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## **Editorial Note**

The November 2020 issue of the *Journal of International Business Disciplines (JIBD)* has been the result of a rigorous process of blind reviews, and in the end, five articles were recommended for publication in this issue.

*JIBD* is committed to maintaining high standards of quality in all of its publications.

Ahmad Tootoonchi, Chief Editor  
*Journal of International Business Disciplines*

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# THE COLLEGIATE ATHLETIC “ARMS RACE”: A RATIONAL RESPONSE TO NCAA REGULATIONS

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## ABSTRACT

College sports programs are repeatedly investigated by the NCAA for violating rules forbidding player compensation. However, many collegiate athletic programs find themselves in a “facilities arms race” in which institutions are spending millions of dollars for athletic facilities. People take at face value that the NCAA simply is protecting the “integrity” of amateur athletics. In this paper, however, we take a different look, modeling NCAA Division I sports as a regulated cartel in which competition is permitted in some areas but forbidden (or allegedly forbidden) in others. We compare this model to the *de facto* cartel that existed in the airline industry until 1978, when Congress voted to deregulate the industry. Our paper specifically looks at the forms of non-price or extracurricular competition that exist when regulations restrict prices either to consumers or for the payment of key resources.

## INTRODUCTION

The spate of stories involving colleges and universities belonging to Division I of the National Collegiate Athletic Association (NCAA) being investigated for wrongdoing seems to be never-ending. At this writing, the athletic programs of 34 colleges and universities in the NCAA’s Division I are on probation for various rules infractions, including the University of Oregon, University of Mississippi, and the University of Louisville. Programs as diverse as football and women’s volleyball and swimming are named as the rules offenders.

A decade ago, the NCAA was investigating Auburn University in 2010 for alleged infractions in football, and while the investigation proceeded, the university also was completing construction of a new, state-of-the-art basketball arena. Likewise, at about the same time, Tennessee was completing a multi-million-dollar facelift to its on-campus football facility, the venerable Neyland

Stadium, at the same time NCAA officials were looking into that university's football program to see if coaches had broken NCAA rules.

To critics, such actions seem almost irrational. While the athletic programs of these universities were accused of rule breaking and "corruption," they often are simultaneously spending millions of dollars to improve or build new facilities to further the very athletic programs that have placed the reputations of the universities in peril.

In 2017, 10 assistant coaches of Division I basketball coaches were arrested – including an assistant at Auburn – amid an FBI probe of collegiate basketball programs, a high-profile action that resulted in convictions in federal court of three agents involved in funneling money to collegiate prospects. One coach named in the scandal; the legendary coach Rick Pittino lost his job when Louisville University fired him after the allegations became public. In the wake of three wire fraud convictions in federal court, the NCAA at the current time is weighing penalties for a number of programs (Kerkhoff, 2019).

Public and media reaction to the stories is uniform: the media calls offenders "cheaters," coaches and their staffs often are fired along with athletic directors caught up in the scandals. The NCAA then places the offending institution on probationary status, with punishments being as diverse as loss of scholarships, recruiting restrictions on coaches, forfeiture of past games and championships, or even bans on playing in the post-season. Some universities, including Southern Methodist University and the University of Kentucky, suffered the NCAA "death penalty" by having a sports team closed down for a season.

The NCAA regulations involved a stated attempt to preserve amateur athletics (athletes are not paid directly for their services), but we would like to take another view, one that applies economic models to the NCAA and how it operates its vast sports complex. In this paper, we not only examine the NCAA operation itself, but we also look at its sets of rules and policies and model the NCAA after the various regulated business organizations, such as the U.S. airline industry before Congress and the Jimmy Carter administration deregulated it in 1978. While the popular view that NCAA rules are necessary to "protect the integrity" of college athletics makes for good moral theater in the media, such a perspective does not hold up to economic analysis. Instead, we believe that a view that models the NCAA to the old Interstate Commerce Commission and its member institutions as firms competing within the framework of a regulated industry better explains the behavior we observe, such as building palatial athletic facilities and giving players clandestine but "improper" benefits. We specifically examine the old regulatory structure of the U.S. airline industry disbanded by Congress in 1978 as a model to help us take a closer look at the rules and structure of NCAA sports and the outcomes that arise when teams break rules.

In our comparison of the NCAA to the old regulatory structure that governed U.S. airline companies before 1978, we look at the so-called "arms race" in college sports that involve the increase in coaches' salaries, and the spending of millions of dollars for new athletic facilities. Furthermore, we tie this development to the very rules that restrict the financial benefits that collegiate athletes can receive.

Obviously, there are differences between the structure of college sports and regulated industries, but there also are similarities and this paper will dwell on both. Our purpose is to present an alternative from the “good guy-bad guy” paradigm presented in the media and popular literature, showing a model that examines incentives for rule breaking that are contained within the NCAA regulatory structure.

We first point out that the two regulatory structures we are comparing have elements of non-price competition that are vital to understanding the behavior of people in both industries. With the airline industry, airlines were not permitted to compete based on price to consumers; while in NCAA sports, the non-price restriction is applied to a *key resource*, that being the individual athlete who will play for a collegiate team.

We examine the behavior that is associated with the elements of non-price competition to see how these two “industries” operated within such strictures to see if we can find similar actions that would result in both industries. After all, non-price competition restrictions do not eliminate competition; they simply shift it to other arenas. In this paper, we compare and contrast those particular avenues of competition to see if our viewpoint of the NCAA as an economic model actually is credible.

The next section examines the NCAA, giving a brief history of how the organization came to its present structure, and examine some of the rules that restrict compensation to collegiate athletes. The section after that will examine the regulatory structure of airlines that existed until 1978. After that, we will compare the two industries and draw conclusions.

## **THE NCAA HISTORY AND REGULATORY STRUCTURE**

This section draws heavily not only from the NCAA’s own website (NCAA, 2015), but also from Depken and Wilson (2006), who examined the relationship between NCAA rules and the “competitive balance” in Division I football (or what is known today as the BCS). While the NCAA is one of four organizations that serve college sports, it clearly is the largest and most influential, and it represents the so-called major players in college sports, the colleges and universities that have the best-known sports teams. Besides the NCAA, there is the National Association of Intercollegiate Athletics (NAIA), the National Christian College Athletic Association (NCCAA), and the National Junior College Athletic Association (NJCAA).

The NCAA operates three divisions, including Division I, which has the major sports programs, including the NCAA Basketball Championships (nicknamed “March Madness”) which Depken and Wilson point out is a key revenue generator for the organization, along with the BCS football bowl games. Division II athletics includes small and medium-sized colleges and universities that have athletic scholarships but where sports are not large revenue generators, and Division III, which consists of relatively small colleges that do not give scholarships for sports.

The focus for NCAA sports, obviously, is in Division I football and basketball, although the NCAA has 87 championships sports for both men and women, including gymnastics, ice hockey,



track and field, and baseball and softball (NCAA, 2015). The main reason is that Division I men's football and basketball bring most of the revenues for the NCAA. Most other collegiate sports do not generate enough revenues to cover their own expenses.

Depken and Wilson write that since 1946, the NCAA has governed athletics through its "Code of Sanity," which the NCAA claims to "protect" its athletes from "exploitation" and seek to preserve amateur athletics. The NCAA permits member institutions (except for Division III, which grants no official athletic scholarships) to make in-kind payments to athletes that do not exceed books, tuition, room and board. Cash payments are forbidden as well as other benefits that the NCAA deems would not be available to other members of the college or university's student body. (The NCAA also has many rules that restrict recruiting practices for prospective athletes, ostensibly for the purpose of protecting the prospects and their families.)

Institutions and individuals that violate these rules (which fall into major and minor – or secondary – categories) can receive punishment from the NCAA, which will vary from the loss of scholarships, prohibition from post-season play, or, as was the case with the Southern Methodist University football team in 1987, be forbidden to field a team for a specified number of years. The question as to whether these actions serve (economically speaking) as "cartel enforcement" (Fleischer, Goff, and Tollison, 1992) or simply as a rational means by which to "protect" student athletes has been debated in the literature and is not our primary focus in this paper.

Instead, this paper points out how the NCAA rules forbidding "extra" payments to a key resource result in *other forms* of competition for other key resources and for the consumer dollar. We compare it to the former U.S. airline regulation regime that also restricted prices, albeit for airline fares, in which there was substantial non-price competition for passengers. We further explore these points in the next section by examining the regulated airline industry.

## **FLYING THE FRIENDLIER SKIES: COMPETITION AND REGULATION**

From 1938 to 1978, the U.S. Government made the airline industry a state-sponsored cartel, restricting competition for interstate carriers by regulating routes and fares (Vietor, 1990). Congress ended that regulatory regime through efforts of President Jimmy Carter, Sen. Edward Kennedy and economist Alfred Kahn, who headed the Civil Aeronautics Board (CAB).

We use airline regulation as a model to examine the NCAA because an important aspect of competition between airline firms was based upon *non-price* competition. The CAB, which oversaw regulation of airlines, not only effectively set schedules for the competing airlines, but it also set fares, which meant that the firms could not compete with each other for passengers on the basis of price.

Yet, they still had to compete for passengers. As Vietor notes, this took many forms, including comfortable surroundings, free alcoholic drinks, piano lounges, hot meals, more legroom, and petite female flight attendants, often dressed complete with high heels. Ball (2011) writes:

Shedding their white gloves and raising their hemlines, stewardesses imparted a mixed message of flirtation and personal indenture.

Advertising for National Airlines had Debbie/Cheryl/Karen cooing “Fly Me” (or, even less ambiguously, “I’m going to fly you like you’ve never been flown before”), and Continental claimed “We Really Move Our Tails for You.”

Braniff coyly asked “Does your wife know you’re flying with us?” and Pacific Southwest Airlines stressed the advantage of an aisle seat, the better to see its miniskirted workforce. Male passengers were assumed to be overgrown frat boys: Eastern Airlines provided, in fact, them with little black books to collect stewardesses’ phone numbers.

The price restrictions also provided a number of perverse incentives to expand their facilities, make larger and more luxurious aircraft, and increase capacity on their routes. Vietor writes:

With capacity and route expansion foreclosed as outlets for product differentiation, the trunk carriers devised new means of service competition. “Capacity wars” gave way to “lounge wars.” On wide-bodied aircraft, lounges were introduced in first class, then in coach. When American installed piano bars, TWA countered with electronic draw-poker machines. Live entertainment proliferated, with musicians, magicians, wine-tasters, and Playboy bunnies. (pp. 78-79)

Alchian and Allen (1983) write:

Even when a federal regulatory agency enforced the former U.S. domestic airline cartel, there was inadequate control of competition in the quality of airline attendants, the quality and types of service, types of planes, and other fringe benefits to passengers. (p. 264)

The post-regulation era of airlines has been quite different, as both Vietor and Ball note. Ball quotes an anonymous letter from a flight attendant recently posted on the Internet:

“We’re sorry we have no pillows. We’re sorry we’re out of blankets. We’re sorry the airplane is too cold. We’re sorry the airplane is too hot. We’re sorry the overhead bins are full.... We’re sorry that’s not the seat you wanted. We’re sorry there’s a restless toddler/overweight/offensive-smelling passenger seated next to you.... We’re sorry that guy makes you uncomfortable because he ‘looks like a terrorist....’”

This sorry state of affairs ends with an admonition: “The glory days of pillows, blankets, magazines, and a hot meal for everyone are long gone. Our job is to get you from point A to point B safely and at the cheapest possible cost to you and the company.”

Ultimately, as Vietor notes, the problem of excess capacity moved front-and-center. In the end, the airlines deregulated because the current structure no longer was affordable, and that meant

while more passengers would be able to fly more places for less money, they also would give up those benefits that once made air travel famous.

## **COMPETING FOR ATHLETES – AND DOLLARS**

Collegiate athletic competition obviously differs from competition in the airline industry. First, airlines do not have “alumni” and boosters. Second, while there is brand loyalty in the airline industry, it does not compare to something like the rivalry between the University of Alabama and Auburn University, which have won BCS football titles in the past two years, respectively. The account of the Alabama fan who poisoned a number of old water oaks at Toomer’s Corner in Auburn, where Auburn fans gather to celebrate team victories, after Auburn beat Alabama in football nicely portrays the intensity of collegiate rivalries (“Alabama Fan,” 2013).

Third, because of the existing “brand loyalty” in collegiate sports, higher education institutions do not necessarily compete with each other for “customers.” (One does not suddenly trade a lifelong loyalty to the University of Michigan to become a fan of the Ohio State Buckeyes as one might decide to stop flying Delta and start flying on Southwest.) Writes Mattingly (2011):

Decisions about team loyalties are often made early in life and are resolutely defended over the years. You rarely hear of an Alabama fan suddenly deciding to go to the Tennessee or Auburn side, an LSU fan doing likewise and rooting for Ole Miss, or a Florida fan suddenly hunkering down and rooting for Georgia. It just doesn't happen.

Championships in college sports intensifies competition, especially in men’s basketball and football, and “school pride” is not the only thing at stake. Humphries (2003) found that state universities that have a successful football season are likely to see increases in “state appropriations the following year.” Even when there are payouts to all teams within a conference, a team that plays in a BCS bowl (or for the BCS championship) will receive millions of dollars in new revenue.

Several studies have positively linked alumni and booster giving to the university and the recent success of its athletic teams, including Baade and Sundberg (1996) and McCormick and Tinsley (1990). McCormick and Tinsley (1987) also found that applications for a college or university are likely to increase significantly after high-profile athletic successes, and that average SAT scores of incoming freshmen are likely to have a statistically significant increase.

For example, the University of Alabama has received benefits far beyond success in football since Coach Nick Saban arrived on campus in 2007. Alabama has won five collegiate national championships in the past 12 seasons, but also has seen increased success in about every measurable standard for the university. Walsh (2017) writes:

Before Saban arrived, the school had already begun an enrollment push, topping 20,000 in 2003 (20,333), and reaching a then-record 23,878 for the 2006-07 academic school year. For that fall, it received 15,761 applications.

For the fall of 2016, it received 42,802 applications. Enrollment was 37,665.

Walsh continues:

Normally when a school significantly expands the quality of its student applications dips. That wasn't the case at Alabama. The average ACT score went from 24.2 in 2006 to 27.07 a decade later. The average GPA for the incoming freshmen rose from 3.4 to 3.69.

The geographical makeup of the student body also has changed dramatically. In 2004, 72 percent of freshmen came from within the state. Just four years after Saban arrived the university had more students from out-of-state for the first time.

That's a huge boon in the bottom line. In 2006, tuition was \$4,864 in-state, \$13,516 for those from somewhere else. Following a steady stream of tuition hikes, the latest announced just last month, it'll be \$11,580 in-state, and \$28,900 out-of-state for the 2017-2018 academic year. Room and board is another \$13,224.

In other words, athletic success of a collegiate institution, at least in football or basketball, is likely to result in a better-qualified student body in the longer run and also better financial prospects. Thus, just as airlines once competed for comely flight attendants (Whitelegg, 2005), collegiate athletic programs will compete aggressively for those factors of production that can translate into success in the sports arena.

The fact that collegiate programs are limited in what they can offer prospective athletes means that two things are certain: cheating and competition for other factors that will lead to a team recruiting better athletes, and for those coaches that can put the collection of athletes together into a championship team. Because there already is a wealth of literature that deals with recruiting violations and "improper" payments to individual athletes, this paper looks at two other issues that are escalating in college sports: coaches' salaries and facilities.

Despite the fact that the U.S. economy has slowed since the recession of 2008, collegiate coaches' salaries continue to rise. Table 1 shows how increasing numbers of top collegiate football coaches are being paid a million dollars or more per year.

**TABLE 1. PAY INCREASING FOR TOP COLLEGE FOOTBALL COACHES**

2009	
At least \$1 million	56
At least \$2 million	25
At least \$3 million	9
At least \$4 million	3
2017	
At least \$ 1 million	19
At least \$ 2 million	19
At least \$ 3 million	31
At least \$ 5 million	6
At least \$10 million	1

Source: USA TODAY research

Coaches' salaries hardly are the only way that collegiate athletic departments compete with each other for the services of the student-athlete, as the incentive structure within college sports also applies to facilities themselves. As a comparison with the regulated airlines, one sees that creating new facilities (or capacity) also was the way that airlines would compete outside the arena of price. Vietor (1990) writes:

Nowhere was the hubris of regulated competition more evident. The CAB's view that capacity utilization was a managerial prerogative, independent of price and entry regulation, was myopic. It separated the economic links between the firm and the market-between price, capacity investment, market share, and earnings.

Excess capacity was just the most perverse consequence of a hybrid regulation that prevented price competition, but not service rivalry. Carriers could maintain market share only by adding capacity (more frequent departures) and service. These costs drove up prices, which in turn weakened demand and resulted in lower capacity utilization. The utility-type rate making that tied fares to the weaker performers among diverse corporations also discouraged cost effectiveness. Pricing under regulation tended to bundle a variety of services into one or two simple packages that hid the real costs and left travelers with little choice about the number and level of services they could purchase.

The effects of regulation on route structure and aircraft fleet were among the most important. By allocating routes piecemeal through individual certification proceedings, CAB regulation produced fragmented, politically stylized, point-to-point route systems. Although they provided convenient nonstop service, often to locations where maintaining that level of service made no economic sense, such route structures afforded air carriers none of the economies of scale or scope that would have been possible with a more integrated, centralized structure. (pp. 72-73)

Indeed, the building of new amenities such as academic centers for athletes (to ensure their academic eligibility), huge weight rooms, strength staffs, indoor football practice facilities, separate basketball practice arenas, stadium skyboxes and the like have an economic explanation tied to NCAA policies. (We must emphasize here that we are not endorsing payment for athletes or a change in NCAA governance; rather, we simply are pointing out the developments that have occurred because of the implementation of NCAA rules.)

The Knight Commission, which the NCAA directed to investigate the growth of college athletics, issued a report in 2009 entitled “College Sports 101,” in which it wrote the following about the expansion of facilities:

Recruiting costs remain a relatively small item in most budgets, accounting for only two percent of total departmental costs, according to the latest NCAA Revenue and Expenditures Report (Fulks, 2008). However, some argue that facilities construction should be considered a recruiting expense as different athletics programs woo 17- or 18-year-old high school seniors with the most lavish practice facility, shiniest academic study center or snazziest arena.

One of the more interesting examples of competition through facilities came when the University of Kentucky more than 40 years ago built a special dormitory just for its basketball team. The dorm had many of the features of a luxury hotel, including maid service. (Unlike many Division I universities which emphasize football, Kentucky is best-known for basketball and its coach, John Calipari, has salary and benefits that rival that of Alabama’s Nick Saban, college football’s highest-paid coach.) When the NCAA ended the practice of separate athletic dormitories, Kentucky then lost that particular advantage in recruiting.

Not all college teams play in new arenas. Duke University, which has won four NCAA championships under current coach Mike Krzyzewski, plays in Cameron Indoor Stadium, which was completed in 1940 and refurbished in the late 1980s (Duke University, 2005). However, Cameron is famous for having a “home-court advantage” and a boisterous (some might call it obnoxious) student body that stands the entire game and is strategically placed close to the arena floor. Duke, however, is not lacking for other facilities or spending for athletics (College Factual, 2019).

Like the airlines during the period of regulation, colleges are not above using feminine charms as a means to help recruit student athletes. The *New York Times* reported on December 8, 2009, that the NCAA was investigating the University of Tennessee for alleged infractions involving its “hostess” program (Thamel, 2009). (At the present time, NCAA has not ruled on any of its findings in that investigation).

