020-0320

Becchetti, L., Semplici, L., & Tridente, M. (2018). The taste for corporate responsibility: Heterogeneity and consensus around CR indicators. *Social Indicators Research, 140*(1), 393-433. DOI: 10.1007/s11205-017-1749-3

Chan, T., & Mohd Hasan, N. A. (2019). Predicting factors of ethical and discretionary dimensions of corporate social responsibility and employees' job satisfaction in a Malaysian public university. *International Journal of Business and Society, 20*(3), 949-967.

Cunha da Silva, R., Dutra, J. S., Veloso, E. F., Fischer, A. L., & Trevisan, L. N. (2015). Generational perceptions and their influences on organizational commitment. *Management Research: The Journal of the Iberoamerican Academy of Management, 13*(1), 5-30. DOI: 10.1108/MRJIAM-12-2013-0537

Davidescu, A. A., Apostu, A., Paul, A., & Casuneanu, I. (2020). Work flexibility, job satisfaction, and job performance among Romanian employees — Implications for sustainable human resource management. *Sustainability, 12*(15), 1-53. DOI: 10.3390/su12156086

Frey, R. V., Bayon, T., & Totzek, D. (2013). How customer satisfaction affects employee satisfaction and retention in a professional services context. *Journal of Service Research, 16*(4), 503-517. DOI: 10.1177/1094670513490236

Global Reporting Initiative (GRI). (2012). Global Reporting Initiative Sustainability Report 2010/11. Retrieved June 5, 2020 from https://www.globalreporting.org/resourcelibrary/GRI-Sustainability-Report-2010- 2011.pdf

Harvey, J., Erdos, G., Bolam, H., Cox, M. A., Kennedy, J. N., & Gregory, D. T. (2002). An analysis of safety culture attitudes in a highly regulated environment. *Work & Stress*, *16*(1), 18–36. DOI: 10.1080/02678370110113226

Jain, P., & Dahima, V. S. (2015). Job satisfaction of employees working in power industry – a study of Guru Gobind Singh Super Thermal Plant in India. *Pranjana: The Journal of Management Awareness*, *18*(2), 38-51. DOI: 10.5958/0974-0945.2015.00011.4

Jain, D. (2018). The influence of demographic factors on the satisfaction level of hospitality employees with special reference to age, marital status and gender diversity. *The IUP Journal of Organizational Behavior, 17*(2)*, 53-64.

Jehanzeb, K., & Mohanty, J. (2018). Impact of employee development on job satisfaction and organizational commitment: Person-organization fit as moderator. *International Journal of Training and Development, 22*(3), 171-191. DOI: 10.1111/ijtd.12127

Kennedy, P. (2003). *A guide to econometrics*. MIT Press.

Lewin, L. D., Warren, D. E., & AlSuwaidi, M. (2020). Does CSR make better citizens? The influence of employee CSR programs on employee societal citizenship behavior outside of work. *Business and Society Review*, *125*(3), 271–288. DOI: 10.1111/basr.12212

Lup, D., & Booth, J. E. (2019). Work and volunteering: Longitudinal relationships between work-related experiences and volunteering behaviour. *British Journal of Industrial Relations*, *57*(3), 599–623. DOI: 10.1111/bjir.12421

Marshall, C. (2020). Analysis of a comprehensive wellness program's impact on job satisfaction in the workplace. *International Hospitality Review*, *34*(2), 221–241. DOI: 10.1108/IHR-05-2020-0014

Mascarenhas, C., Mendes, L., Marques, C., & Galvao, A. (2020). Exploring CSR's influence on employees' attitudes and behaviours in higher education. *Sustainability Accounting, Management and Policy Journal, 11*(4), 653-678. DOI: 10.1108/SAMPJ-04-2018-0101

McGlone, T., Spain, J. W., & McGlone, V. (2011). Corporate social responsibility and the millennials. *Journal of Education for Business*, *86*(4), 195–200. DOI: 10.1080/08832323.2010.502912

Newsham, G. R., Veitch, J. A., & Hu, Y. (2018). Effect of green building certification on organizational productivity metrics. *Building Research & Information, 46*(7), 755-766.

Ng, Y. N., & Salamzadeh, Y. (2020). The impact of ethical leadership on the intention to stay among the Generation Y workforce of MNCs in Penang, Malaysia: Mediating role of employee rewards. *International Journal of Business Science and Applied Management, 15*(2).

Partouche, J., Vessal, S., Khelladi, I., Castellano, S., & Sakka, G. (2020). Effects of cause-related marketing campaigns on consumer purchase behavior among French millennials. *International Marketing Review*, *37*(5), 923-943. DOI: 10.1108/IMR-12-2018-0348

Pinzone, M., Guerci, M., Lettieri, E., & Huisingh, D. (2019). Effects of 'green' training on pro-environmental behaviors and job satisfaction: Evidence from the Italian healthcare sector. *Journal of Cleaner Production, 226*, 221-232. DOI: 10.1186/s40991-020-00058

Rank, S., & Contreras, F. (2021). Do Millennials pay attention to corporate social responsibility in comparison to previous generations? Are they motivated to lead in times of transformation? A qualitative review of generations, CSR and work motivation. *International Journal of Corporate Social Responsibility, 6*(4), 1-13. DOI:10.1186/s40991-020-00058

Regmi, K., Naidoo, J., & Regmi, S. (2009). Understanding the effect of discrimination in the workplace: A case study amongst Nepalese immigrants in the UK. *Equal Opportunities International, 28*(5), 398-414. DOI: 10.1108/02610150910964259

Reisenwitz, T. H., & Iyer, R. (2009). Differences in generation x and generation y: Implications for the organization and marketers. *Marketing Management Journal*, *19*(2), 91–103.

Shams, G., Rehman, M. A., Samad, S., & Oikarinen, E. L. (2020). Exploring 'customer's mobile banking experiences and expectations among generations X, Y, and Z. *Journal of Financial Services Marketing, 25*(1), 1-13. DOI: 10.1057/s41264-020-00071-z

Sharma, E., & Mani, M. (2012). A comparative analysis of employee satisfaction in Indian commercial banks. *The IUP Journal of Organizational Behavior, 11*(4), 38–61.

Singhapakdi, A., Lee, D. J., Sirgy, M., Roh, H., Senasu, K., & Yu, G. (2019). Effects of perceived organizational CSR value and employee moral identity on job satisfaction: A study of business organizations in Thailand. *Asian Journal of Business Ethics,* 53–72. DOI: 10.1007/s13520-019-00088-1

Smith, C., & Duxbury, L. (2019). Attitudes towards union through a generational cohort lens. *The Journal of Social Psychology, 159*(2), 190-209. DOI: 10.1080/00224545.2019.1570906

Spector, P. E. (1985). Measurement of human service staff satisfaction: Development of the job satisfaction survey. *American Journal of Community Psychology*, 13(6), 693-713.

Tafolli, F., & Grabner-Krauter, S. (2020). Employee perceptions of corporate social responsibility and organizational corruption: Empirical evidence from Kosovo. *Corporate Governance, 20*(7), 1349-1370. DOI: 10.1108/CG-07-2020-0274

Tamm, K., Eamets, R., & Mõtsmees, P. (2010). Relationship between corporate social responsibility and job satisfaction: The case of Baltic countries. *University of Tartu - Faculty of Economics & Business Administration Working Paper Series*, *76,* 3–56.

Valentine, S., & Godkin, L. (2016). Ethics policies, perceived social responsibility, and positive work attitude. *The Irish Journal of Management*, *35*(2), 114–128. DOI: 10.1515/ijm-2016-0013

Vittinghoff, E., Glidden, D. V., Shiboski, S. C., & McCulloch, C. E. (2012). *Regression methods in biostatistics: Linear, logistic, survival, and repeated measures models. 2nd ed*. Springer.