## EXPANDING ON NON-PRICE COMPETITION

That non-price competition would be intense and reach multi-million-dollar levels in collegiate sports should not be surprising, the academic mission of higher education notwithstanding. The question is how athletic program engage in competition.

The NCAA may forbid its athletes from receiving monetary payment in the name of purity, amateurism, or academic integrity, but this does not prevent the *compensation* of athletes. In order to access the compensation of NCAA athletes we must first deal with money on a conceptual basis. Although the literal and physical transfer of money to athletes as a form of athletic compensation may be prohibited, this is not to say that the concept money fulfills is not or is impossible to be used within the NCAA for athletic compensation. Money is simply a tool used to gauge exchange but is not the only tool with the ability to initiate exchange.

## CONCLUSION

As noted in our introduction, many people have complained about the “arms race” at NCAA institutions for new facilities and escalating coaches’ salaries, with such actions often portrayed as the result of misdirected institutional priorities. We have demonstrated through both reference to previous economic studies and anecdotal evidence, however, that such actions are the rational response to the governing structure of the NCAA and the fact that successful sports teams can have a positive effect both in the raising of institutional revenues (including revenues outside of athletics) and increasing the numbers of applications for the incoming freshman class.

Furthermore, the actions of institutions of higher learning can be compared to the actions of U.S. airlines before they were deregulated in 1978, as airlines had their own “arms race” competition on the basis of facilities, since competition for customers by price was illegal. We find that this comparison contains explanatory power when applied to what is happening currently with collegiate athletics, and that when seen from this perspective, the behavior of college administrators is rational.

Although we have not engaged in empirical research, depending instead upon other empirical studies and anecdotal evidence, a comparison of collegiate athletics to professional sports – in which the athletes are paid, and many highly-so – is in order to see if different patterns from what we see in college athletics have developed regarding the building of facilities and the salaries of professional coaches. Just as the incentive structures changed for airlines after deregulation, one might expect to see different patterns emerging in professional sports.

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# **TIME SERIES MODELING OF THE DYNAMICS OF THE DOW AND S&P 500 INDEXES OVER TIME**

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## **ABSTRACT**

Performance of the stock market affects many individuals and corporations and is of importance for the economy of the country. Therefore, it is of prime importance to be able to determine variables that relate to stock returns and develop models that can predict the behavior of the stock market over time. In this study, from a set of nine macroeconomic variables, we developed linear time series models (using transfer function and auto-regression time series analyses) relating the DOW index and the S&P 500 index as dependent variables to the GDP as the independent variable. For both indexes, the index at time  $t$  was a function of its lag at time  $t-1$  and the GDP at time  $t$  and its lag at time  $t-1$ . This simple model gave an excellent fit to the data for pre and post the 2008 recession. Forecasts from the model were good for the pre-2008 recession but underestimated somewhat the observed indexes for 2017 and 2018. This could be attributed to outside intervention due to deregulation (or in anticipation of) during the Trump presidency. GDP seems to be a good predictor of the DOW and S&P behaviors over time under normal circumstances, barring any intervention, such as recessions, regulations or deregulations, or world political events.

## **INTRODUCTION**

The stock market in the US is of major importance for the economy of the country. More than fifty percent of individuals in the United States are invested in the stock market. In addition, corporations are heavily invested in the stock market and many people depend for their retirement on the stock market. Therefore, performance of the stock market affects many individuals and corporations and hence is of importance for the economy of the country. Movement and volatility in the stock market are indicative of changes in macroeconomic variables that have a bearing on the economy.

Many studies in the literature show that stock market returns are related to certain macroeconomic variables such as interest rate, bond rate, GDP, inflation, and industrial production. Most of the studies used cointegration analysis to determine short and long-term effects of macroeconomic variables on stock returns. Of importance is to develop models that can predict the performance of the stock market returns from macroeconomic variables. Few models using ordinary least square regression were used to develop predictive models in developing countries. These models were weak predictors of stock market performance. Ordinary least squares is known not to be the proper methodology for time series data. The best approach for model development is the use of multiple time series methodology that addresses the autocorrelation in the errors and allows for the detection of feedback between the dependent and independent variables and the determination of lags in the dependent as well as each of the independent variables in the model.

In this study, we extend the present research in the literature by attempting to build models, using time series methodology, for out of sample prediction of the US DOW JONES and S&P 500 stock market indexes.

## **LITERATURE REVIEW**

In a study of the effects of macroeconomic variables on the stock exchange in Romania, Sabău-Popa et al. (2014) using the grey incidence analysis technique, reported that there was a significant relationship between the Bucharest stock exchange index and each of the following variables: GDP, 5-year bond interest rate, the RON/USD exchange rate, and inflation rate. GDP has the largest impact of all the variables studied. It was concluded that economic growth, currency appreciation, low interest rate, and low inflation rate contribute to a robust stock market.

Pian and Smith (2013) applied nonparametric dimension-reduction techniques to study the effects of macroeconomic variables on monthly stock returns of 25 portfolios between 1960 and 2008. Authors used inverse regression to extract from the 15 macroeconomic variables three variates that were significant and explained 95% of the variation in the stock returns. The first variate represented low inflationary expectations and low credit-risk. The second variate was strong economic indicators; the third variable related to inflation shocks and gave a small contribution to the model.

Naifar (2016) reported on economic factors affecting the global Islamic index using quantile regression. Of the variables studied it was found that conventional stock market returns, stock market volatility and future economic conditions (deduced from the slope of the yield curve) were significant for all the quantiles. In addition, the credit risk factor was significant with a positive coefficient. Oil prices and investor sentiment indicator had a positive effect, but only for the lower quintiles.

Chakraborty and Gupta (2017) using ordinary least squares regression studied the effects of money supply, gold prices, exchange rate, GDP, and inflation on the Bombay Stock Exchange. Results indicated that none of the macroeconomic variables had any significant effect on the stock market returns.

In a study on the effect of macroeconomic factors on the Indian stock market, Bhattacharya (2014) using factor analysis and regression on factor scores, reported that three factors had an effect on the stock market returns for the time 2000-2010. One factor was termed a domestic macroeconomic factor, the second a money market factor which includes interest rate, and the third a foreign involvement factor. After correcting for autocorrelation by using the Cochrane and Orcott regression technique, it was found that factor one was positively related to stock returns and factors 2 and 3 were negatively related to stock returns.

Hassan and Al Refai (2012) investigated the long run relationship between macroeconomic variables and equity returns using cointegration analysis. Results indicated that trade surplus, foreign exchange reserves, the money supply, and oil prices were important macroeconomic variables that had long run relationship with the Jordanian stock market. Kudyba (1999) using ordinary least square regression examined the effect of 30-year treasury yield as the independent variable on the daily close of the S&P and NSDQ indices as the dependent variables. The author reported that more than 50% of the variability in each index was attributed to the T-bond yield. In addition, the relationship between T-bond yield and index was nonlinear in the sense that the elasticity varied with yield. For yields above 6.4%, the inverse relationship between yield and index was observed. The rise in yield in the range 5.6% - 6.4% accounted for 30% decrease in the corresponding stock index.

In a study on the effects of macroeconomic variables (industrial production index, consumer price index, money supply, exchange rate, foreign portfolio investment, Treasury bill rates, and oil prices) on the stock market monthly returns for the period 1998-2008 in Pakistan, Hasan and Tariq (2009), using Granger causality test and cointegration, reported that equity market returns were causally effected by exchange rate, T-Bill, money supply and the consumer price index. Cointegration analysis revealed the presence of four cointegration vectors among the variables. Industrial production, oil price, and foreign investment had no significant impact on the equity market. However, inflation, Treasury bill rate and exchange rate were major contributors to the volatility of the equity market.

Misra (2018) investigated the effects of Index of Industrial Production (IIP), inflation, interest rate, price of gold, rate of exchange, foreign institutional investment (FII) and supply of money for the period April 1999-March 2017 on the Bombay stock exchange, namely BSE Sensex. Results of the Johansen Cointegration analysis and the Vector Error Correction Model (VECM) revealed that there was a long-term relationship between the macroeconomic factors and BSE Sensex. In addition, a short-term relationship existed between BSE Sensex, inflation, and money supply. Also, BSE Sensex had an effect on exchange rate, money supply, FII, gold price, and IIP.

Ratanapakorna and Sharma (2007) investigated the effect of six macroeconomic variables on the S&P500 index in the US over the period 1975-1999. Based on the Johansen cointegration analysis and the Vector error Correction Model (VECM) results showed that stock prices were negatively related to the long-term interest rate and positively related to industrial production, money supply, inflation, exchange rate, and short-term interest rate. Furthermore, every economic variable Granger causes the stock prices in the long-term, but not in the short-term.

Kwon and Chin (1998) investigated cointegration and causality between macroeconomic variables and stock market returns in Korea. The data was monthly stock prices on the Korea Composite Stock Price Index (KOSPI) and Small-size Stock Price Index (SMLS) for the period, January 1980 to December 1992. Results from the cointegration test and the Vector Error Correction Model, showed that both stock market indices were cointegrated with the production index, exchange rate, trade balance, and money supply. This indicated that both market indices had long-run equilibrium with these four macroeconomic variables. While the macroeconomic variables had an effect on predicting the stock market prices, the reverse was not true.

Flannery and Protopapadaki (2002) using the GARCH (1, 1) model and 17 macroeconomic conditions to investigate the effect of the macroeconomic variables on the NUSE\_AMEX\_NASDAQ stock market daily index for the period 1980-1996. Results indicated that six of the 17 variables had effects on the stock market index. Two inflation measures (CPI and PPI) had an effect on the level of the market returns.

Balance of trade, employment and housing starts had an effect on the returns' volatility. Monetary Aggregate had an effect on return level and volatility. Also, the same variables increased the stock market trading volume. It was interesting to find that real GNP and industrial production had no effect on the stock market index.

Sousa et al. (2016) investigated the predictability of stock market returns from macroeconomic, macro-financial and US/global variables in the BRICS countries: Brazil (BR), Russia (RS), India (IN), China (CH) and South Africa (SA), over the period 1995Q1–2013Q2 employing quarterly data. Using ordinary least square regression, their analysis shows that overall there was very little evidence for out of sample predictability using macro-finance variables (Consumption–wealth ratio, wealth-income ratio and equity price scaled by GDP) that seem to have predictability in developed markets. Variables that showed signs of out of sample predictability for equity returns were the output gap to GDP variable, the central bank rate and the change in the exchange rate with regard to the US dollar. In general, for the 2005-2013 out of sample period, empirical evidence for predictability of stock returns for the BRICS countries was limited

Rjoub et al. (2009) investigated the effects of macroeconomic factors on the returns of 193 stocks in the Istanbul stock market using monthly data for the period January 2001 to September 2005. The six macroeconomic variables chosen for the study were the term structure of the interest rate, unanticipated inflation rate, risk premium, exchange rate, money supply, and unemployment rate. Using ordinary least square regression, results showed that there was a significant relationship between stock market returns and inflation, interest rate, money supply and risk premium. However, it was noted that the regression model was a weak predictor of stock returns indicating that there were other macroeconomic factors affecting stock returns that were not included in the model.

Kashif and Hasan (2016) investigated the effect of macroeconomic variables on stock returns in the Pakistan stock market. The data used was monthly for the period January 2000 to December 2015. The data was analyzed using the Garch model. Results indicated that an increase in interest rate had a negative effect on stock returns and a positive effect on volatility. Also, oil price was negatively related to volatility and positively related to stock returns.

Literature shows that certain macroeconomic variables had an effect on stock returns and in some cases volatility. However, most of the studies were done in developing countries. Few studies were for developed countries or in particular the United States. Furthermore, almost none of the studies attempted building models to predict stock returns. In this study, we extend this research by attempting to build a model using time series methodology for out of sample prediction of the US stock market index for the DOW JONES and S&P 500 stock markets.

## DATA

Time series data on macroeconomic variables were obtained from the Federal Reserve Economic Data Base (<https://fred.stlouisfed.org>). Data was quarterly from the first quarter 1970-1 to the fourth quarter 2018-4. The economic variables were GDP in billions, consumer price index (CPI), saving deposits at commercial banks in billions, 10-year bond yield, Central bank interest rate, federal debt in millions, unemployment rate, industrial production index, and money supply in billions.

## METHODS

In order to develop a model that can predict the performance index for the DOW and the S&P 500 two analytical procedures (transfer function in time series, and auto-regression) were utilized using the SAS software. The quarterly data were analyzed for two periods, before and after the 2008 recession. The first period was from 1970-1 – 2006-4 and the second period, after the recession, was from 2009-1 to 2016-4.

### Time Series: Transfer function

The transfer function approach is one of the methods used in relating one or two input time series to an output time series. This time model relating a stationary output series  $y_t$  to a stationary input series  $x_t$  is expressed as

$$y_t = v(B) x_t + a_t, \quad (1)$$

where  $v(B) = w(B)B^c/d(B)$ .

Here,  $w(B) = w_0 - w_1B - \dots - w_sB^s$

$d(B) = 1 - d_1B - \dots - d_rB^r$ .

and  $c$  represents the time delay (or lag) until the input variable  $x_t$  produces an effect on the output variable  $y_t$ .

We assume that the input series follows an ARMA process,  $\frac{\varphi(B)}{\theta(B)} x_t$ . The function  $v(B)$  with its lags is determined from the cross correlations between the white noise input series  $\frac{\varphi(B)}{\theta(B)} x_t$  and the filtered output series  $\frac{\varphi(B)}{\theta(B)} y_t$ , namely the significance at a given lag and the pattern of the cross correlations over lags (Wei, 2006). For instance, if the correlation is significant at only lag 0, then Equation (1) becomes

$y_t = w_0 x_t + a_t$ . On the other hand, if the correlation is significant at only lag 1, then one has

$$y_t = w_0 x_{t-1} + a_t$$

Once  $v(B)$  is identified, one can express  $a_t$  in Eq. (2) as

$$a_t = y_t - v(B) x_t \quad (2)$$

and identify the appropriate time series model for Eq. (2). With  $a_t$  known, one can determine the final model in Eq. (1).

## Auto regression

The auto-regression model employed takes the form

$$y_t = a + b x_t + n_t \quad (3)$$

Where  $n_t$  was an auto-regressive process of the first order

$$n_t = \theta n_{t-1} + e_t \quad (|\theta| < 1), \quad (4)$$

where  $e_t$  is random error. The order was determined by the Durbin-Watson statistic.

This auto-regression analysis is a proper method to use for time series data where the errors are auto-correlated. The estimation procedure corrects for the autocorrelation in the errors.

## RESULTS AND DISCUSSION

### Auto regression analysis: Period 1970-1 – 2006-4

#### *DOW*

All nine macroeconomic variables were entered first in the model and a backward elimination scheme was performed which deleted one at a time the variable that was least significant

(Montgomery et al., 2001). The three significant variables that remained in the final model were consumer price index (CPI) measuring inflation, saving deposits at commercial banks and GDP (Table 1A).

As expected, saving deposits and CPI had a negative effect on the DOW index and GDP a positive effect as presented in Table 1A. The model is given in Equation (5). The errors are represented by a first order autoregressive model, AR (1). Replacing Z in Equation (5) by its value,  $E_t / (1 - 0.89B)$ , and simplifying, one arrives at the conclusion that the DOW index is a function of its own lag and of CPI, Savings, GDP and their own lags. Figure 1 shows a plot over time of the observed quarterly DOW index and its predicted values from Equation (5). It is seen that there is a good agreement between observed and expected for the period 1970 to 2006. The model has an R-squared value of 0.9928. It is seen from the out of sample prediction that the model predicted the observed values for 2007-1 to 2008-3 fairly well as shown in Table 1B. The observed quarterly index was within the 95% confidence limits of the predicted value. The prediction for 2008-4 was not as good due to the plunge in the market because of the 2008 recession. This points to the fact that a model can predict the market under normal conditions when there is no outside intervention such as a recession, market deregulation or political events.

**TABLE 1. AUTO REGRESSION ANALYSIS**

A. DOW is dependent variable, GDP, CPI, and Savings are the independent variables. Data, first quarter of 1970 (1970-1) till the fourth quarter of 2016 (2016-4)

Variable	DF	Estimate	Error	t Value	Pr >  t
Intercept	1	1980	884.3758	2.24	0.0267
CPI	1	-236.2610	50.9471	-4.64	<.0001
Savings	1	-2.8948	0.9586	-3.02	0.0030
GDP	1	2.8935	0.4506	6.42	<.0001
AR1	1	-0.8925	0.0386	-23.11	<.0001

B. Observed and predicted values of the DOW index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample data

Quarter	Observed	Predicted	LCL	UCL
2007-1	12621.69.	12201.23	10803.27	13599.18
2007-2	13862.91	12502.72	10987.31	14018.12
2007-3	13211.99.	12721.68	11106.01	14337.35
2007-4	13930.01.	12663.59	10977.52	14349.66
2008-1	12650.36	12336.55	10605.34	14067.77
2008-2	12820.13	12237.74	10431.79	14043.69
2008-3	11378.02	11950.82	10104.76	13796.88
2008-4	9325.01	11300.54	9304.35	13296.73

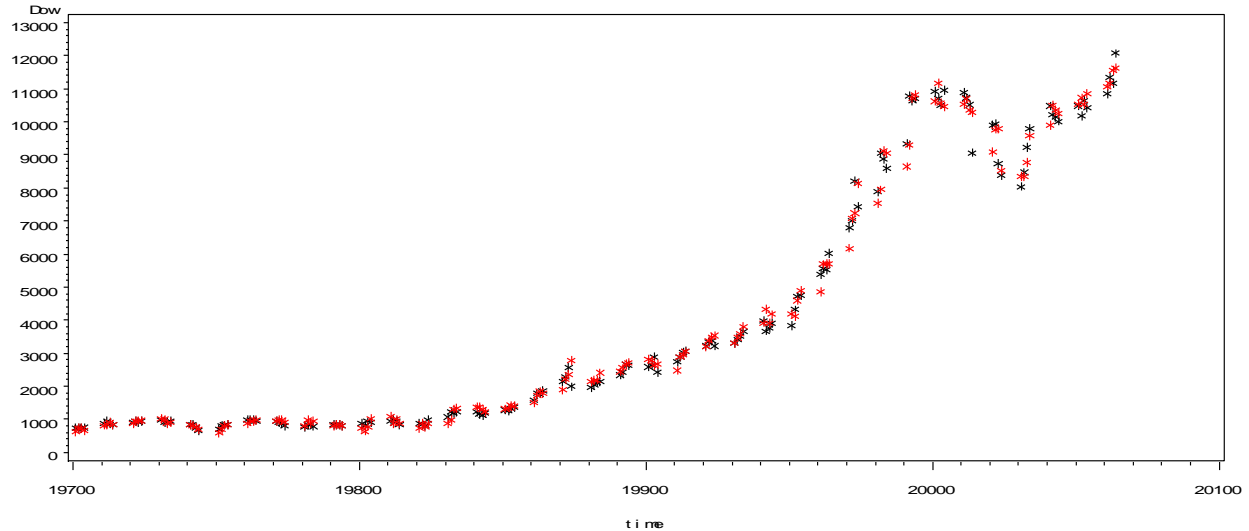


*Model based on the estimates in Table 1A.*

$$\text{DOW}_t = 1980 - 236.26 \text{ CPI}_t - 2.89 \text{ Savings}_t + 2.89 \text{ GDP}_t + Z_t \quad (5)$$

where  $Z_t = E_t / (1 - 0.89B)$

Here B is the backshift operator ( $BX_t = X_{t-1}$ ) and E is random error or noise.