Wisse, B., Van Eijbergen, R., Rietzschel, E. F., & Scheibe, S. (2018). Catering to the needs of an aging workforce: The role of employee age in the relationship between corporate social responsibility and employee satisfaction. *Journal of Business Ethics, 147,* 875-888. DOI: 10.1007/s10551-015-2983-8

Woo, H. (2013). Do consumers want a ""good"" apparel brand? The effects of apparel 'brands' corporate social responsibility (CSR) practices on brand equity moderated by culture. Unpublished 'master's thesis, University of North Carolina at Greensboro.

Xie, X., Huang, L., Li, J., & Zhu, H. (2020). Generational differences in perceptions of food health/risk and attitudes toward organic food and game meat: The case of the Covid-19 crisis in China. *International Journal of Environmental Research and Public Health*, *17*(9), 1-17. DOI: 10.3390/ijerph17093148

Zainee, I. A., & Puteh, F. (2020). Corporate social responsibility impact on talent retention among Generation Y. *Revista de Gestão, 27*(4), 369-39

A FRIEND IN NEED IS A FRIEND INDEED: EMPLOYEE FRIENDLINESS AND WORKING CAPITAL MANAGEMENT

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ABSTRACT

Lately, it has been well-established in the literature that being employee satisfaction is essential for the success of a corporate firm (Jiao, 2010; Faleye and Trahan, 2011; Edmans, 2011; Ertugrul, 2013; Guiso, Sapienza and Zingales, 2015). These studies are based on human relation theories (Maslow, 1943; Hertzberg, 1959; McGregor, 1960). These theories argue that employees are one of the most critical assets of the companies as they can add significant value to the firm through different channels such as innovation, customer relationships, bank relationships, and so on. So, the modern firms need to be employee-friendly so that they can attract, retain and motivate better employees (Likert, 1967; Rust, Stewart, Miller and Pielack, 1996; Ostroff and Bowen, 2000; Whitener, 2001; Eisenberger, 2002 and Fulmer, Gerhart and Scott, 2003).

Previous studies have examined how firms with happier employees can create value through long-term financing policies (Verwijmeren and Derwall, 2010; Bae et al., 2011; Ghaly, Dang, V. A., and Stathopoulos; 2015). But we do not know whether and how happy employees can assist corporate firms in managing their net operating working capital. The proper management of short-term financing is crucial as the substantial proportion of total assets is invested in net working capital. For example, Kieschnick, Laplante, and Moussawi (2013) report that more than 27% of the firm's total assets, on average, belong to Working Capital Management in their sample of US firms. Further, finance theory also suggests that increasing the speed of cash inflow and decreasing the speed of cash outflow help firms create value (Gentry, De La Garza, 1990). So, we observe the literature gap about whether happier employees of a firm can be useful in increasing the speed of cash inflow or decreasing the speed of cash outflow, thereby creating favorable working capital management.

To fill this void in the existing knowledge, in this article, we diagnose the relationship between employee friendliness and short term financing. Specifically, we study the effect of firms' employee friendliness on the Cash Conversion Cycle (CCC), a measure of working capital management and its different constituents. Our primary focus will be on Days Payables Outstanding (DPO).

Cash conversion cycle is one of the most popular measures of working capital management. It is defined as

$$CCC = DIO + DSO - DPO$$

where CCC= Cash Conversion Cycle
DIO= Days Inventories Outstanding
DSO = Days Sales Outstanding

and   DPO = Days Payables Outstanding.

Thus, CCC tracks the length of the time between the collection of cash from the sales of finished products or services and the amount of dollar spent on the purchase of the raw materials. So, a longer cash conversion cycle means the more cash investment of a firm. In other words, investment in short-term financing (working capital management) increases with a longer cash conversion cycle. Inferring through the balance sheet, if the asset side holds more extensive inventories and account receivables, networking capital will increase. Similarly, if the balance sheet's liability side possesses smaller account payables, the investment in working capital will again increase.

Dewing (1941) recognizes the investment in working capital management as one of the "key elements" of the firm. Working capital is related to the liquidity position in a firm (Ding et al., 2013). Dunn and Cheatham (1993) provide evidence that even the solvent firms may be on the verge of bankruptcy because of inadequate liquidity. In general, existing research finds a negative relationship between investments in working capital management and firm profitability or firm value (Kim and Chung, 1990; Shin and Soenen, 1998; Wang, 2002; Deloof, 2003; Garcia-Teruel and Martinez-Solano, 2007; Hayajneh and Yassine, 2011; Kieschnick, Laplante, and Moussai, 2013). For example, Garcia-Teruel and Martinez-Solano, 2007 reports that shortening the cash conversion cycle increases firm value. Emphasizing in the components of the cash conversion cycle, Gentry, Vaidyanathan, and Lee (1990) recognize collecting cash at the earliest and delaying payments until late as a fundamental notion in finance.

So, firms need to find a way to remain liquid and, at the same time, do not lose firm value. Firms can improve liquidity by faster conversion of inventories and account receivables into cash, but such practice may affect sales. Another way for firms to remain better liquid is to delay payments on their short-term obligations. In this paper, we argue that if the firm can keep its employees happy, they can effectively delay the payments in account payables, helping create firm value.

To understand the mechanism involved in accounts payables, we briefly review trade credit literature. Trade credit refers to allowing customer firms to defer payments on the goods and services they receive from their suppliers. Firms report such differed amounts as accounts payables in their balance sheets. That way, trade credit provides an alternative to bank credits, a credit from the financial institutions, as the source of short-term funding for the firms. As Wilson and Summers (2002) report, there are a wide variety of credit terms involved in the trade credit. Such trade credits vary in terms of discounts for early payments, offered timing of the payments, the payment method, the late fee or the interest involved for the late payment, and so on. But Ng, Smith, and Smith (1999) notices that the most common form of trade credit is "2/10 net 30." That means the customer firm gets a 2 percent discount if the firm makes payment within ten days of the supply of the goods. Buyer firms can settle the payments within 30 days without penalty, after

which a late fee and interest might be charged. Based on this arrangement, Ng, Smith, and Smith (1999) and others calculate the implicit annual interest rate of around 44% and consider trade credit (involving deferred payment, not benefitting from discount) for buyers as a poor choice to increase the value of the firm. Similarly, other commonly used credit terms are 2/10 net 40, 2/10 net 45, 2/10 net 60, 2/10 n 30 EOM (end of the month), and so on.

However, lately, Giannetti, Burkart, and Ellingsen (2011) provide strong evidence that most firms get trade credit at a low cost. This evidence is different from both the general assertions in the literature (Petersen and Rajan, 1994; Ng, Smith and Smith, 1999; Cunat, 2007) and the implication of the implied interest rate discussed above. Giannetti, Burkart, and Ellingsen (2011) further point out that very few firms in their sample receive discount terms in their credit agreement invalidating the claim that trade credit is more expensive than bank credits. Finally, they revert the widely believed notion that the trade credit is for the small companies which do not have access or ability to bank credits by establishing the positive association between the lower cost of inputs and large accounts payables for the larger firms. So, a company that can acquire a better credit term from the supplier, specifically the longer days for accounts payable, will be better off in managing working capital by shortening the cash conversion cycle without negatively affecting the firm's liquidity position. We argue that happier employees in a firm are crucial in helping companies achieve this goal.