**FIGURE 1. DOW INDEX AND ITS PREDICTED VALUE OVER TIME. OBSERVED INDEX IS BLACK COLOR AND PREDICTED IS RED COLOR. MODEL USED IS THAT OF EQUATION (5).**

As seen from the results in Table 2 A, GDP alone was found to be as good a predictor of the DOW index as the model in Equation (5). In other words, CPI and Savings although significant in the model did not contribute substantially to the total R-squared. When deleted from the model, GDP alone had an R-squared of 0.9922. The model is presented in Equation (6). It expresses the DOW index at time t as a function of its lag value at time t-1 and the GDP at time t and its lag at time t-1. Table 2 B shows that the prediction of out of sample observations over the quarters 2007-1 to 2008-3 is as good as that for model (5).

### ***S&P 500***

Table 3A presents the model estimates for the S&P 500. The variables in the model that were significant were the same as for the DOW model in Equation (5). They were CPI, Saving deposits, and GDP. From the estimates in Table 3A, the model, expressing the S&P 500 as a function of the independent variables, is given in Equation (7). The plot in Figure 2 shows a good fit between observed and predicted from Equation (7). The R-squared was 0.9932.

As in the case of the DOW Jones index, the out of sample S&P 500 predicted values for the quarters 2007-1 to 2008-3 were rather good when compared to the observed values. The 2008-4 value was lower than predicted due to the great recession.

As seen in Table 4A, GDP alone is as good a predictor of the S&P 500 index as CPI, Savings and GDP together. The model for the GDP is given in Equation (8). As in the case of the DOW analysis, the S&P 500 at time  $t$  is expressed as a function of its own lag at time  $t-1$  and the GDP at time  $t$  and its lag at time  $t-1$ . The model predicts the out of sample observation over the quarters 2007-1 to 2008-4 fairly well. The R-squared value for the model is 0.9922.

**TABLE 2 AUTO REGRESSION ANALYSIS**

A. DOW is dependent variable and GDP is the independent variable. Data, first quarter of 1970 (1970-1) till the fourth quarter of 2016 (2016-4).

Variable	DF	Estimate	Error	t Value	Pr >  t
Intercept	1	-1380	948.7888	-1.45	0.1479
GDP	1	0.9471	0.1179	8.03	<.0001
AR1	1	-0.9597	0.0220	-43.53	<.0001

B. Observed and predicted values of the DOW index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample data

Quarter	Observed	Predicted	LCL	UCL
2007-1	12621.69	12233.14	9940.77	14525.52
2007-2	13862.91	12406.84	9993.67	14820.01
2007-3	13211.99	12541.23	10026.05	15056.42
2007-4	13930.01	12645.81	10043.32	15248.30
2008-1	12650.36	12625.06	9965.66	15284.46
2008-2	12820.13	12757.37	10019.61	15495.13
2008-3	11378.02	12781.41	9990.29	15572.52
2008-4	9325.01	12499.68	9712.52	15286.83

*Model based on the estimates in Table 2A.*

$$\text{DOW}_t = -1380 + .947 \text{ GDP}_t + Z_t \quad (6)$$

where  $Z_t = E_t / (1 - 0.96B)$

**TABLE 3. AUTO REGRESSION ANALYSIS**

A. S&P is the dependent variable, GDP, CPI, and Savings are the independent variables. Data, first quarter of 1970 (1970-1) till the fourth quarter of 2016 (2016-4).

Variable	DF	Estimate	Error	t -Value	Pr >  t
Intercept	1	281.6529	121.3900	2.32	0.0217
CPI	1	-32.3457	6.4070	-5.05	<.0001
Savings	1	-0.4927	0.1180	-4.17	<.0001
GDP	1	0.3950	0.0551	7.17	<.0001
AR1	1	-0.9237	0.0317	-29.11	<.0001

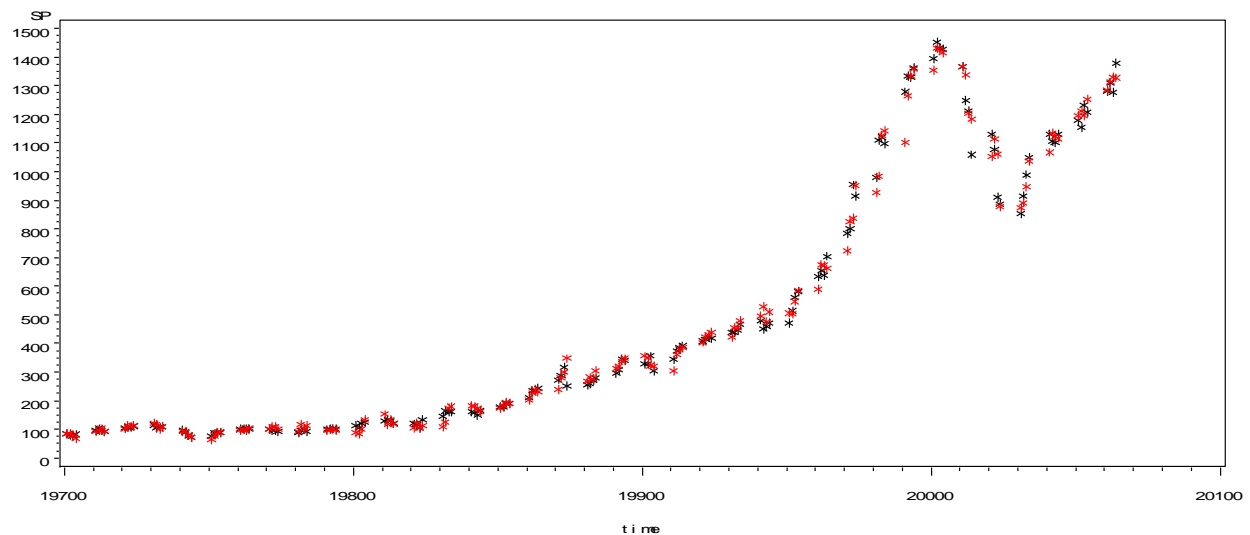
B. Observed and predicted values of the S&P (SP) index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample data.

Quarter	Observed	Predicted	LCL	UCL
2007-1	1438.24	1400.82	1105.04	1696.59
2007-2	1482.37	1425.42	1116.39	1734.46
2007-3	1455.27	1450.03	1129.24	1770.82
2007-4	1549.38	1455.58	1126.07	1785.10
2008-1	1378.55	1433.73	1099.65	1767.81
2008-2	1385.59	1443.46	1100.68	1786.25
2008-3	1267.38	1422.03	1073.63	1770.42
2008-4	968.75	1406.78	1059.52	1754.05

***Model based on the estimates in Table 3A.***

$$SP_t = 281.65 - 32.34 CPI_t - 0.493 Saving_t + 0.395 GDP_t + Z_t \quad (7)$$

where  $Z_t = E_t / (1 - 0.924B)$



**FIGURE 2. S&P INDEX AND ITS PREDICTED VALUE OVER TIME. OBSERVED INDEX IS BLACK COLOR AND PREDICTED IS RED COLOR. MODEL USED IS THAT OF EQUATION (7).**

**TABLE 4. AUTO REGRESSION ANALYSIS**

A. S&P (SP) is the dependent variable and GDP is the independent variable. Data, first quarter of 1970 (1970-1) till the fourth quarter of 2006 (2006-4).

Variable	DF	Estimate	Error	t Value	Pr >  t
Intercept	1	-166.7866	127.2197	-1.31	0.1919
GDP	1	0.1126	0.0154	7.32	<.0001
AR1	1	-0.9658	0.0203	-47.56	<.0001

B. Observed and predicted values of the S&P (SP) index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample data.

Quarter	Observed	Predicted	LCL	UCL
2007-1	1438.24	1398.06	1100.62	1695.50
2007-2	1482.37	1420.64	1109.31	1731.97
2007-3	1455.27	1438.47	1115.31	1761.64
2007-4	1549.38	1452.70	1119.32	1786.07
2008-1	1378.55	1451.96	1112.12	1791.79
2008-2	1385.59	1469.35	1120.03	1818.66
2008-3	1267.38	1473.81	1118.14	1829.48
2008-4	968.75	1441.86	1087.27	1796.45

**Model based on the estimates in Table 4A.**

$$SP_t = -166.78 + 0.113 GDP_t + Z \quad (8)$$

Where  $Z = E/(1 - 0.966B)$

**Time Series Analysis: Transfer Function (Period 1970-1 – 2006-4)**

Tables 5 and 6 present the analyses for the DOW and the S&P 500 using the transfer function analysis. It is interesting to note that the analysis gave rise to the same results as those of the auto-regression analysis, namely that the independent variables that were significantly related to the DOW index or the S&P 500 index were CPI, Savings, and GDP. CPI and Savings had negative effects on the DOW and S&P 500 and GDP had a positive effect. The variables, both dependent and independent were first differenced to make them stationary. The out of sample predictions were rather good and similar to those from the auto-regression analysis above. The error in Table 5A (AR1,1 and AR1,2) is represented by an autoregressive model where “a” in Equation 1 is  $a_t(1 - 0.155B^2 + .154B^3) = e$ . Also, the error in Table 6A (AR1,1) is represented by  $a_t(1 + 0.314B^3) = e$

Because all the models presented were equally adequate predictors, one may recommend using the simplest models for the DOW and GDP as well as for the S&P and the GDP, which are presented in Equations (6) and (8).

As can be seen below, the GDP model was also the best model for predicting the DOW and the S&P 500 for the period after the 2008 recession.

**TABLE 5. TIME SERIES MODEL**

A. DOW is the dependent variable, GDP, CPI, and Savings are the independent variables. Data, first quarter of 1970 (1970-1) till the fourth quarter of 2006 (2006-4).

Parameter	Estimate	Error	t Value	Pr >  t	Lag	Variable	Shift
AR1,1	-0.15504	0.08529	-1.82	0.0712	2	Dow	0
AR1,2	0.15455	0.08411	1.84	0.0683	3	Dow	0
NUM1	2.48173	0.53827	4.61	<.0001	0	GDP	0
NUM2	-200.51012	76.92167	-2.61	0.0101	0	CPI	0
NUM3	-2.48860	1.19847	-2.08	0.0397	0	Savings	2

B. Forecasts for the Dow index with the 95% confidence limits.

Quarter	Observed	Predicted	Std Error	95% Confidence Limits	
2007-1	1438.24	12488.3199	343.2771	11815.5092	13161.1306
2007-2	1482.37	12448.7330	497.1240	11474.3878	13423.0782
2007-3	1455.27	12570.0908	604.5984	11385.0996	13755.0819
2007-4	1549.38	12716.6240	729.5675	11286.6980	14146.5499
2008-1	1378.55	12775.9598	851.2886	11107.4648	14444.4547
2008-2	1385.59	12849.6477	962.8577	10962.4812	14736.8142
2008-3	1267.38	12932.0769	1074.7188	10825.6668	15038.4871
2008-4	968.75	12999.7058	1185.2456	10676.6671	15322.7445

**TABLE 6. TIME SERIES MODEL**

A. S&P is the dependent variable, GDP, CPI, and Savings are the independent variables. Data first quarter of 1970 (1970-1) till the fourth quarter of 2006 (2006-4).

Parameter	Estimate	Error	t Value	Pr >  t	Lag	Variable	Shift
AR1,1	0.31460	0.08120	3.87	0.0002	3	SP	0
NUM1	0.33395	0.06182	5.40	<.0001	0	GDP	0
NUM2	-33.14021	9.69929	-3.42	0.0008	0	CPI	0
NUM3	-0.30880	0.13890	-2.22	0.0278	0	Savings	0

B. Forecasts for the S&P index with the 95% confidence limits

Quarter	Observed	Predicted	Std Error	95% Confidence Limits	
2007-1	1438.24	1407.1662	39.3586	1330.0247	1484.3077
2007-2	1482.37	1411.8170	58.1690	1297.8077	1525.8262
2007-3	1455.27	1440.8273	74.6551	1294.5060	1587.1487
2007-4	1549.38	1452.1562	95.0075	1265.9448	1638.3675
2008-1	1378.55	1457.8318	113.4886	1235.3982	1680.2654
2008-2	1385.59	1472.8150	130.7478	1216.5540	1729.0760
2008-3	1267.38	1481.3357	148.4113	1190.4550	1772.2165
2008-4	968.75	1487.7219	165.2374	1163.8626	1811.5813

**Auto regression analysis for the period 2009-1 to 2016-4**

***DOW Jones***

The auto regression analysis for the period after the 2008 recession showed that only the GDP was related to the DOW index and the S&P 500 index. The DOW model based on the estimates in

Table 7A is given in Equation (9). The Total R-Square = 0.9728. Figure 3 showed a good fit between observed and predicted over the period 2009-1 – 2016-4. In addition, the model gave fair predictions for out of sample observation for the first three quarters of 2017 but fell short for 2017-4 and 2018-1 quarters. In general, the model underestimated the observed out of sample values. This may be due to outside intervention through deregulations (or in anticipation of) in the Trump presidency that caused the markets to soar.

### ***S&P 500***

Similar results to the DOW were obtained from the S&P analysis as shown in Tables 8A and Figure 4. The model in Equation (10) gave a good fit to the data as seen from Figure 4. The Total R-Square = 0.9793. As seen in Table 8B, the model underestimated the out of sample S&P 500 observed values due to what may be termed outside intervention (market deregulation or in anticipation of) during the Trump presidency.

**TABLE 7. AUTO REGRESSION MODEL**

A. The DOW index is the dependent variable and GDP the independent variable. Data are quarterly, from 2009 to 2016

Variable	DF	Estimate	Error	t Value	Pr >  t
Intercept	1	-22023	2845	-7.74	<.0001
GDP	1	2.1726	0.1722	12.62	<.0001
AR1	1	-0.6458	0.1535	-4.21	0.0002

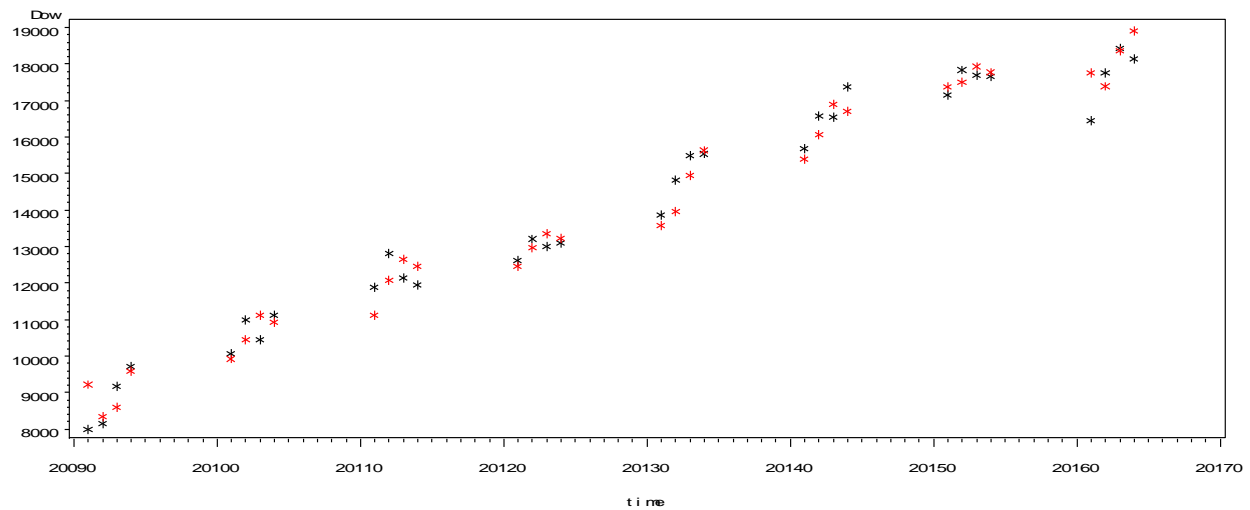
B. Observed and predicted values of the DOW index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample quarters

Quarter	Observed	Predicted	LCL	UCL
2017-1	19864.09.	18795.07	17257.17	20332.98
2017=2	20940.51.	19420.88	17685.40	21156.37
2017=3	21891.12.	20099.67	18253.15	21946.19
2017=4	23377.24.	20737.19	18813.80	22660.58
2018-1	26149.39	21240.78	19263.15	23218.41

***Model based on the estimates in Table 7A.***

$$\text{DOW}_t = -22023 + 2.1726 \text{ GDP}_t + Z \quad (9)$$

where  $Z = E/(1-.646B)$



**FIGURE 3. DOW INDEX AND ITS PREDICTED VALUE OVER TIME FROM MODEL (9). OBSERVED INDEX IS BLACK COLOR AND PREDICTED IS RED COLOR. DATA IS QUARTERLY FROM 2009 TO 2016**

**TABLE 8. AUTO REGRESSION MODEL**

A. The S&P index is the dependent variable and GDP the independent variable. Data are quarterly, from 2009 to 2016

Variable	DF	Estimate	Error	t Value	Pr >  t
Intercept	1	-3152	322.3851	-9.78	<.0001
GDP	1	0.2846	0.0195	14.59	<.0001
AR1	1	-0.6427	0.1530	-4.20	0.0002

B. Observed and predicted values of the S&P index with predicted lower and upper 95% confidence limits (LCL and UCL) for out of sample quarters

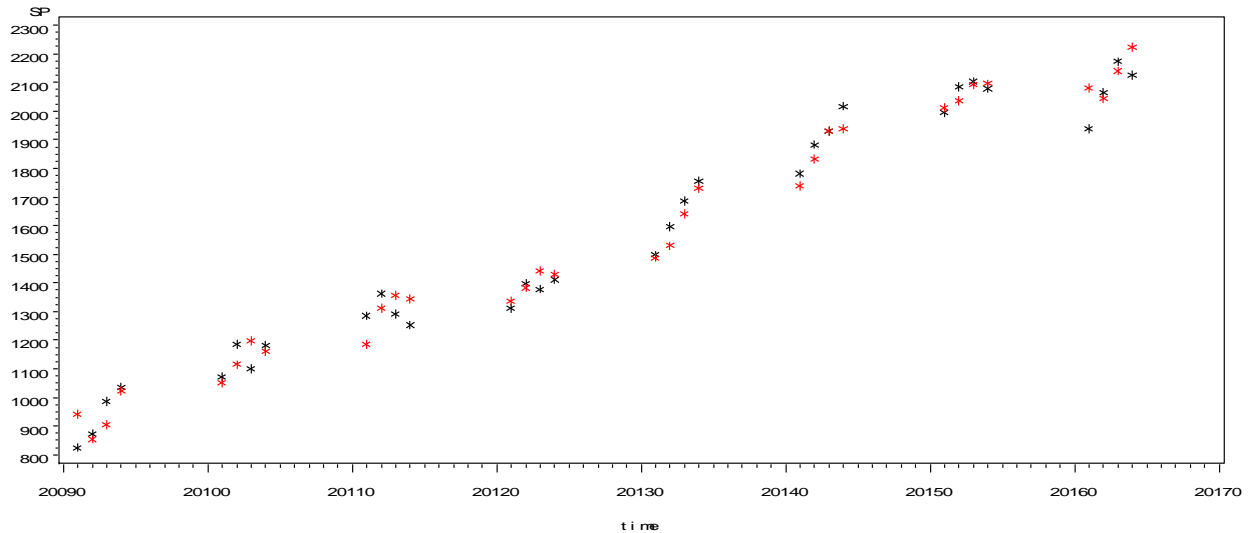
Quarter	Observed	Predicted	LCL	UCL
2017-1	2278.87	2205.83	2030.57	2381.08
2017-2	2384.20	2283.93	2086.20	2481.67
2017-3	2470.30	2370.27	2160.01	2580.54
2017-4	2575.26	2452.07	2233.17	2670.98
2018-1	2823.81	2516.90	2291.90	2741.90



### *Model based on the estimates in Table 8*

$$SP_t = -3152 + 0.285 GDP_t + Z \quad (10)$$

where  $Z = E/(1-.643B)$



**FIGURE 4. S&P INDEX AND ITS PREDICTED VALUE OVER TIME FROM MODEL (10). OBSERVED INDEX IS BLACK COLOR AND PREDICTED IS RED COLOR. DATA ARE QUARTERLY FROM 2009 TO 2016**

### **CONCLUDING REMARKS**

In this study, we used time series analyses (transfer function and auto-regression) to develop a model that can predict the DOW Jones and S&P 500 indexes over time from macroeconomic variables. The variables used to develop the models were: consumer price index (CPI), saving deposits at commercial banks, 10-year bond yield, Central bank interest rate, federal debt, unemployment rate, industrial production index, and money supply.

Out of the nine variables, the only variables that were significant and remained in the model were GDP, CPI, and saving deposits. GDP, as expected, had a positive effect on the DOW and S&P 500 indexes. On the other hand, CPI and savings had negative effects on both indexes. Of interest was the fact that GDP was the predominant variable. When CPI and saving deposits were deleted from the model, GDP alone was as good a model as all three variables together. The fact that the GDP model was simpler than the rest to use, makes it the choice model for predicting and forecasting the dynamics of the DOW index or the S&P 500 index over time. The models in Equations (6) (8) (9) and (10) gave an excellent fit to the DOW and S&P indexes over time for the time series data, pre and post the 2008 recession. The dependent variable (Dow or S&P index) at time  $t$  is a function of GDP at time  $t$ . Therefore, for forecasting the DOW or S&P index at time  $t$  one must know the

GDP value at time  $t$ . This can be obtained from the US Congressional Budget Office forecast of GDP at time  $t$ .

Out of sample forecasts of the indexes were fairly good for the first four quarters or more. Where the model underestimated the observed values of the DOW and S&P indexes was for the quarters in 2017 and 2018. This could be attributed to outside intervention because of deregulation, or in anticipation of, during the Trump presidency. There are studies in the literature (Bolanle & Adefemi, 2019; Malik et al., 2012; Ramdhan et. al., 2018; Sabău-Popa et. al., 2014) pointing to the fact that the stock market is positively influenced by the GDP. However, the present study quantifies this relationship by developing models that give the functional relation between the DOW index as well as the S&P index and the GDP. The models were all of the same function in which the index (DOW or S&P) at time  $t$  was a function of its lag at time  $t-1$  as well as the GDP at time  $t$  and its lag at time  $t-1$ . This simple model explained over 99% of the variation in the index and was a good predictor of the stock markets, barring any outside intervention.

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# **PERSPECTIVES OF TECHNOLOGY COMPETENCY IN BUSINESS INSTRUCTION**

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## **ABSTRACT**

The thesis revolves around business students' competency with technology. Business schools are passively adapting to a new strategy of instruction. The business school curriculum has remained for the most part stagnant because of traditionalism in education. Innovating the curriculum can satisfy the market's need for professionals with combined business and technology skills. Jobs in technology are no longer just for computer science students. Machine-human interaction requires competency in a hybrid between technology and business instruction. There are greater professional opportunities for students acquainted with Artificial Intelligence (AI). AI, cryptocurrency, blockchain, and data analysis have to be more than just a topic in a business course textbook. There is not a robust selection of academic literature regarding technology competency in business instruction. Business curriculum and instruction has to be developed with technology as a medium. Technology is a main component of business in modern times.

## **INTRODUCTION**

The study of technology has been concentrated mostly to what is referred to as Information Technology (IT). New terms emerge and Information Technology Competency (ITC) is yet another terminology for issues related to IT. The Oxford Dictionary defines IT as the use or learning of systems, for storing and sending information, particularly in reference to telecommunications. Interestingly, more recent academic articles have a slightly different definition of IT. Lopez (2013) indicates that IT has yet broader, functions, such as an impact on careers, creativity, and entertainment, to complement the usual telecommunication aspect. Fernandez-Mesa et al. (2013) propose that IT is a tool to enable access to critical knowledge expeditiously, enabling efficient management with elaborate information.

Most institutions of higher education in the United States and possibly abroad, offer courses in the use of a spreadsheet, a presentation program such as PowerPoint or Keynote, and Word processing document. Nevertheless, the use of technology has become such a major tool for business, that the aforementioned skills no longer suffice for graduate students to succeed professionally. In this perspective, colleges and universities must offer courses that provide the students with a medium to connect technology to all aspects of business instruction.

Beaudry et al. (2013) concluded that the higher cognitive skills offered by higher education have reached its peak and that students earning a bachelor's degree were, essentially, taking jobs from high school students. In fact, the authors make reference to individuals holding bachelor's degrees

and working as baristas in coffee shops, thus taking the usual jobs of high school students. This paper refutes the idea that the demand for jobs requiring higher education have been exhausted. Conversely, there is indeed a higher demand for jobs requiring skills in technology that bypass the common ability to use a spreadsheet and Word processing (King, 2015).

Because the requirements for workforce skills have changed, colleges and universities must work more proactively in embedding skills related to technology in business instruction (King, 2015). In fact, it would be ideal to implement technology in all offered courses, as needed for the optimization of the workforce in contrast with the jobs currently being offered. Furthermore, schools must instill the idea of using technology as a tool to solve problems that continue to change (Cuff, 2015). In other words, learning continues to change, and sharpening ones' skills is a never-ending state to remain employed using cognitive skills. In sum, the demand in cognitive tasks did not necessarily decline, as proposed by Beaudry et al. (2013), but the nature of the employment opportunities has changed.

Colleges and universities must adapt to offering business courses with greater infusion of technology competency. Technology competency is a broad term that allows more aspects of technology to be embedded in the fabric of instruction. For instance, Mortenson et al. (2014) argue that what is today Artificial Intelligence (AI) is the consolidation of technologies, such as electrical engineering, and quantitative methods, such as mathematics, statistics, and econometrics. Information systems is the association of decision making and computer science (Mortenson et al., 2014). Technology is moving faster than our ability to include these skills into instruction, thereby releasing graduate students into the market lacking the proper skills to embrace jobs that require a different set of cognitive skills.

## **THE IMPORTANCE OF UPDATING THE BUSINESS CURRICULUM**

According to Mamonov et al. (2015), the expeditious convergence of technologic trends has surged the amount of data to which business managers need to analyze. The global communication systems, miniaturization of the computer, greater storage technology, and the sheer volume of available data have empowered businesses to approach commerce in creative ways (Mamonov et al., 2015). For instance, reviews of products and services over the internet have become empowering tools to consumers and also to businesses. A high school student can create an app, or start a blog, that becomes an overnight sensation. The creativity in using technology competently to create new products and services is the essence of the new academic curriculum.

In this perspective, topics such as Artificial Intelligence, blockchain, cryptocurrency, creating an app, and datamining should become more permanent part of the business curriculum. According to research, 71% of interviewed recruiters indicated difficulty in finding suitable candidates because recent graduates lack the ability to analyze and problem-solve, collaborate in teams, understand business-context communication, aside from lacking in flexibility, adaptability, and agility (King, 2015). Furthermore, IBM Institute for Business Value surveyed industry leaders regarding the state of higher education and 51% of the interviewed stated that higher education

failed to meet the needs of the students, and 60% affirmed that it fails to meet the needs of the industry (King, 2015).

## **TRADITIONALISM IN HIGHER EDUCATION**

Quintana et al. (2016) remark about what prevents a match between higher education and employment needs. The inability to match what the market needs and students' abilities, the time gap to adjust to new job requirements, and the dynamics of the quantitative development of occupations, are some of the reasons to the mismatch between incoming graduates and job availability (Quintana et al., 2016). Burke-Smalley (2014) offers critique on terms of passive teaching which is simply based on lecturing and use of textbooks which many students do not read. Furthermore, authors discuss the use of a textbook as a framework for guiding learning; however, the renewal of modes for learning is imperative such as: collaborative learning, work-based learning, solving of real-life problems, professional mentoring, experiential learning, and so on (Burke-Smalley, 2014; Quintana et al., 2016).

Mulkey (2017) highly criticize colleges and universities as conservative institutions that avoid fundamental change at all cost. John (2015) remarks that faculty attitude toward technology is rooted in a plethora of factors; for instance: age, highest education earned, teaching experience, computer competency, relative advantage, and self-efficacy. These factors significantly influence faculty acceptance or resistance to technology (John, 2015). Coleman and Blankenship (2017) also criticize the disparity between what the market looks for in terms of the skills of graduates and the subjects being taught in academia. The authors state that some instructors are out of their field for long periods of time, or courses are taught by adjuncts who do not have sufficient power of bargain within the school (Coleman & Blankenship, 2017).

ACT, a nonprofit organization working to improve student readiness to ingress college, and the Business-Higher Education Forum (BHEF) offer recommendations for higher education (Business-Higher Education Forum, 2014). One of the recommendations from the leadership of the ACT and the BHEF is to promote access and effort to STEM majors, particularly for women and minority groups. Conversely, the Business-Higher Education Forum's membership is composed of affluent universities and might not necessarily offer a realistic picture of the population of minorities and women enrolled in small colleges and universities. The BHEF's website states that what sets them apart from other member-induced organizations is the fact that the members are CEOs and the nation's leading colleges and universities (<https://www.bhef.com/about>). The perpetuation of the have and have-nots in higher education is not a precursor for greater equality in STEM jobs. Actually, the Equal Employment Opportunity Commission (EEOC) reported in 2014 that, compared with the private sector, the tech industry employed more White males than Hispanics, or African Americans. It also employed less women to the rate of 36% in tech versus 48% for the private sector ([www.techrepublic.com](http://www.techrepublic.com)). Furthermore, White individuals are represented at a higher rate in the technology sector in the executive category, than in the private sector, at 83% ([www.techrepublic.com](http://www.techrepublic.com)). Apple's diversity report in 2017 presented a workforce of 21% Asian employees, 9% are black, and 13% are Hispanic; and 3% are multiracial. There were 54% white employees working at Apple in 2017. Only 32% were

female workers and only 23% of the female workers were actually working in tech roles ([www.techrepublic.com](http://www.techrepublic.com)).

In this perspective, the traditional system that corrodes higher education, also corrodes tech businesses. A system where a few schools have incredibly large endowment and several schools have no endowment at all simply perpetuates the current state of higher education. Small schools are usually populated by minorities and first generation college students, who will have difficulties fitting into a society with so many jobs in technology, mainly because these small colleges and universities cannot afford to invest in tech labs, professional development for the professors, or hire professors with top notch tech credentials. At most, small colleges and universities will have to find creative and alternative ways to bring technology competency into business instruction.

## **INNOVATING THE CURRICULUM FOR JOBS IN INNOVATION**

The inclusion of technology competency in business instruction has become more prominent in the academic field. Researchers from around the world are emphasizing the importance of technology enhanced learning and the importance of innovation in universities, while encouraging taking risks (Nurutdinova et al., 2018). Some authors suggest that faculty should embrace instead of banning technology to enfranchise students and improve the outcome of the learning experience (Crittenden et al., 2019). In a study by He and Guo (2015), the authors interviewed key business recruiters in regard to 103 open job positions in the Midwestern United States. Among the findings, the authors note that recruiters were more interested in hiring individuals with skills in information technology, even when the position was not IT related. In other words, technology competency is showing a spillover effect in areas that commonly were not experienced. Sevillano-Garcia and Vasquez-Cano (2015) propose the use of Digital Mobile Devices (DMD), also known as tablets and smart phones, to enhance education. The authors suggest that improvements in instruction using DMDs will increase the possibilities for students to become the creators of digital-content, improving upon it, and spreading the knowledge (Sevillano-Garcia & Vaques-Cano, 2015).

Crisan et al. (2014) address the need for adequate entrepreneurship education, with proper competency in Information and Communication Technologies (ICT) to conform with a 21<sup>st</sup> century digital economy. Zhang (2014) postulate that successful internet entrepreneurs do not necessarily need to be college dropouts (in reference to Bill Gates and Mark Zuckerberg). The author discusses a model for nurturing college students to become successful internet business entrepreneurs. The model combines technology, business, and the environment (Zhang, 2014). Zhang's (2014) model for a course in Internet Entrepreneurship include fundamental technologies, current technologies, business-driven technologies, and emerging technologies under the umbrella of Technology. It also includes product opportunity discover and evaluation, product development and management, marketing and sales strategies, finance and legal issues, and leadership under the umbrella of Business Management. Finally, the course includes internal and external environment under Environment.

**TABLE I. ZHANG'S PROPOSED INTERNET ENTREPRENEURSHIP COURSE**

Internet Entrepreneurship		
Technology	Business	Environment
<ul style="list-style-type: none"><li>• Fundamental Technologies</li><li>• Current Technologies</li><li>• Business-Driven Technologies</li><li>• Emerging Technologies</li></ul>	<ul style="list-style-type: none"><li>• Product Opportunity Discover and Evaluation</li><li>• Product Development and Management</li><li>• Marketing and Sales Strategies</li><li>• Finance and Legal Issues</li><li>• Leadership</li></ul>	<ul style="list-style-type: none"><li>• Internal Environment</li><li>• External Environment</li></ul>

*Note.* The table includes the contents to Zhang's proposed Internet Entrepreneurship course. Adapted from Zhang (2014).

Colleges and universities with limited funding will have to be creative and mindful about the need to embed technology competency in the curriculum. All students, regardless of the size of college endowment, show favorable attitudes toward technology (Sapkota & Putten, 2018). According to Zhang's (2014) research, students perceive the importance of technology embedded in the business curriculum as *moderately to extremely important* 96% of the time. Sapkota and Putten (2018), discuss the fact that the students are very engaged with technology, but they need guidance to use technology in meaningful ways for academics. Furthermore, the authors emphasize that learning how to use word processing, spreadsheet, and database software is not enough (Sapkota & Putten, 2018). Students need to use social media as a communication tool for business, but the business curriculum has not evolved sufficiently fast to offer courses that require the use of social media as a major form of communication with customers (Sapkota & Puttin, 2018).

Benson and Filippaios (2015) substantiate the fact that there is a gap in academic literature, in regard to the instruction of technological competencies in business schools. Zhang (2014) names several business courses with focus on technology, which are offered by MIT and Stanford University. The reality of schools with low endowment is rather different from affluent schools of higher education. Ellahi et al. (2019) state that academia must do its job in preparing young people to the reality of the future. The authors suggest the introduction of subjects such as Artificial Intelligence, Big Data, the Internet of Things (IoT), Augmented Reality, and Cloud Computing to higher education curriculum (Ellahi et al., 2019).

## **THE MARKET ENVIRONMENT THE STUDENT AWAITS**

There are, indeed, students with a bachelor's degree in business who are working in coffee shops, throughout the United States; thereby, seizing the ability of an individual with a high school diploma from having a job. Nevertheless, there are also thousands of available jobs which require some level of tech expertise and these positions are not being filled. According to Fenlon and McEneaney (2018), the United States has an average of 500,000 tech jobs unfilled and this number is predicted to double by 2020. The applications of technology to business are moving at a faster



pace, to which academia is suffering to adapt, still focusing on exams and lectures (King, 2015). In a research with corporate recruiters, 71% pointed that finding applicants with practical experience was the greatest challenge when looking for recent graduates (King, 2015). In this perspective, the data suggests that there are jobs for labor force graduating each year. What seems to be lacking is a focus on the skills the employers are searching for.

## **THE COLLABORATION BETWEEN HUMAN AND MACHINE**

Although there is a gap in literature in regard to the application of technology competency in the business curriculum, there are many academic references focused of issues of related to ethics and sustainability. To be more specific, these authors discuss the use of technology and the responsible use of data, as well as technology as a tool to sustain the environment and improve economic sustainability. So, the connection between technology and social responsibility is a trendier topic in academic papers (Faham et al., 2017; Mora et al., 2018; Walker & Moran, 2019). Research by Mora et al. (2018) identified technology-based courses from the most recognized online education platforms, namely EdX with approximately 14 million students and Coursera with approximately 30 million students. The findings suggest a plethora of courses with main concept that is well known to a business curriculum (i.e., economy, ecommerce, sustainability, business). The authors point out a lack of courses related to social business, social commerce, collaborative economy, and cryptocurrency (Moran et al., 2018).

The human-machine collaboration is a necessary amalgamation if humanity wishes to continue to prosper and move on to the new frontier (looking for resources in space, including inhabiting different planets). In any circumstance, some authors focus efforts on more earthly themes, such as the use of technology for sustainable development (Mora et al., 2018). The authors state that infusing technology and sustainability in education is the key to both, economic and environmental sustainability. Nowadays, many people understand the need to reduce one's own carbon footprint and technology is a versatile tool to for that purpose. Some applications (apps) and online tools can help anyone with a smartphone to calculate, and by extension, decrease carbon footprint. Some of the apps are the United Nations Environmental, Zero Carbon, Oroeco, GoGreen: Carbon Tracker, LiveGreen Daily Carbon Tracker, Skeptical Science, DropCountr, Seafood Watch, Good Guide, The Extra Mile, and My Planet. Some online tools are Carbon Footprint and WWF Carbon Footprint Calculator.

Mora et al. (2018) also discuss the use of technology to boost economic sustainability. One of the tools to economic sustainability could be the use of cryptocurrency, as JP Morgan is already studying the viability of using it as legal tender for international payments. Undoubtedly, the use of cryptocurrency would facilitate international business transactions and, by extension, support economic sustainability. Another interesting concept connected to idea of technology and economic sustainability is Uber. There are, however, its pros and cons to the thousands of employment opportunities afforded by the company. Uber has given women and minorities an opportunity to work without the fear of discrimination. It gave women with children the ability to make money during the time their children are at school, or the grandparents' house. Conversely, it has been reported that the earnings afforded by Uber are not always compatible with the expenses

provided by such an expensive a tool as a vehicle. One also ought to wonder about the carbon footprint associated with so many cars running around.

Faham et al. (2017) emphasize the need for colleges and universities to take the lead in instruction regarding global issues such as food insecurity, water management, climate change, biodiversity, non-renewable energy management, social inequality, and the health care system. Undoubtedly, technology can help us calculate the chances to improve human condition. The authors proposed the development of sustainability competencies characterized by inter and trans-disciplinary teaching techniques, problem-oriented teaching, and linking formal and informal learning (Faham et al., 2017). In this perspective, building a strong connection between the technology the students enjoy so much with the processes established to create that technology in the first place. Introducing some of these concepts to all business subjects seem like a reasonable call, but ultimately, some form of technology instruction should be embedded to all disciplines. Field trips to places where individuals are currently working alongside technologies is another idea the students could appreciate. Furthermore, the creation of labs would reinforce the acquired knowledge even further, since the student can already practice what she or he learned with the support of the instructor. Experiential learning is an important tool for recent graduates looking for employment.