Now, we detail how happier employees in a company can help to shorten the cash conversion cycle. Trade credit literature extensively asserts that trade credit is prevalent because suppliers obtain the buyer's information at a lower cost than banks do. For example, Peterson and Rajan (1997) argue that suppliers have a comparative advantage in getting information from the buyers. If the supplier and buyer exchange information such as the design of the product, production process, and demand forecasts for the next period, such information-sharing improves "speed-to-market and greater efficiency" (Baiman and Rajan; 2000). We argue that happier employees, who can maintain stable and long-term relationships with suppliers, can better serve in providing needed information to the supplier, which will be trustworthy and useful to the suppliers. Vaysman (1998) and Baldenius (2000) provide a model that the magnitude of the exchange of information between the two parties (buyers and sellers) depends on their bargaining on efficiency gain. The model implies that the buyer firm can receive more favorable credit terms by providing reliable and timely information to the supplier.

Further, happier employees in a firm can also spill over the firms' strengths, which may not be visible otherwise, to the suppliers. That way, the supplier firm can access different facets of the buyer firm, including creditworthiness. So, it is beneficial for the supplier firms to provide better payment options to such buyer companies and access information in a less costly way. If a firm cannot keep its employees happy, the firm cannot retain an able employee. Consequently, the firm will not be able to develop a close tie with the suppliers and take advantage of maintaining its short-term financing.

Besides the spillover channel, as mentioned above, a company's happier employees can also benefit their companies in terms of short-term financing management in the following ways. As discussed above, employee-friendly firms have an advantage in attracting, motivating, and retaining better employees. Further, companies with satisfied employees minimize the annual

voluntary turnover rate and absenteeism of the employees (Somers, 1995; Gellatly, 1995; Bridges and Harrison, 2003). Attraction, motivation, and retention of talented employees devoted to the firm can generate relatively more and stable cash flows compared to the similar firms that cannot keep their employees happy. We argue that the suppliers perceive companies with somewhat larger and more stable expected cash flows as less risky (less likelihood of default risk) and provide favorable payment conditions to such firms.

Further, as discussed in Peterson and Rajan (1997), suppliers do not only consider the net profit margin in a single sale but factor the present value of all future profit margins and provides better terms in payment for the companies with anticipated stable cash flows. In both ways, employee satisfaction can translate to better short-term financing for a company. We call this a Cash Flow Channel.

Similarly, research has provided evidence that employee happiness is a signal of a lower debt ratio. For example, Hanka (1998) notes that highly leveraged firms reduce employees, wages, and pension funding more frequently. This evidence is consistent with Jensen's argument that employee benefits depend on a firm's capital structure (Jensen, 1986). Further, Maksimovic and Titman (1991) point out that all stakeholders, including customers and employees, are hesitant to conduct business with highly indebted firms because they are afraid that such firms may turn away from honoring their implicit contracts. One implication of these arguments is that the employees' higher happiness index in a company signal that the company is liquid and solvent. When a supplier realizes that the company is liquid and solvent, they provide favorable trade credit. So, companies with happier employees receive better terms and conditions in payments from their suppliers. We call this a Signaling Channel.

Further, the satisfied employees may invest time in finding major vendors with sizeable access to credit and negotiate longer payment terms rather than wasting time with nickel and dime suppliers. We call this negotiation channel.

Overall, these different channels suggest that employee satisfaction help firms gain an advantage in getting better payment plans from the suppliers.

To study the relationship between employee happiness and working capital management, we use MSCI ESG (formerly KLD SOCRATES Research and Analytics) database to construct Employee Friendliness Index (EFI) and use EFI as a measure of employee satisfaction. MSCI ESG database obtains data from numerous sources such as company filings, public media, and government data. It provides a rating of the companies based on screens called "strengths" and "concerns." We are interested in screens related to employee treatment. MSCI ESG describes these screens as Union relations, Cash profit sharing, Employee involvement, Retirement benefits, strength, and Work/life benefits.