Walker and Moran (2019) have an approach of social responsibility that emphasizes marketing in the digital age. The authors emphasize that, as much as technology is a tool to improve record keeping, it has also shown issues related to social responsibility and the misuse of data (Walker & Moran, 2019). Most colleges and universities do not address the responsible use of data in the curriculum albeit knowing the student will be manipulating someone's personal data in the near future. According to research, a majority of firms plan to increase marketing budgets by 50% not only because of the low cost of online channels but because of the value of obtaining consumer information (Walker & Moran, 2019). To illustrate this shift, the authors highlight Direct Marketing Association's CEO decision to change the business' name to Data and Marketing Association (Walker & Moran, 2019). The increased use of data is directly related to its profitability, thereby increasing the chances for people's personal information to be misused due to managerial oversight. That is yet another job opportunity afforded by technology. The data privacy officer, perhaps.

Luckily, some entrepreneurs are working hard in demonstrating the possibilities of the collaborative work between humans and machines. One example is that of Tom Szaky, the CEO of TerraCycle. He has been working tirelessly trying to convince big brands, such as Procter and Gamble, Danone, Unilever, PepsiCo, and others to bring back the milk man. In other words, to reutilize the containers consumers throw in the trash every day. Some of these products are deodorant, ice cream, toothpaste, yogurt, mouthwash, laundry detergent, shampoo, conditioner, and a multitude of other products. Szaky wishes consumers to order products online (just like it has been done), however, the consumer will return the container when making the next purchase. In this perspective, the same container can be reutilized several times and the consumers have the convenience to receive products at home and participate in an impactful recycle initiative (Wiener-Bronner, 2019).

Another example of new technology applied to environmental protection is a design by Boyan Slat from The Ocean Clean Up. Slat developed a machine that is a buoyant barrier to capture trash from the oceans (Scott, 2019). It is reported that about 91% of all produced plastic in the world has never been recycled and that, on average, people eat a credit card worth of plastic every week as microplastic has become part of the diet of the food people consume (Wiener-Bronner, 2019). Clearly, the use of technology to aid humans in cleaning the mess produced by ourselves and our ancestors is imperative at this point in time. Opening the doors of creativity to young people in college to pursue such endeavors is precisely what is expected of institutions of higher education.

## **TECH JOBS ARE NO LONGER JUST FOR COMPUTER SCIENCE STUDENTS**

Although there is a gap in literature in terms of discussing the adjustments needed to adapt the business curriculum to technology competency, there is a considerable number of sources calling for the reform of higher education. Some of the literature is focused on social responsibility (either in terms of the environment, or the privacy of individual information), other scholars will emphasize accounting practices, or social media. The matter of fact is that technology competency has entered most aspects of life and, likewise, should enter all aspect instruction. Students usually know how to post on their personal social media platform, but they are not always instructed on how to use social media for business. Nearly all organizations (public, nonprofit, or for-profit) use social media to connect with costumers and therefore, need workers with skills to manage specific aspects of social media (Freberg & Kim, 2018). Freberg and Kim (2018) discuss the adaptation of the business curriculum to social media instruction covering the following aspects: content creation, principles of public relations, writing, analytics, and handling crisis. Most teenagers today can learn how to handle a social media platform and such skills are no longer expected solely from a computer science student. In this perspective, the evidence suggests that greater focus on social media content is important in business instruction.

Research by PwC and the Business-Higher Education Forum (BHEF) revealed that 31% of executives surveyed have concerns about their firm's ability to hire individuals with the skills needed to run the firm's AI technology (Fenlon & Fitzgerald, 2019). Furthermore, the research found 54% of the interviewed CEOs worried about the lack of people with the skills to analytically use the tremendous amount of data collected (Fenlon & Fitzgerald, 2019). Finally, the study pointed to 55% of CEOs stating that the gap in skills related to technology would stifle the company's growth. In this perspective, business leaders refer to the need of reskilling or training employees in order to remain competitive (Cardenas-Navia & Fitzgerald, 2019; Fenlon & Fitzgerald, 2019).

The leadership of major telecommunications company AT&T took reskilling in its own hands. It initiated a partnership with Georgia Tech to properly train its workforce (Donovan & Benko, 2016). According to Donovan and Benko (2016), AT&T has approximately 280,000 employees who were, for the most part, trained in a different era. In other words, individuals received their degrees at a time in which technology was not changing so rapidly and its reach was not as prevalent. As AT&T continue to expand operations and acquire new companies, such as DirecTV; the leadership found no other way but to concede to customer demand. Between 2005 and 2015

data traffic increased more than 150,000% through its network, and the company's forecast indicate 75% of its network will be controlled by software-defined framework by the year 2020 (Donovan & Benko, 2016). Because of the increase in competition for workforce with technical skills, the leadership of the company decided to invest in reskilling and consolidation of roles. In other words, programmers are no longer just writing code, they have greater job mobility (Donovan & Benko, 2016). Furthermore, AT&T also changed the compensation system for the employees, emphasizing skills, as opposed to seniority.

## **THE OPPORTUNITIES AVAILABLE WITH ARTIFICIAL INTELLIGENCE**

Artificial Intelligence (AI) is a technology that support human activity, just like the internal combustion gave rise to chainsaws, lawn mowers, cars, trucks; consequently, industry as a whole developed (Brynjolfsson & McAfee, 2018). Although some may find the concept of AI intimidating, many of us use this technology in a daily basis. For instance, customer reviews on a website (such as Amazon) would trigger a suggestion of a product one might want to purchase. Facial recognition will allow someone to unlock a smart phone. Historical market data might influence a customer in purchasing certain types of stocks. Store transaction details might trigger a system to detect fraud (Brynjolfsson & McAfee, 2018). There are so many other applications to AI and this technology is becoming each day more within reach of businesses. AI is no longer just for the tech guy who went to school to learn Computer Science. In this light, employees will increasingly find themselves dealing with AI in business transactions.

## **ARTIFICIAL INTELLIGENCE WITHIN REACH**

Even though the advances in technology might result in job loss, people do not refrain from using it. Banks and grocery stores, for instance, have been using ATM and self-assistance scanning for many years, replacing human labor. Artificial Intelligence (AI) goes a step further as computers use data to make predictions regarding consumer taste. Walmart and Regal Cinemas took a direct hit from Amazon and Netflix, which rely heavily on AI technology (Davenport et al., 2018). Big companies, such as General Electric (GE), use AI to predict when a part of a machine will need replacement; and Danske Bank improved its fraud detection by 50% due to AI (Wilson & Daugherty, 2018a). Mercedes-Benz was able to increase customization of its vehicles using AI. Unilever, with a workforce of approximately 170,000, uses AI to screen potential candidates. The company's Human Resource managers only meet with the candidates after they play an online game and submit a video of themselves (to observe body language and tone). According to company officials, the easy access to smartphones allowed for greater diversity among the pool of applicants (Wilson & Daugherty, 2018a). The entertainment industry is also making great use of AI, as previously noted with the example of Netflix. Walt Disney World resorts use AI to boost the experience of its guests. Disney's guests wear a wrist band to make purchases inside the parks and the resorts, open the door of their rooms, and interact with the attractions. When a guest is standing in line, their name might just pop up on a screen, as the machines read the guest's wrist

band. Apple's virtual assistant Siri and Microsoft's virtual assistant, Cortana; are also examples of AI within reach.

The fact is that AI and other technologies can greatly improve human condition and, despite of the fear for job security, these trends will not fade away. AI can assist with problems that society demand to solve. Robots in factories can carry parts that are too heavy for humans, thereby reducing the risk of accidents and potential lawsuits. Cancer treatment can be accelerated with a plethora of data and drug combinations assessed by scientists throughout the world. The access to massive numbers of financial data can trigger the alarm to fraud, or another financial meltdown. The ability to read genetic information and accumulate data, allows for the prediction of a patient's predisposition to certain diseases (Wilson & Daugherty, 2018a). Conversely, people have also taken to technology for enjoyment. Spotify allows customers to choose the songs they want to listen, without having to purchase an entire album. The application even uses AI to make recommendations of songs you might like, given your input. Netflix and Amazon Prime also recommend movies, based on what you have previously watched. Many customers have decided to completely give up on cable TV and only use streaming as a preference. This is a perfect example of industry changes reflected upon the progress in the field of technology. Failure to adapt to these changes is equivalent to a football team playing always the same strategy, without taking into consideration the strengths and weaknesses of the opponent.

The financial investment in technology cannot be underestimated and, because of that, institutions of higher education that want to remain relevant must change. The students need the skills to proficiently understand and manipulate technology they already use in a daily basis. Wilson and Daugherty (2018b) state that employees need to have fusion skills; meaning, the ability to juggle the human-machine interface. Students need to get acclimated to work with AI-enhanced processes, just like radiologists use X-rays and MRI (Wilson & Daugherty, 2018b). The idea is that businesses and technology should interact in a collaborative way, without the sole purpose of displacing workers and just saving money on labor. Such dynamic is not sustainable as businesses won't last without the worker's income to support the system in the first place. In any case, the workforce must be properly trained to adapt to an ever-changing business environment.

## **DEVELOPING BUSINESS CURRICULUM**

Considering the speed to which technology develops, it is not completely out of place to view each generation as a bit outdated from its successor. For instance, for an individual born in Brazil in 1976, growing up surrounded by cell phones and laptop computers is an alien scenario. For an individual born in 2011 basically in any place in the world, however, being surrounded by cell phone and laptop computers is commonplace. Most professors in academia today, have attended school at time in which technology was very different from what it is today. Aside of a change in perspective, there is also the traditionalism that is well known in academia. Tradition is not a bad concept. Tradition is the backbone of civilization. In any case, to send students into an ever-changing market, we need ever-changing instruction. Textbook-based teaching and exams are not necessarily the main tools to engage the next generation of businesspeople. In dealing with technology, a hands-on approach is imperative. Not all available textbooks focus on the importance

of technology and how the students can use to effectively run a business. The separation between business instruction and computer science is no longer valid; rather, a hybrid is in order.

According to Pan and Seow (2016), “the pervasiveness of information technology (IT) in business has altered the nature and economies of accounting activities” (p. 166). The authors include cloud computing, eXtensible Business Reporting Language, and business analytics as some of the technologies that has impacted accounting as a profession. In 2016, businesses such as Microsoft, Facebook, and Google spent approximately \$20 to \$30 billion dollars in AI (Davenport, Libert, & Beck, 2018). Even though these businesses are big players of the tech industry, such businesses still need managers to guide the companies.

Even schools with lower endowment can work creatively teaching useful skills. For instance, business schools could include website creation and maintenance in their curriculum. There are ways in which students can create a free webpage. Wix is an example of such free resource. Students need to understand with better clarity how cryptocurrency works as major banks are already studying the implementation of this new financial tool. Students should be able to learn how to create their own app. They also need to learn how to analyze the massive amounts of data processed by computers and make decisions based on the data collected. In this perspective, a mix of lab work and lecturing can be an effective combination.

Furthermore, the experiential learning can go even further with field trips, as students could visit businesses using some, or all of the technologies covered through the semester. These are just some examples as to how technology can be added to the curriculum and expanded upon for richer delivery. Clearly, each subject has its own particularities, for instance, marketing is big with data analytics as the consumer has such easy access to compatible products and products’ review. Google Analytics is a great tool to analyze a marketing campaign, so an instructor teaching Marketing should focus on such available tools. In sum, just teaching from the textbook will no longer satisfy the job opportunities being offered.

## **CONCLUSION**

### **Making the Case for Change in Business Instruction**

Beaudry, Green, and Sand (2013) have made a strong case in regard to the number of cognitive tasks, or jobs, offered and the number of graduates joining the workforce each year. The authors suggested that the number of high cognitive tasks have been exhausted and individuals with bachelor’s degrees have started to take away the jobs of students with a high school diploma. As previously stated in this paper, the United States has an average of 500,000 tech jobs unfilled and the number is expected to increase by 2020 (Fenlon and McEneaney, 2018). This fairly invokes the question: do we not have sufficient jobs that require high cognition, or are we not properly training the workforce to the future of jobs?

There has to be a logical reason as to why the United States government is investing so much in Science, Technology, Engineering, and Mathematics (STEM) within the country's public schools. According to the US Department of Education, the government spent \$540 million dollars with STEM in the 2019 fiscal-year (US Department of Education, 2019). The demand for skills related to technology will continue to increase, as consumers continue to trade high tech products for even higher tech products. Big corporations such as Apple, Amazon, and Samsung, already strategize upcoming products and services, with the customer's tech demands in perspective. When beating the competition translates into smarter products and services, it is not unreasonable to imply that the jobs will remain in that area. Zhang (2014) states that the majority of internet entrepreneurs who dropped out of school felt that college was not leading them where they wanted to go. The students were more entrepreneurial than the courses they were taking. Unfortunately, the school system in general, is outdated and traditionalist by nature. For more than 100 years people have been seating orderly in classrooms, taking exams that usually measure the ability to memorize more so than to solve problems. The lack of congruity between the jobs being offered right now and instruction in higher education could be a reason why graduate students are lacking the proper skills to claim jobs that requires higher cognition.

Moreover, with prices of building a mobile app falling from around \$200,000 in 2010 to around \$10,000 in 2017, it is likely that many business students will take an interest in building their own online business (Hosanagar & Saxena, 2017). Online businesses are less taxing to start than brick and mortar businesses. In this perspective, training the business student to the future of business will require greater periods of discovery and lab-involved assignments and less lecturing and textbook exercises. Jonathan Bush, the co-founder and former CEO of athenahealth, stated that his team was able to eliminate 3 million hours of work from the healthcare system just by using machine-learning and automation and categorization of faxes (Bush, 2018).

There are many ways in which AI can assist in making business practices less bureaucratic, but we still need people to tell the machines what to do. The fact is that there are infinite ways in which students can become successful business professionals. It does, however, take tinkering and creativity working alongside with technology. If the students do not practice tinkering and creativity in college, how are they to be successful in a time that requires such traits? How are the students to learn how to open their online business using an app, if they don't know how to make an app? How are they to work with AI if they don't understand it? There is no future of business without technology. Business schools must adapt to it or risk obsolescence as students are unable to find jobs.

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# **FEMALE ENTREPRENEURS IN DEVELOPING COUNTRIES: A REVIEW OF RURAL VERSUS URBAN REGIONS**

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## **ABSTRACT**

The paper provides a literature review on female entrepreneurship studies in developing countries. To contribute to the gender and entrepreneurship literature the study aims to identify the research gap on the impact of several context and content-wise factors with a focus of rural versus urban regions, industry sector, socio-economic and cultural setting and educational attainment on female entrepreneurs in developing countries. The study aims to bring an understanding on how women entrepreneurs recognize opportunities and pursue entrepreneurial activities in rural regions in developing countries. Based on a multidisciplinary theoretical framework the paper intends to build theoretical explanations for the current issues and generate questions for further studies.

## **INTRODUCTION**

Women entrepreneurs play a substantial role in growing their economies (Terjesen & Amoros, 2010; GEDI, 2013; Sarfaraz et al., 2014). Female entrepreneurs contribute greatly to the acceleration of economic growth through job creation and innovative products and services (Yadav & Unni, 2016; Lock & Smith, 2016). More studies on female entrepreneurship are needed to develop theories, raise awareness, address challenges and advance policy and programs (Brush & Cooper, 2012; Jadav & Unni, 2016). Although over the years female entrepreneurship studies have increased still there is a growing need to understand female entrepreneurship, especially in the developing countries (Brush & Cooper, 2012; Jadav & Unni, 2016). A cross-disciplinary systematic literature review on female entrepreneurship studies between 2000-2013 indicates that most female entrepreneurship studies have increasingly focused on developed countries compared to developing countries (De Vita et al., 2014a).

To date studies on female entrepreneurs in developing countries were usually focused on certain topics such as gender differences and findings were generalized. Earlier studies on women entrepreneurs in developing countries reported multiple challenges such as accessing resources, finances and networks (Goyal & Yadav, 2014; Ramadani, 2015; Beqo & Gehrels, 2017); societal inequality (Jones & Lefort, 2006); cultural and social limitations (Akhalwaya & Havenga, 2012); economic, legal and technological barriers (De Vita et al., 2014b; Della-Giusta & Phillips, 2006; Fletschner & Carter, 2008; Nagadevara, 2009; McIntosh & Islam, 2010; Welsh et al., 2013). Although these findings on female entrepreneurship highlight challenges that female entrepreneurs face in their entrepreneurial activities in developing countries, literature reported that usually most earlier studies have rather weak theoretical framework (De Vita et al., 2014b). It was indicated that

there is a need to include a multidisciplinary framework, build more theoretical explanations for the current issues and especially analyze the female entrepreneurship through a feminist theory (De Bruin et al., 2007), shifting the focus from gender-based differences to how social circumstances impact gender (Ahl & Nelson, 2010; Naudé, 2010; De Vita et al., 2014b).

Most of the earlier studies did not provide comparison on different other contexts and contents as well and findings were generalized. Literature survey also indicates that there is a need to include various context and content factors (Ahl, 2006; De Vita et al., 2014b) to advance female entrepreneurship studies.

## **THE PURPOSE OF THE STUDY**

To contribute to the gender and entrepreneurship literature and to respond to the need to further study various content and context dimensions and build more theoretical explanations, the paper aims to review several context and content dimensions that impact female entrepreneurial activities in developing countries. Based on a multidisciplinary theoretical framework the paper intends to build theoretical explanations for the current issues and generate questions for further studies on a few other context and content dimensions. The context dimension includes rural versus urban regions and the type of the industry sector and the content dimension includes socio-economic factors and educational attainment.

## **THEORETICAL FRAMEWORK**

### **Social Feminist Theory (SFT)**

Literature survey suggested there is a need to include feminist theories to study female entrepreneurship as feminist theories may bring unique insights in understanding female entrepreneurial activities. (Bird & Brush, 2002; De Bruin et al., 2007). In this study we will refer to social feminist theory. SFT argues that, variances in female and males' social relations stem from early socialization and lead to differences in certain traits and power relations between genders (Shava & Rungani, 2016). SFT posits that due to differences and, at the first stage of socialization and learning experiences, there are inherent unique characteristics that define genders (Fischer et al., 1993; Greer & Greene, 2003). These specific characteristics that occur through socialization impact how genders perceive themselves and their environment, and how they view the world (Johnsen & McMahon, 2005). As a result, the society may ascribe roles in gender and that results in females and males differing in self-perceptions. Unlike liberal feminist theory, social feminist theory does not suggest that women are disadvantaged or discriminated nor are they inferior. SFT suggests that women and men may develop different but equally effective characteristics, skills, psychological traits, motivation and intentions due to the differences in socialization (DeMartino & Barbato, 2003; Camelo-Ordaz et al., 2016). For instance, due to gender ascribed roles that arise from earlier socialization, males exhibit higher levels of self-assertion and

autonomy and risk-taking propensity than females (Gottschalk & Niefert, 2012). Females also tend to exhibit higher level of fear of failure than men (Minniti, 2009; Sánchez-Cañizares & Garcia, 2010; Camelo-Ordaz et al., 2016). Also, in some cultures due to social expectations of traditional gender stereotypes that men are considered self-assertive and forceful while women are expected to be emotional and conservative (Eagly & Wood, 1991; Powell & Ansic, 1997). In some societies, women may not be socialized to “negotiate” (Greene et al., 1999). Earlier studies found that these inherent characteristics are relevant to entrepreneurship and reflect in females’ entrepreneurial intentions, firm size and performance. A study using the social feminist theory found that differences in socialization of female entrepreneurs may be related to smaller size, slower income growth, and lesser sales per employee of their firms compared to male entrepreneurs (Fischer et al., 1993). Other studies using the SFT found that females have less intention than men to engage in entrepreneurial activities (Veciana et al., 2005, Wilson et al., 2007). Further Camelo-Ordaz et al. 2016 study found that fear of failure acts as a critical barrier in reducing the entrepreneurial intention of female non-entrepreneurs.

A Lao People’s Democratic Republic (PDR) study on micro, small, and medium sized enterprises (MSMEs) aimed to understand the applicability of social feminist theory and liberal feminist theory suggested that social feminist theory is more applicable than liberal feminist theory in the entrepreneurship context (Sengaloun et al., 2014). The study empirically tested 1,534 Lao enterprises from different industries and found that consistent with social feminist theory social and cultural structures exist in micro, small, and medium sized enterprises. The study found that there are socially inherent differences between males and female entrepreneurs’ experiences earlier on, such as socially segregated duties and cultural norms and expectations, and this reflect in genders’ venture activities, entrepreneurial decision making and strategic approaches (Sengaloun et al., 2014). In sum, based on the SFT, it is argued that society may condition potential for entrepreneurship generating differences in gender’s behavior.

### **Austrian School of Thought**

Austrian School of Thought associated with the work of Kirzner (1973) and Hayek (1945) defines entrepreneurship based on mostly asymmetry of information and suggests that information gaps exist. Austrian School of Thought posits that in a competitive market economy, knowledge is unevenly dispersed (Hayek, 1945), and only ‘alert’ individuals engage in non-random discovery and become entrepreneurs (Kirzner, 1973). Austrian school of thought stresses the importance of market arbitrage in identifying opportunities (Kirzner, 1973) and posits that marketplace inefficiencies create disequilibrium profit opportunities (Kirzner, 1979; Kaish & Gilad, 1991). Kirzner (1973, p. 16) argued that “the entrepreneurial element in the economic behavior of market participants consists....in their alertness to previously unnoticed changes in circumstances which make it possible to get more in exchange for whatever they have to offer than was hitherto possible.”

Austrian School of Thought proposes that opportunity recognition is critical in entrepreneurship (Kirzner, 1973, 1979). Opportunity recognition is defined as perceiving a profitable business opportunity (Bygrave & Hofer, 1991; Kourilsky, 1995; Hills et al., 1997). According to the

Austrian School of Thought, opportunities are recognized as individuals have asymmetries of information (Hayek, 1945; Shane & Venkataraman, 2000). Only alert individuals who discover profit opportunities can identify and exploit market opportunities (Kirzner, 1973).

Therefore, opportunity recognition occurs by random discovery without having been planned (Kirzner, 1973). Kirzner (1997, p. 71-72) noted that “an opportunity for pure profit cannot, by its nature be the object of systematic search. Systematic search can be undertaken for a piece of missing information but only because the searcher is aware of what he does not know and is aware with greater and lesser certainty of the way to find out the missing information. But is the nature of an overlooked opportunity that it has been utterly overlooked, i.e., that one is not aware at all that one has missed the grasping of any profit. What distinguishes discovery (relevant to hitherto unknown profit opportunities) from successful search (relevant to the deliberate production of information which one knew one had lacked) is that former (unlike the later) involves the surprise that accompanies the realization that one had overlooked something in fact readily available.” The Austrian School of Thought offers insights into opportunity recognition with respect to alertness and possession of information. (Westhead & Wright, 2000, p. xiv).

## **Institutional Theory**

Institutional theory posits that social structures establish as authoritative formal (i.e. legislature) and informal (i.e. shared norms, values and beliefs) guidelines for social behavior. The theory argues that institutional environment sets the standards of the appropriate behavior and pressure the society to conform (Suchman, 1995; Brundin & Wigren-Kristoferson, 2013). Institutions refer to formalized rational beliefs displayed in individuals’ behaviors (Lammers & Barbour, 2006). Institutions are also considered as drivers of change that lead to a social process by which individuals in a society form their policies, work habits, beliefs, expectations and values and norms (Scott, 1981; Palthe, 2014). Social structures refer to cultural-cognitive, normative, and regulative elements that are rooted in societies and guide social life (Scott, 2004).

Regulative elements within the institutional system refer to the legal political environment that includes policies, rules and regulations (Leaptrott, 2005). Regulative elements represent the legal obligations that society must conform (Palthe, 2014). Normative elements refer to societal factors that include society’s expectations on work roles, habits, norms, duty and responsibilities (Scott, 1995). Normative elements are moral obligations that emphasize informal structures and guide towards preferred behavior (Palthe, 2014). Cognitive elements refer to commonly shared values, beliefs and mindset (Baughn et al., 2006; Vossenbergh, 2013; Palthe, 2014) that reflect social identity and personal desire (Palthe, 2014). In sum institutional theory suggests that regulative, normative and cognitive elements of the external environment provide a social structure and framework that organizations and people in a society must conform.

We now return to female entrepreneurial activities in developing countries. Earlier female entrepreneurship research indicated a need to include various context and content factors (Ahl, 2006; Naudé, 2010; De Vita et al., 2014b) to advance female entrepreneurship studies. Including

various contexts plays a critical role in entrepreneurship studies because of the unique choices and circumstances that entrepreneurs have.

## **CONTEXT DIMENSION**

### **Rural versus Urban Areas**

Entrepreneurial start-up rate is reported lower in rural areas than urban areas (Sternberg, 2009; Yu et al., 2008). Yet there are very limited comparative studies on rural versus urban areas in a developing economy context. Literature review indicates there are limited studies on female entrepreneurship from developing countries and these studies usually generalize findings without separating rural versus urban areas. Most of the few studies that explore rural female entrepreneurs in developing countries were not rural-urban comparative studies (Maruthesha et al., 2018; Chakravarty, 2013). Very few studies on rural-urban female entrepreneurship did not include a theoretical framework and focused on individual specific characteristics excluding the social, economic and political conditions in the external environment (Bello-Bravo, 2015; Sivanesan, 2014; Savitha et al., 2009).

Savitha et al. (2009) study aimed to develop a scale to measure entrepreneurial behavior of female urban and rural entrepreneurs looked into mainly individual specific variables (i.e. demographic characteristics such as marital status, birth order, etc.; socio-economic background; and individual's venture-related characteristics such as her ownership, investment, training). The study found differences in education, socio-economic status, and investment level of urban and rural female entrepreneurs. Yet, since the study's focus was mainly on individual entrepreneurial behavior, many other factors in the national entrepreneurial framework setting were not included in the study. Another rural-urban female entrepreneurship comparative study also focused on individual specific factors such as education level, age, marital status and socio-economic background to analyze motivational forces and address challenges among rural and urban women entrepreneurs (Sivanesan, 2011). Another study that investigates reasons for migration of female entrepreneurs from rural to urban areas in West Africa also focused individual characteristics of the participants (i.e. marital and educational status, family support) and the impact of migration on their personal and professional lives, excluding the effects of numerous factors in the external environmental setting of rural and urban regions (Bello-Bravo, 2015).

Although these earlier studies had a good start towards creating awareness on female entrepreneurs, still there is a growing need to address the external environment and national entrepreneurial framework setting and address unique circumstances of the rural and urban regions. Since urban and rural regions present unique characteristics for female entrepreneurial activities, comparative studies will provide more specific suggestions and action plans and even potential cooperative strategies for the improvement of entrepreneurial activities.

Rural areas in developing countries present multidimensional complex issues, such as low population density, limited local demand, limited access to qualified labor, distance to services,

weak infrastructure, limited access to credit providers and localized markets, climate, public policy, limited resources (Costa et al., 2011; Kumar, 2014), patriarchal life and lack of ownership (Olja, 2016). These findings highlight the needs of rural female entrepreneurs yet, due to a lack of comparison with urban regions, the actual differences in available individual, economic, and social support resources between two regions may not be identified properly.

Institutional theory posits that legislature and cultural social structures established in communities provide guidelines for expectations on work roles, habits and social behavior and these sets of standards pressure the individuals of the society to conform. Therefore, institutional structures need to be addressed in entrepreneurial studies as they guide the entrepreneurial behavior in that community. For instance, “Gender and Rural Employment Policy Brief # 3” (2010a) reports that discriminatory laws, regulations and social norms in rural areas in developing countries prevent females from starting their entrepreneurial ventures. Further, institutional structures in rural and urban communities may differ and, as a result, expectations and norms may vary in regions, especially in rural and urban areas. Due to a lack of comparison between institutional structures of urban and rural regions, either issues in rural areas can be magnified; not be accounted properly or entrepreneurial behavior in that region that guide entrepreneurial activities cannot be addressed effectively through proper aid programs. Therefore, based on the institutional theory it is imperative to study extensively critical parameters such as legislation, social and cultural norms in each area to better reveal the specific needs of each area and highlight the contrast between them. Addressing the contrast between rural and urban regions in developing countries reveals the situation of institutional structure and highlights the extent of social and legislative expectations gap between them. In sum, based on the institutional theory, comparative studies on rural-urban areas better pinpoint the needs and provide suggestions for entrepreneurial policy and programs, NGO and international aid programs that are more tailored to the specific needs of the female entrepreneurs in rural and urban areas. Based on this rationale we will develop the propositions below and suggest the following questions for further studies.

### ***Proposition #1***

Institutional structure impacts female entrepreneurial activities in rural and urban regions in developing countries.

### ***Proposition #2***

Female entrepreneurial activities differ in rural and urban regions in developing countries due to differences in institutional structure in each region.



### *Questions for further studies*

What specific institutional structure differences do play a role in female entrepreneurs' entrepreneurial activities in rural versus urban regions in developing countries?

What mechanisms may influence the institutional structure to facilitate female entrepreneurial activities in rural versus urban areas in developing countries?

How does the institutional structure influence female entrepreneurs' goal orientation and motivation in entrepreneurial activities in rural and urban regions in developing countries?

## **CONTENT DIMENSION**

### **Culture: (Rural versus Urban areas)**

Societal inequality was considered one of the important challenges for female entrepreneurs in developing countries (Jones & Lefort, 2006). United Nations (2008) report indicates that gender-based stereotypes and discrimination due to social norms escalate more in rural areas than urban areas. Cultural and social structural constraints pose more obstacles for rural women than urban women (United Nations, 2011) in developing countries. United Nations (2011) report indicates that

rural women spend more time than urban women and men in reproductive and household work, including time spent obtaining water and fuel, caring for children and the sick, and processing food. This is because of poor rural infrastructure and services as well as culturally assigned roles that severely limit women's participation in employment opportunities. Faced with a lack of services and infrastructure, rural women carry a great part of the burden of providing water and fuel for their households. In rural areas of Guinea, for example, women spend more than twice as much time fetching wood and water per week than men, while in Malawi they spend over eight times more than men on the same tasks. Girls in rural Malawi also spend over three times more time than boys fetching wood and water.

Numerous earlier studies on rural female entrepreneurs in developing countries are all in common that female entrepreneurs are constrained by societal norms and prejudices (Fletschner & Carter, 2008; Chitsike, 2010; Nguyen, Nguyen, Frederick, 2014; Rani and Sinha, 2016; Pathak and Varshney, 2017). Rural female entrepreneurs are expected to adopt culturally assigned roles and act within the cultural restraints of the rural society (Fletschner & Carter, 2008; Chitsike, 2010; Nguyen et al., 2014).

According to the social feminist theory, early socialization and learning experiences define gender ascribed roles, and society's expectation of females' responsibilities and household chores may impact the quality and rate of rural women entrepreneurs' entrepreneurial activities. For instance,

rural female entrepreneurs may more likely perceive entrepreneurial activities as part time than full time compared to their urban counterparts due to their household chores. Rural female entrepreneurs may suffer from lack of society support (Rani & Sinha, 2016; Akhalwaya & Havenga, 2012). Rural societies may differ from urban societies in occupational mobility, density of population, homogeneity of people, and pace of life, which all shape the social learning experience and inherent gender values that lead to gender perceived roles and responsibilities. Based on the social feminist theory, since urban regions may have different socialization than rural regions, then we expect differences in female entrepreneurial activities in each region.

To date, earlier research brought attention to the cultural restraints that rural female entrepreneurs face, yet most female entrepreneurial studies were not rural-urban comparative studies. In fact, based on the social feminist theory, due to the different socialization process, rural-urban female entrepreneurs may have inherent different characteristics which reflect in their entrepreneurial activities. Therefore it will be valuable to understand how differences in rural-urban socialization impact female entrepreneurial activities: the choice of the venture, the amount of time they devote on the venture, and the growth prospects, size and the profitability of the venture. Based on the social feminist theory, we suggest that more rural-urban comparative studies that explore the socio-cultural differences and various dimensions of social cultural norms are needed to better understand female entrepreneurial activities.

### ***Proposition #3:***

Female entrepreneurial activities differ in rural and urban regions in developing countries due to differences in cultural norms and societal expectations.

### ***Questions for further studies***

How does various dimensions of culture, such as social status, family life, cultural heritage, religion, social mobility, and socialization, influence female entrepreneurial activities in rural versus urban regions in developing countries?

How does socialization in rural and urban regions in developing countries differ in female entrepreneurs' choice of the venture, the amount of time devoted on venture, the growth prospects, size and the profitability of the venture?

What specific policy and programs that address social norms and cultural expectations should be implemented to empower female entrepreneurs in rural regions in developing countries?

How policies and programs that address social norms and cultural expectations to empower female entrepreneurs will differ in rural and urban regions?

## **Socio-economic institutions: Rural versus Urban areas**

While there are numerous socio-economic institutions in this study, we will mainly focus on government spending and financial freedom as these factors may highly moderate entrepreneurial activities and play a critical role in female entrepreneurship rates.

### ***Government spending***

This important socio-economic factor includes government spending on infrastructure and human capital provisions. We will focus here on infrastructure. A well-developed infrastructure facilitates innovation-driven entrepreneurial activities in a region/country responding to potential demand (Fuentelsaz et al., 2015). Infrastructure development includes transportation, communications network, water, legal system access to electricity, infrastructure projects, etc.

Infrastructure development is crucial for the enterprise development in a region. Yet in many developing countries, urban areas have more infrastructure development projects planned and underway compared to the rural regions. For instance, it was reported that in Vietnam, a developing country, urban regions have vast infrastructure projects and much higher rates of entrepreneurial start-ups than rural areas (Santarelli & Tran, 2013). Having access to a well-built infrastructure facilitates access to large and differentiated markets for production factors, such as capital, labor and services. Inadequate supply of physical infrastructure such as irrigation, transport, and communications may create an obstacle in access to markets, capacity building, limited mobility and access to raw materials and resources.

Poor rural infrastructure hinders female entrepreneurs' access to resources, markets and services (United Nations, 2011). Earlier research on female entrepreneurs in rural regions found numerous obstacles for female entrepreneurs that relate to weak infrastructure. For instance, it is reported that poor infrastructure of roads and transportation in India cause barriers in rural female entrepreneurs' access to raw materials (Mishra & Kiran, 2014). Further "limited mobility" and "access to transportation" and "inability to drive" and "possible problems of traveling alone" cause hurdles for female entrepreneurs in rural India (Mishra & Kiran, 2014, pp.95).

Institutional theory presumes that individual actions are guided by rules and norms set by institutions. Therefore, some prevailing formal institutions, such as government laws and regulations on the extent of government spending on infrastructure in a region, may affect the tendency and ability of individuals to undertake entrepreneurial activities in that region. The strength of infrastructure in a region may play a role in perceived opportunities, human coordination and the allocation of resources and prepare entrepreneurial framework for potential entrepreneurs.

#### ***Proposition # 4***

Government spending on infrastructure, a socio-economic factor, plays a role in female entrepreneurial attempts in rural regions. Female entrepreneurs are expected to have more challenges in rural regions than urban regions in accessing adequate supply of infrastructure in their entrepreneurial attempts.

#### ***Questions for further studies***

How will government spending on infrastructure development influence female entrepreneurial activities in rural versus urban regions in developing countries?

What drives growth in government spending on infrastructure in rural vs urban areas in developing countries and how does it relate to the rate of female entrepreneurial activities?

To what extent is differential quality in government spending on infrastructure impacting the types of female entrepreneurial outcomes in rural vs urban regions?

#### ***Financial Freedom***

Financial freedom as another key socio-economic factor is defined as access to an unrestricted banking environment. The availability of adequate credit and access to financial resources in a society are found highly correlated with the level of entrepreneurial activities in a society. (Drori et al., 2009; GEM, 2013; Fuentelsaz et al., 2015).

In some developing countries such as Vietnam rural regions have a lower ranking in access to finance than those in the urban regions (Vietnam Provincial Competitiveness Index, 2014). Further, credit institutions and banks require literacy, formal education, the knowledge of the business and a proper business plan for the entrepreneurial loan applications. In rural regions where female entrepreneurs have already hurdles with access to education and low literacy rate and lack of networking, they have more difficulty in accessing credit than those in urban regions.

Based on the institutional theory, we suggest that formal institutions, such as laws and regulations on the extent of government spending on infrastructure in a region, may affect the tendency and ability of individuals to undertake entrepreneurial activities in that region. Unfavourable conditions in local regulatory systems, such as a heavy regulated banking/financial system, place additional burdens on female entrepreneurs in accessing to the credit and raising investment capital. Especially in rural regions, heavily regulated banks could be more restrictive for female entrepreneurial loan applications as females in rural regions are reported to have many hurdles such as lack of collateral, lack of financial literacy, lack of physical access, lack of networking and lack of established track record. Credit institutions and banks require literacy, formal education,

the knowledge of the business and a proper business plan for the entrepreneurial loan applications. While it is relatively easier for the female entrepreneurs in urban regions to provide these requirements, usually these requirements are more difficult to meet by their counterparts in rural regions. Further, formal credit institutions and banks in urban regions could more easily collect personal credit information about the female entrepreneurial loan applicant or collateral than those in rural regions where credit information or collateral could be difficult to extract. As a result female entrepreneurs in rural regions could have more impediments than those in MDCs. In sum, the perceived difficulty in accessing credit and financial freedom especially in rural regions may hamper female entrepreneurial pursuits more than those in urban regions.

### ***Proposition #5***

Economic freedom, a socio-economic factor, plays a role in the difference of female entrepreneurial attempts in rural and urban regions.

### ***Proposition #6***

Female entrepreneurs are expected to have more challenges in rural regions than urban regions in accessing finance in their entrepreneurial attempts.

### ***Questions for further studies***

What policy and programs could be applied to increase female entrepreneurs' access to financing in rural versus urban regions in developing countries?

What factors may influence the access to credit in rural versus urban regions in developing countries?

Is there any difference in commercial, social, necessity-based and opportunity-based female entrepreneurs' access to credit in rural versus urban regions in developing countries?