We find evidence for the following conclusions. First, on average, the Cash Conversion Cycle is shorter for the employee friendly firms. Second, the main driver of the shorter Cash Conversion Cycle is Days Payables Outstanding. Among the three components of the Cash conversion cycle, Days Inventory Outstanding and Days Sales Outstanding are not related to the employee friendliness of a firm. Still, Days Payables Outstanding is significantly longer for the firms, which makes their employees relatively happier than other firms. Third, the relationships between employee friendliness and the Cash Conversion Cycle disappears for the high-tech firms

but remains vital for old-economy manufacturing firms. The main driver of the shorter cash conversion cycle in old-economy manufacturing firms is Days Payables Outstanding. Fourth, the relationship between employee friendliness and the Cash Conversion Cycle is stronger for firms with a low probability of bankruptcy than firms with a high probability of bankruptcy. For the firms with a high probability of bankruptcy, Employee Friendliness Index and Days Payables Outstanding are not related. However, for the firms with a low probability of bankruptcy, Employee Friendliness Index is significantly positively related to Days Payables Outstanding. These results are robust to the alternative measure of short-term financing as well.

To develop further insight, we consider the financial crisis of 2007-2009 as an exogenous shock and study the relationship between employee satisfaction and the Cash Conversion Cycle. We also examine the relationship between employee satisfaction and Days Payables Outstanding for old-economy firms, which are less prone to bankruptcy (with the above-median Altman Z score). Credit becomes tight during the financial crisis. We can expect that it is tough to get bank credit or better terms in trade credit even for the firms with a lower probability of bankruptcy during the financial crisis. But, we contend that if the employees of such firms are happier, have maintained a good relationship with the suppliers, and have revealed the company's strengths to the suppliers, their firm will get more preferable credit terms, particularly, longer Days Payables Outstanding compared to other firms. Consistent with our contention, we find a significant positive relationship between employee satisfaction and Days Payables Outstanding during the financial crisis for the firms with a low probability of bankruptcy, further strengthening our results.

Our study adds to the extant literature on employee satisfaction and Working capital management. However, our paper is fundamentally different from other articles associating employee happiness and corporate policies or corporate outcomes. Existing research in Working Capital Management focuses fundamentally on three aspects. As discussed above, one line of research (Deloof and Jegers, 1996; Deloof, 2003; Garcia-Teruel and others) provides evidence that the investment in working capital is negatively related to firm profitability or firm value. Another stream of the research studies the role of proper working capital management in minimizing the effect of financial constraints (Fazzari and Petersen, 1993; Ding, Guariglia, and Knight, 2013). They generally discuss the sensitivity of investment in working capital under financing constraints. The third stream of research relates certain firm characteristics (Baños-Caballero, García-Teruel, Martínez-Solano, 2010; Hill, Kelly, and Highfield, 2010) or top management characteristics (Adhikari, Bulmash, Krolikowski, and Sah, 2015) as the determinant of working capital management. In this paper, we explore the novel factor (as employee satisfaction) influencing the company's short-term financing. Further, in this article, we provide evidence that establishes the importance of employee happiness for old economy manufacturing companies, unlike the existing research, which focuses more on the importance of employee satisfaction for "New" high-tech firms (for example, Zingales, 2000).

FAMILY FIRMS AND MANAGEMENT EARNINGS FORECAST TACTICS

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ABSTRACT

In this paper, we study voluntary information disclosure tactics of family firms, namely voluntary management earnings forecasts. We find that family firms prefer to issue annual earnings forecasts to quarter earnings forecasts as compared to non-family firms. This is because family firms focus on long-term performance rather than to beat consecutive short-term targets. We also find that family firms issue more accurate earnings forecasts because they are more concerned about their reputations and in the meantime, want to minimize litigation risks. However, when dealing with information-sensitive major corporate events such as repurchases or seasonal equity offerings, we find evidence of opportunism in information disclosure practices of family firms. Specifically, we find that family firms issue more bad news prior to stock repurchase announcements and more good news before seasoned equity offerings, which suggests that family firms tactically time the flows of materially important information to their own benefits.

Key words: Family firms, Voluntary Disclosure, Stock Repurchase, Seasoned Equity Offerings