### **Educational Attainment: Rural versus Urban Areas**

Education increases the quality of human capital and impacts the rate of entrepreneurial activities (Petrin & Gannon, 1997). Having an education is crucial in absorbing new knowledge (Knudsen et al., 2001), identifying opportunities. (Shepherd & DeTienne, 2001), getting collateral and improving entrepreneurial relates activities. Lack of education, limited access to education and lack of entrepreneurial training are challenges for rural female entrepreneurs in developing

countries (Gender and rural employment policy, 2010b). For instance, lower literacy rate of women and inadequate government support in educational attainment are considered as some of the major obstacles for rural female entrepreneurs in Bangladesh (Bhuyan & Abduhalla, 2007). 76.3% of rural Bangladeshi female entrepreneurs have no formal education, and 17% are illiterate (Gender and rural employment policy, 2010b). Similarly, in Nepal, women have poor access to education and health services, and gender disparities exist in literacy rate (42.8 to 68%). GEM 2016-2017 report indicates that entrepreneurship education at school stage is lowest at the factor-driven (necessity-based) developing countries (2.8) compared to innovation-driven economies (3.4) with GEM average 3.4 (Herrington & Kew, 2017). In India, where the education gender gap is greatest, most of the women in rural areas are reported as illiterate and are deprived of their rights (Mahendran & Babu, 2014).

Based on the feminist theories and the institutional theory context, due to the society's expectations of gender roles, females are not given equal rights in accessing education in most rural areas in developing countries. For instance, in rural areas, society's expectation of females' duties that include considerable agricultural work and household duties create time constraints for training and getting education. Further growing up and living in a *disprivileged* area, having an education or access to entrepreneurial training programs may not be societal expectation or norm.

Australian School of Thought argues that to identify an idea and pursue an opportunity in a specific field, one must be knowledgeable about the field and have a profound knowledge base. Lower literacy rate and limited access to education and entrepreneurial programs could hinder rural female entrepreneurs' getting industry specific knowledge, being aware of their rights on property, family and inheritance laws and practices, which all impact the quality of their entrepreneurial pursuits.

To date, previous research pointed out the need for education is among the barriers for rural female entrepreneurs in developing countries and also female entrepreneurs in general in developing countries. Location plays a role in the access and quality of education (Porter, 1990). To date, there appears to be a lack of research on specific comparative studies on rural vs urban areas in developing countries regarding priority differences on specific education and training needs and the mechanisms to deliver the needed education and training programs in these two locations. Further studies on these issues would expand the knowledge base on female entrepreneurs in developing countries.

### ***Proposition #6***

Female entrepreneurs in rural regions in developing countries may face more challenges in their entrepreneurial attempts regarding access to education and training programs than those in urban areas in developing countries.

### ***Proposition #7***

Female entrepreneurs in rural regions in developing countries may have different needs in education and training programs than those in urban areas in developing countries.

### ***Questions for further studies***

What are priority differences on specific education and training needs for female entrepreneurs in rural versus urban regions in developing countries?

What factors may influence the mechanisms to deliver the needed education and training programs to female entrepreneurs in rural versus urban regions in developing countries?

How to apply targeted public sector credit programs to the rural and urban female entrepreneurs in developing countries?

## **CONTEXT DIMENSION**

### **Industry Sector: Technical versus Nontechnical Fields**

Global Entrepreneurship Monitor (GEM) 2017-2018 states that wholesale and retail trade accounts for about 60% of female entrepreneurial activity around the world compared to less than 2% in the Information and Communications Technology sector (Herrington et al., 2018). Kuschel & Lepeley (2016) literature review on female start-ups in technology reported that the majority of the studies of women entrepreneurs in the technology field was in developed countries, particularly USA (Cohoon & Aspray, 2007; Colombo & Grilli, 2005; Dautzenberg, 2012). The literature survey reported that, to date, no studies have been conducted on female entrepreneurs in technology sectors in developing countries, and there is very limited information on women entrepreneurs and their needs and challenges in technology sectors (Kuschel & Lepeley, 2016).

The respective environments of technical and non-technical sectors are different as technical environments are more complex, uncertain, and dynamic than nontechnical sectors. The changing pattern of environmental factors in technology domains creates technological uncertainties. As the technical environment gets more complex, entrepreneurs need more information to handle the complexity. As they have more information, they increase their capability to understand the technical environment and become more active in pursuing opportunities for viable ventures in the technology sectors. Therefore, understanding the entrepreneurial process in technology domains may help understand the challenges women face in entrepreneurial ventures in technical fields as well as assuring that their talents are being used effectively.

The Austrian School of thought regards opportunity recognition as the key for an entrepreneurial activity and suggests that in a competitive market only the individuals who possess specific information can recognize opportunities (Kirzner, 1973). Therefore, individuals who are good at rationalizing resources and accessing information are better at recognizing opportunities in their entrepreneurial pursuits. Prior knowledge prepares the mind and increase the ability to detect information related with that background (Shane, 2000). As a result, having technical training may help individuals filter signals from the environment, adapt complex technical developments and utilize available information processing in identifying profitable opportunities for viable new ventures. Previous research found that the low level of technical and business skills could prevent individuals from starting a venture in the technology sector (Davidsson, 1991). In sum, research on female entrepreneurs in technology sector in developing countries could facilitate “funding sources,” establishment of training programs and necessary networking infrastructure to support women’s capacity to develop opportunities in this domain (Kuschel & Lepeley, 2016).

### ***Proposition #8***

Female entrepreneurs in developing countries may face more challenges in their entrepreneurial attempts in technology sector than non-technology sector.

### ***Questions for further studies***

How to increase women’s participation in technical programs and encourage their starting new ventures in technical fields in developing countries?

What are the appropriate policy interventions that might help women entrepreneurs in technical fields in developing countries?

How could training and support programs be designed to help women entrepreneurs in technology ventures have a larger impact in business, achieve success, and foster new ventures in developing countries?

## **CONCLUSION**

At present, much research still has to be done to understand female entrepreneurship in rural areas in developing countries. Female rural entrepreneurs play a vital role in the overall economic development of the country in terms of proper utilisation of local resources, employment generation, fostering economic development, reducing disproportionate growth of towns and cities, and entrepreneurial development. Understanding and addressing the needs of female entrepreneurs in rural areas also prevent a large-scale migration from rural areas to urban areas.



Therefore, it is particularly important to understand how women entrepreneurs recognize opportunities and pursue entrepreneurial activities in rural regions in developing countries. Such a study would be very timely and helpful in our understanding the challenges women face with in starting new ventures in rural areas as well as assuring that their talents are being used effectively. Studies that raise awareness among financial and micro-finance institutions about rural women entrepreneurs' needs and introduce incentives for them to provide appropriate, accessible and flexible financial products and services (including affordable insurance and savings), at fair interest rates and foster coordination, (Gender and rural employment policy, 2010b) could be helpful.

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# **THE MODERATING EFFECT OF SERVANT LEADERSHIP ON TRANSFORMATIONAL, TRANSACTIONAL, AUTHENTIC, AND CHARISMATIC LEADERSHIP**

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## **ABSTRACT**

Researchers have examined similarities and differences among different forms of leadership, comparing their interpersonal processes and outcomes. Contingency and situational theories of leadership, and modern leadership research, such as the full range leadership model, posit that the most effective form of leadership differs depending on context. Nonetheless, few studies have examined a leader's ability to demonstrate the intentions and strengths of multiple forms of leadership simultaneously and congruently. This research focuses on whether leaders who embody servant leadership are more effective as transformational, transactional, charismatic, and authentic leaders. Conditional moderation is used to examine data collected from 416 employees across many industries. The interactional effects of servant leadership on the relationships between transformational, transactional, charismatic, and authentic leadership are examined for several employee outcomes. The practical implications are discussed along with the potential for further theoretical insight and development.

## **INTRODUCTION**

At the heart of servant leadership is an attitude of compassion and service that serves as the foundation of trust, credibility, and relationships. Within this manuscript we will offer four hypotheses that seek to examine whether servant leadership influences the effectiveness of four other forms of leadership in terms of generating positive employee level attitudes and behaviors.

Robert K. Greenleaf (1973) stated that servant leadership starts with the desire to serve others. While this service can broadly aid others in achieving their own purposes and goals, this service can also benefit those being served in their own work-related and organizational efforts. We posit that this elevation of the individual served combined with other forms of leadership can further



enhance the benefits of other forms of leadership.

Our argument relies on the assumption that there are many different types of leadership on display in organizations and in given situations. We will argue that a combination of leadership intentions, focuses, and behaviors that includes an attitude of service will be more effective. This connects with the concept of “adaptive leadership” (Staats, 2015). As an example, we propose that transformational leader will be more effective as a transformational leader when they think and act as both transformational and servant leaders. The attitude, attention, and behaviors composing service by a leader directed toward a subordinate would enhance the effectiveness of leadership directed toward change, innovation, growth, and self-leadership as expressed within transformational leadership. Beyond enhancing transformational leadership, servant leadership might likewise provide a more helpful and positively perceived relational foundation for transactional, authentic, and charismatic leadership by means of social exchange (Walumbwa et al., 2010).

## **FORMS OF LEADERSHIP**

### **Servant Leadership**

Greenleaf (1979) suggested that a first among equals approach to leadership is key to a servant leader’s greatness. Servant leadership places a leader in the passenger seat such that resources and support are provided to followers without expectation of acknowledgement (Smith et al., 2004). Servant leaders are motivated more by a desire to serve than to lead (Greenleaf, 1979). Servant leadership is virtuous, highly ethical, and based on the premise that service to followers is at the heart of effective leadership (Mehambe & Engelbrecht, 2013; Sendjaya & Sarros, 2002). Servant leaders also demonstrate the qualities of vision, caring for others, altruism, humility, hope, integrity, trustworthiness, and interpersonal acceptance (van Dierendonck & Nuijten, 2011).

Servant leadership is unique among leadership styles because of its “follower first” position (Stone et al., 2004). Servant leadership directs its focus first on followers to succeed and then on the success of the mission (Gandolfi et al., 2017). The focus on employee needs make servant leadership different from other leadership approaches such as transformational leadership, which focuses on mission first and people second (Bass & Avolio, 1990; Luthans & Avolio, 2003).

Servant leadership provides a foundation for compassion, kindness, and trust, all of which are positively related to follower outcomes (Walumbwa et al., 2010). As a result of a stronger social exchange, a number of positive outcomes are associated with servant leadership, including affective commitment, normative commitment (Drury, 2004), leader-member exchange (Barbuto & Hayden, 2011), supervisory trust (Joseph & Winston, 2005), perceived organizational support (Yildiz & Yildiz, 2015), turnover intentions (Babakus et al., 2010), promotion regulatory focus, prevention regulatory focus (Neubert et al., 2008), job satisfaction (Drury, 2004), and work-life balance (Zhang et al., 2012). While other forms of leadership are associated with these positive outcomes, we posit that the benefits of servant leadership can further enhance the positive benefits

of other forms of leaders. While there may be multiple pathways toward these positive outcomes through other forms of leadership, perhaps the nature of the positive impact is to some extent cumulative because they are perceived differently by those in whom the outcomes are generated.

## **Transformational and Transactional Leadership**

Transformational and transactional leadership have held dominate places within the literature since their creation by Burns (1978), elaboration by Bass (1985). While they serve different purposes within the Full-Range Leadership Model (FRLT) (Bass & Avolio, 1991), they have been compared within a wide range of studies. Both have been examined in relationship with the outcomes within this study: affective commitment, normative commitment (Nguni et al., 2006; Walumbwa et al., 2005), leader-member exchange (Epitropaki & Martin, 2013) supervisory trust (Braun et al., 2013), perceived organizational support (Epitropaki & Martin, 2013), turnover intentions (Wells, & Welty Peachey, 2011), promotion regulatory focus, prevention regulatory focus (Hamstra et al., 2011), job satisfaction (Nguni et al., 2006; Vecchio et al., 2008), and work-life balance (Syrek et al., 2013).

### ***Transformational leadership***

Judge and Piccolo (2004) state that transformational leadership is the preeminent form of leadership study currently (Washington, 2007). More studies have been done on transformational leadership than all the other popular theories combined (Washington, Sutton, and Sauser, 2014). Bass (1985) developed the theory, which states that transformational leadership occurs “when leaders broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and mission of the group, and when they stir their employees to look beyond their self-interest for the good of the group.” According to Washington (2007), transformational leaders build commitment to organizational objectives and empower followers to accomplish objectives (Yukl, 2006) by making followers aware of the importance of task outcomes, orienting followers toward performance beyond established organizational standards, activating higher-order intrinsic needs, and focusing on follower empowerment instead of dependence (Bass, 1985; Judge & Piccolo, 2004; Yammarino et al., 1993).

Transformational leadership, according to Judge and Piccolo (2004), has four dimensions: Individualized consideration, idealized influence (charisma), inspirational motivation, and intellectual stimulation. Consideration involves leaders utilizing mentorship and coaching of employees. Charisma is the aspect of being admired and respected as a leader. Inspirational motivation emphasizes organizational vision (Hater & Bass, 1988) and allows followers to symbolically follow the leader. These leaders create meaningful tasks, high standards, and create optimism among their followers. Intellectual stimulation is the final aspect of transformational leadership. Here the leader increases follower awareness of problems and encourages followers to look at issues from a new perspective (Bass, 1985).

## *Transactional leadership*

Burns (1978) sees transactional leadership as much more commonplace than transformative and servant leadership (Washington, 2007). It is defined as an exchange process in which leaders recognize followers' needs and then define appropriate exchange processes to meet both the needs of followers and leaders' expectations (Washington, 2007 Bass, 1985). At the heart of transactional leadership theory is the idea of hierarchy, task completion, rewards and punishments (Tracey & Hinkin, 1998). The upshot of rewards and punishments is compliance. However, compliance is not necessarily a driver of work for its own sake. It only achieves compliance.

There are many types of transactional leadership. They are contingent reward leadership, management-by-exception (active or passive), and laissez-faire leadership (Bass & Avolio, 1990; Washington, 2007). Contingent rewards are basically an explanation by leadership of the manner to gain rewards, as well as negotiated incentives (Washington, 2007). Management-by-exception deals with enforcement of rule in order to eliminate errors (Judge & Piccolo, 2004). Management only deals with mistakes employees make here. Active management by exception monitors behavior while passive managers do not act until the behaviors have become unacceptable to the organization. Finally, laissez-faire leadership is an abdication of leadership duties (Bradford & Lippitt, 1945). It is non-leadership as opposed to active leadership in the organization.

One shortcoming of transformational leadership is the subordination and lack of concern for a follower's personal goals and purpose with the leader, instead, imposing goals on them. While, overall, transformational leadership is typically perceived positively since it empowers the follower, it can also be experienced negatively and be potentially resisted because it serves as the impetus of change and often requires subordinates to put forth greater effort (Johnson et al., 2012). While growth opportunities can be positive and rewarding, the additional energy required and obstacles encountered can generate stress and negative attitudes, servant leadership might help offset some of this through compassionate service by the leader that seeks to alleviate any unnecessary burdens, thus clearing the path toward greater growth and empowerment. As such, we offer the following hypothesis:

*Hypothesis 1: Servant leadership will positively moderate the relationships between ten transformational leadership and various subordinate attitudes and behaviors, including: (a) affective commitment, (b) normative commitment, (c) leader-member exchange, (d) supervisory trust, (e) perceived organizational support, (f) turnover intentions, (g) promotion regulatory focus, (h) prevention regulatory focus, (i) job satisfaction, and (j) work-life balance.*

A deficiency of transactional leadership is that it can be seen as lacking in quality of the relationship, including a lack of human compassion and concern because it is solely focused on transacting work for reward. Combined with servant leadership, while still a transaction, such exchanges might be perceived as existing within a caring and supportive relationship that does not necessarily possess an agenda beyond a fair exchange. Perceptions of organizational fairness (or justice) can influence all behaviors of individuals, and a servant leader would likely give greater attention to meeting the fairness needs of a subordinate so that they would not experience feelings of unfairness that could lead to withholding effort and negative attitudes. As such, we offer the

following hypothesis:

*Hypothesis 2: Servant leadership will positively moderate the relationships between transactional leadership and various subordinate attitudes and behaviors.*

## **AUTHENTIC LEADERSHIP**

Authenticity comes from the Greek ideology of “Know thyself.” Authenticity has been shown to influence individual well-being and enduring social relationships (Duncan et al., 2017; Erickson, 1995; Rogers, 1959). The authentic leadership construct has four dimensions: (1) self-awareness, (2) balanced processing, (3) internalized moral perspective, and (4) rational transparency. Self-awareness is a dynamic process and is the degree to which the leader reflects and demonstrates an understanding of how he/she derives and makes sense of the world and is aware of his/her strengths, limitations, how others see him/her, and how he/she impacts others (Duncan et al., 2017; Kernis, 2003; Walumbwa et al., 2008). Balanced processing is the degree to which the leader shows that he/she objectively analyzes the relevant data and solicits others’ views that challenge his/her deeply held beliefs before making a decision (Duncan et al., 2017; Gardner et al., 2005; Walumbwa et al., 2008). Internalized moral perspective refers to the degree to which the leader sets a high standard for moral and ethical conduct, and lets these values consistently guide his/her decisions and actions versus external pressures from groups, organizations and society at large; Duncan et al., 2017; Gardner et al., 2005; Walumbwa et al., 2008). Rational transparency is the degree to which the leader presents his/her true self to others, shares information openly, and expresses his/her true thoughts and feelings, reinforcing a level of openness with others that allows them to be themselves and with their opinions, ideas, and challenges (Gardner et al., 2005); Duncan et al., 2017; Gardner et al., 2005; Walumbwa et al., 2008).

Authentic leadership has a moral dimension and as such, moves beyond transformational or full-range leadership. It is a root construct for other leadership processes (Duncan et al., 2017; Gardner et al., 2005). Extant research has found relationships between authentic leadership and the outcomes within this study, including affective commitment, normative commitment (Rego et al., 2016), leader-member exchange (Hsiung, 2012), supervisory trust (Wong & Cummings, 2009), perceived organizational support (Rahimnia & Sharifirad, 2015), turnover intentions (Laschinger & Fida, 2014), promotion regulatory focus, prevention regulatory focus (Shang et al., 2017), job satisfaction (Wong & Laschinger, 2013), and work-life balance (Braun & Peus, 2018).

An authentic leader is often effective because they are perceived as trustworthy and predictable, people of integrity who operate based on their values. By being authentic, they present themselves consistently and sometimes vulnerability. While authenticity conveys who they are, it does not imply that they are willing to elevate others through caring. Authenticity combined with reciprocation of support could lead to deeper relationship, inviting greater authenticity from subordinates, generating greater psychological safety expressed through many potential positive outcomes. As such, we offer the following hypothesis:

*Hypothesis 3: Servant leadership will positively moderate the relationships between authentic*

*leadership and various subordinate attitudes and behaviors.*

## **CHARISMATIC LEADERSHIP**

Charismatic leadership derives from the Greek word “gift.” Max Weber applied charisma to leadership and defined it as “heroism or exemplary character of an individual person” (Shao et al., 2016). According to Shao et al. (2016), charismatic leadership is identified as among the most critical leadership form influencing individual behaviors. Conger et al. (2009) defined charismatic leadership as an attribution based on follower perceptions of their leader’s behavior. Yammarino and Waldman (1999) defined charismatic leadership as a relationship between leader and follower, resulting in “internalized commitment to the vision of the leader, exceptionally strong admiration and respect for the leader, and identification of followers with the leader, the vision, and the collective forged by the leader.”

Charisma leads to outcomes such as inspirational following and positive attitudes towards accomplishments. Shao et al. (2016) discuss that employees are emotionally involved with a charismatic leader since they have a strong belief in the leader’s ability to accomplish the company’s goal or mission (House et al., 1991; Wang et al., 2005; Choi, 2006). Charismatic leadership has been specifically related to the outcomes examined within this study, namely, affective commitment, normative commitment (Rowden, 2000), leader-member exchange (Waldman et al., 1988), supervisory trust (Michaelis et al., 2009), perceived organizational support (Xenikou, 2014), turnover intentions (Conger & Kanungo, 1998), promotion regulatory focus, prevention regulatory focus (Kark & Van Dijk, 2007), and job satisfaction (Vlachos et al., 2013).

Charismatic leadership is emotion-based, and a subordinate is likely to feel good following a charismatic leader. A leader might be respected and even admired for values such as confidence, courage, passion, talent, and inspiration, yet might also be recognized as unworthy of trust because of their abusiveness (Johnson et al., 2012), narcissism (Sankowsky, 1995), and unethical tendencies (Howell & Avolio, 1992). A leader who is charismatic and acts as a servant is likely to engender stronger bonds of trust and a deeper relationship. As such, we offer the following hypothesis:

*Hypothesis 4: Servant leadership will positively moderate the relationships between ten charismatic leadership and various subordinate attitudes and behaviors, including.*

## **METHODS**

### **Participants and Survey Design**

A total of 416 respondents provided 95% or more of the data for the surveys. The sets of responses from additional participants who did not provide sufficient data for analysis were dropped. There

was nothing demographically unusual that separated those who provided insufficient data from those who provided sufficient data. For the respondents who provided sufficient data, any missing scores were imputed when possible. The data was collected within an organizational behavior course as part of a master's program in organizational leadership. The data were collected through the use of multiple surveys using anonymous ID coding to prevent survey fatigue and so that data from multiple surveys could be linked together. The time gap between surveying was less than a month, and completion of all four surveys occurred within a single semester, though accumulation of data occurred using several class sections over a two-year period. The master's students within the course completed the surveys and also asked other individuals not within the program to complete the survey.

## Instruments

A number of instruments were utilized within the surveys to assess the five forms of leadership and the ten individual level outcomes. These five leadership instruments were all multi-dimensional, but each one was treated as unidimensional to provide an overall rating for each latent construct.

*Servant leadership.* For servant leadership, a 28-item scale by Liden, Wayne, Zhao, and Henderson (2008) was used and includes items such as “My boss gives me the responsibility to make important decisions about my job” and “My boss seems to care more about my success than his/her own.” The Cronbach’s alpha for the instrument in this study was .94.

*Transformational and transactional leadership.* These were surveyed using the Multi-Factor Leadership Questionnaire by Avolio and Bass (2004), which consisted of 20 and 12 items, respectively. Examples of the items include “My boss specifies the importance of having a strong sense of purpose” and “My boss treats me as an individual rather than just as a member of a group” for transformational. Items for transactional include “My boss concentrates his/her full attention on dealing with mistakes, complaints, and failures” and “My boss discusses in specific terms who is responsible for achieving performance targets.” The instrument’s reliabilities, respectively, were .95 and .88 for this study.

*Authentic leadership.* This was assessed with the Authentic Leadership Questionnaire (ALQ) by Avolio, Gardner, Walumbwa, Luthans, and May (2004), consisting of 16 items. “My boss analyzes relevant data before coming to a decision” and “My boss asks me to take positions which support my core values” are examples of items within the scale. Reliability for the instrument was .94.

*Charismatic leadership.* A 25-item scale by Conger and Kanungo (1998) was used to assess charismatic leadership. Among the items are “In pursuing organizational objectives, my boss engages in activities involving considerable personal risk” and “My boss consistently generates new ideas for the future of the organization.” The scale’s reliability in this study was .90.

*Affective and normative organizational commitment.* These were assessed using the 8-item and 18-item scales created by Allen and Meyer (1990). “This organization has a great deal of personal

meaning for me” is one of the affective commitment items and “I think that people these days move from company to company too often” is an example of the normative commitment items. The reliability in this study was .95 for affective and .96 for normative.

*Leader-member exchange.* This was assessed with the leader-member exchange multidimensional measure (LMX-MDM) by Liden and Maslyn (1998), consisting of 12 items. The instrument’s reliability in this study was .88.

*Supervisory trust.* The 12-item instrument consisting of items such as “I can depend on my supervisor to meet his/her responsibilities” and “I’m confident that I could share my work difficulties with my supervisor,” created by Yang, (2005) was used. Reliability for the instrument was .82.

*Perceived organizational support.* This was assessed using the 7-item scale by Coyle-Shapiro and Conway’s (2005) which consists of such items as “My employer considers my goals and values” and “My employer values my contributions to its well-being.” Reliability for the instrument was .92.

*Turnover intentions.* Individuals’ desires to leave their organizations were assessed using the 4-item instrument by Babakus, Yavas, and Ashill (2010), which included items such as “I will quit this job sometime in the next year” and “I often think about quitting.” Reliability for the instrument was .91.

*Promotion and prevention regulatory focus.* These variables were assessed with Wallace and Chen’s (2005) two 6-item scales, which included items such as “I focus on getting a lot of work finished in a short amount of time” for promotion and “I focus on fulfilling my work obligations” for prevention. Reliabilities for the scales in this study were .84 for promotion and .86 for prevention.

*Job satisfaction.* Overall satisfaction was assessed with the Job Description Index (JDI) (Smith et al., 1969) growth satisfaction and satisfaction with supervisor scales consisting of 4 and 3 items respectively. Examples of items include “I am satisfied with the amount of independent thought and action I can exercise in my job” and “I am satisfied with the amount of support and guidance I receive from my supervisor.” The scale’s reliability in this study was .93.

*Work-life balance.* Fisher-McAuley et al.’s (2003) 15-item instrument was used to assess this work-life balance. “I miss personal activities because of work” and “My job makes personal life difficult” are examples of scale items. Reliability for the instrument was .87.

## ANALYSIS

Moderated regression was used to test the ten sub-components of each of the four overall hypotheses regarding servant leadership as a moderating variable on other forms of leadership. Hierarchical linear regression was conducted with the benefit of the Hayes PROCESS macro

(Hayes, 2018). The PROCESS macro is a robust plug-in for SPSS capable of producing results like those produced within an SEM program. To reduce the potential impact of multicollinearity, the data was mean-centered. Servant leadership's impact on the relationships between four other forms of leadership, namely, transformational, transactional, authentic, and charismatic leadership, and a variety of individual-level outcomes is conceptualized as conditional moderation (cf. Hayes et al., 2017). In normal moderation using linear regression, using the equation.

$$(Y^{\wedge}=iY+b1X+b2W+b3XWY^{\wedge}=iY+b1X+b2W+b3XW)$$

W represents servant leadership, X represents any of the other four forms of leadership used as independent variables, Y represents any of the dependent variables found associated with those four forms of leadership, and XW represents the interaction term, how servant leadership interacts with those other form of leadership. This assumes a consistent linear relationship in which the conditional effect of X on Y will change consistently with the changes on b3 given changes in W. However, conditional moderation (Hayes & Rockwood, 2019) takes into account the varying influence of servant leadership on other forms of leadership based on the strength of servant leadership characteristics. Thus, the equation can be represented as:

$$(Y^{\wedge}=iY+(b1+b3W)X+b2W,Y^{\wedge}=iY+(b1+b3W)X+b2W)$$

The weight of X, one of the other forms of leadership (transformational, transactional, authentic, and charismatic), is represented by  $b1+b3W$ , the conditional effect of that form of leadership on one of the particular associated outcomes given the strength of servant leadership.

The output ( $R^2$ , and adjusted- $R^2$ , regression coefficients, *t-values*, *p-values*, mean square error, and confidence intervals) of the regression determine the statistical significance of the main effects and interaction terms. However, the inclusion of an interaction term makes interpretation of the main effects inaccurate (Hayes & Preacher, 2013).

To better analyze the interactions, the slope of regression lines was examined with a “pick-a-point” approach of points along the continuum. The Johnson-Neyman procedure differs from the simple slopes approach in that it provides a wide range of points to show effect and significance at each of the points (Hayes & Preacher, 2013). This approach allows for identification of points along the continuous moderator at which the relationship between the independent variable and the outcome variable differ in terms of statistical significance and effect. The PROCESS macro provided the effects of X (non-servant leader form of leadership) on Y (individual level outcome) at -1SD, 0SD and +1SD of the moderator's, servant leadership's, mean, which were then plotted and compared to visually represent the changes in slope based on the strength of W (servant leadership), as well as the output for the Johnson-Neyman's region of significance (effect, t-value, p-value, and confidence intervals).

## RESULTS

The four over-arching hypotheses focus on the moderating effects of servant leadership on the



relationships between four other forms of leadership and ten individual level outcomes. The results of hypothesis testing are provided in summarized tables to provide greater clarity.

Based on the information reported within Tables 1 and 4, all four hypotheses were supported partially. This is summarized within the tables rather than within the text because, if treated individually as hypotheses, there would be 40! Therefore, only four overall hypotheses are proposed, with each outcome treated as only one sub-component for each overall hypothesis.

For transformational leadership, four out of the ten sub-components, each representing one of the ten individual level outcomes as dependent variables, were found to be moderated by servant leadership. As stated in Table 1, interactions were statistically significant for turnover intentions, prevention regulatory focus, job satisfaction, and work-life balance. However, the use of these summarized results alone is insufficient, therefore examination of the interaction at various levels of servant leadership is necessary.

**TABLE 1. MODERATED REGRESSION RESULTS FOR SERVANT LEADERSHIP ON TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP**

<i>Dependent Variable</i>	<i>Transformational <math>\beta</math></i>	<i>Servant <math>\beta</math></i>	<i>Interaction <math>\beta</math></i>	<i>Adj R<sup>2</sup></i>	<i>Transactional <math>\beta</math></i>	<i>Servant <math>\beta</math></i>	<i>Interaction <math>\beta</math></i>	<i>Adj R<sup>2</sup></i>
Affective Organizational Commitment	.41***	.35**	-.11	.21***	.28***	.42***	-.18*	.17***
Normative Organizational Commitment	.60***	.12	.00	.23***	.30***	.29***	-.17*	.12***
Leader-Member Exchange	.60***	.35***	-.06	.50***	.39***	.48***	-.16**	.36***
Supervisory Trust	.38***	.38***	-.08	.25***	.26***	.44***	-.16**	.20***
Perceived Organizational Support	.30***	.31***	-.02	.11***	.09	.44***	-.13	.08***
Turnover Intentions	-.16**	-.13	-.11**	.05**	-.02	-.25***	-.08*	.03*
Promotion Regulatory Focus	.50***	.28**	-.11	.23***	.28***	.43***	-.16*	.15***
Prevention Regulatory Focus	-.06	.30*	.18*	.02*	-.21**	.46***	.22**	.04***
Job Satisfaction	.28***	.28***	-.20**	.17***	.21**	.32**	-.18**	.13***
Work-Life Balance	.39***	.35***	-.17***	.36***	.24***	.45***	-.19***	.26***

Interpreting the main effects within the regressions would be misleading due to the interaction terms ( $XW$ ). Within the regression, when both  $X$  (transformational, transactional, authentic, or charismatic leadership) and  $W$  (servant leadership) are involved within an interaction. The statistical significance of the interaction is more accurately reported by examination of  $W$ , servant leadership, at various levels of the moderator. While the Neyman-Johnson results were analyzed as well, the results for the three levels of low servant leadership (one standard deviation below the

mean of servant leadership), medium servant leadership (at the mean level), and high servant leadership (at one standard deviation above the mean) are presented in Tables 2 and 3.

**TABLE 2. SERVANT LEADERSHIP INTERACTIONS**

<i>Independent Variable</i>	<i>Level of Serv. Lead<sup>1</sup></i>	<i>Affective Org. Commitment</i>				<i>Normative Org. Commitment</i>			
		<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>	<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Transformational Leadership</i>	Low	.49***	6.93	.35	.63	<i>ns</i>			
	Medium	.41***	6.71	.29	.53	<i>ns</i>			
	High	.33***	3.97	.17	.49	<i>ns</i>			
<i>Transactional Leadership</i>	Low	.40***	5.19	.25	.56	.42***	4.84	.25	.59
	Medium	.28***	4.42	.15	.40	.30***	4.30	.16	.44
	High	.15	1.82	-.01	.31	.18*	1.96	.001	.36
<i>Authentic Leadership</i>	Low	.46***	6.13	.32	.61	<i>ns</i>			
	Medium	.35***	5.29	.22	.48	<i>ns</i>			
	High	.24**	2.71	.07	.41	<i>ns</i>			
<i>Charismatic Leadership</i>	Low	.49***	5.25	.31	.61	<i>ns</i>			
	Medium	.38***	4.92	.23	.48	<i>ns</i>			
	High	.27**	2.63	.07	.42	<i>ns</i>			

<i>Independent Variable</i>	<i>Level of Serv. Lead.</i>	<i>Leader-Member Exchange</i>				<i>Supervisory Trust</i>			
		<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>	<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Transformational Leadership</i>	Low	<i>ns</i>				<i>ns</i>			
	Medium	<i>ns</i>				<i>ns</i>			
	High	<i>ns</i>				<i>ns</i>			
<i>Transactional Leadership</i>	Low	.50***	8.64	.39	.62	.37***	5.52	.24	.50
	Medium	.39***	8.36	.30	.48	.26***	4.73	.15	.36
	High	.28***	4.53	.16	.40	.14*	1.97	.001	.28
<i>Authentic Leadership</i>	Low	.68***	13.35	.58	.78	.41***	6.29	.28	.54
	Medium	.62***	13.71	.53	.71	.30***	5.25	.19	.42
	High	.55***	9.18	.43	.67	.19**	2.51	.04	.34
<i>Charismatic Leadership</i>	Low	.76***	11.76	.63	.88	.52***	6.56	.37	.68
	Medium	.67***	12.68	.57	.77	.40***	6.19	.28	.53
	High	.58***	8.39	.45	.72	.29***	3.34	.12	.46

<i>Independent Variable</i>	<i>Level of Serv. Lead.</i>	<i>Perceived Organizational Support</i>				<i>Turnover Intention</i>			
		<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>	<i>β</i>	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Transformational Leadership</i>	Low	<i>ns</i>				-.08*	-1.36	-.19	.03
	Medium	<i>ns</i>				-.16**	-3.23	-.25	-.06
	High	<i>ns</i>				-.24***	-3.60	-.37	-.11
<i>Transactional Leadership</i>	Low	.18*	2.15	.02	.34	<i>ns</i>			
	Medium	.09	1.28	-.05	.22	<i>ns</i>			
	High	-.01	-.08	-.18	.17	<i>ns</i>			
<i>Authentic Leadership</i>	Low	<i>ns</i>				-.03	-.46	-.14	.09
	Medium	<i>ns</i>				-.10*	-1.98	-.21	-.001
	High	<i>ns</i>				-.18**	-2.58	-.32	-.04
<i>Charismatic Leadership</i>	Low	.36***	3.60	.16	.55	-.14*	-1.96	-.28	-.01
	Medium	.24***	2.97	.08	.40	-.23***	-3.96	-.35	-.12
	High	.13	1.19	-.08	.34	-.32***	-4.20	-.48	-.17

**TABLE 3. SERVANT LEADERSHIP INTERACTIONS (CONTINUED)**

<i>Independent Variable</i>	<i>Level of Serv. Lead.</i>	<i>Promotion Regulatory Focus</i>				<i>Prevention Regulatory Focus</i>			
		$\beta$	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>	$\beta$	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Transformational Leadership</i>	Low	<i>ns</i>				-.18*	-2.05	-.36	-.01
	Medium	<i>ns</i>				-.06	-.77	-.21	.00
	High	<i>ns</i>				.06	.60	-.14	.27
<i>Transactional Leadership</i>	Low	.39***	4.64	.23	.56	-.37***	-3.96	-.55	-.19
	Medium	.28***	4.09	.14	.41	-.21**	-2.84	-.36	-.07
	High	.16	1.83	-.01	.34	-.06	-.58	-.25	.14
<i>Authentic Leadership</i>	Low	.62***	7.94	.47	.78	-.19*	-2.07	-.37	-.01
	Medium	.53***	7.70	.40	.67	-.01	-.14	-.17	.15
	High	.44***	4.76	.26	.62	.17	1.55	-.05	.38
<i>Charismatic Leadership</i>	Low	.70***	7.22	.51	.89	-.20	-1.82	-.43	.02
	Medium	.58***	7.26	.42	.73	.06	.60	-.13	.24
	High	.46***	4.35	.25	.66	.32**	2.60	.08	.56

<i>Independent Variable</i>	<i>Level of Serv. Lead.</i>	<i>Job Satisfaction</i>				<i>Work Life Balance</i>			
		$\beta$	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>	$\beta$	<i>t</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Transformational Leadership</i>	Low	.42***	6.25	.29	.55	.51***	10.32	.42	.61
	Medium	.28***	4.80	.16	.39	.39***	9.10	.31	.48
	High	.14	1.75	-.02	.29	.27***	4.60	.15	.38
<i>Transactional Leadership</i>	Low	.34***	4.68	.20	.48	.37***	6.54	.26	.49
	Medium	.21***	3.67	.10	.33	.24***	5.20	.15	.33
	High	.09	1.15	-.06	.24	.10	1.72	-.01	.22
<i>Authentic Leadership</i>	Low	.48***	6.85	.34	.61	.57***	11.10	.47	.67
	Medium	.30***	4.95	.18	.42	.46***	10.08	.37	.55
	High	.13	1.58	-.03	.29	.34***	5.65	.22	.46
<i>Charismatic Leadership</i>	Low	.53***	6.20	.36	.70	.62***	9.56	.49	.74
	Medium	.34***	4.86	.20	.48	.49***	9.15	.38	.59
	High	.15	1.65	-.03	.33	.35***	5.07	.22	.49

We found the interactions to be statistically significant at all three levels (low, medium, and high servant leadership) for affective commitment (low  $\beta = .49$ , medium  $\beta = .41$ , high  $\beta = .33$ ; *p-values* of .000, .000, and .001) and work-life balance (low  $\beta = .51$ , medium  $\beta = .39$ , high  $\beta = .27$ ; *p-values* of .000, .000, and .000). Our interaction term was also statistically significant at a low level of servant leadership for prevention focus (low  $\beta = -.18^*$ , medium  $\beta = -.06$ , high  $\beta = .06$ ; *p-values* of .04, .44, and .55). The interaction between servant and transformational leadership was statistically significant for job satisfaction at the low and medium levels of servant leadership (low  $\beta = .42$ , medium  $\beta = .28$ , high  $\beta = -.14$ ; *p-values* of .000, .000, and .08). For turnover intentions, the interaction was significant at the medium and high levels of servant leadership (low  $\beta = -.08$ , medium  $\beta = -.16$ , high  $\beta = -.24$ ; *p-values* of .18, .001, and .000).

Hypothesis 2 was partially supported in terms of the moderating influence of servant leadership on transactional leadership. More support was found in hypothesis 2 for transactional leadership than it was in hypothesis 1 for transformational leadership. The results presented in Table 1 indicate that servant leadership is more important in terms of influencing the impact of transactional leadership than it is in terms of influencing the impact of transformational leadership.

Statistically significant interaction terms found for nine out of ten dependent variables (affective organizational commitment, normative organizational commitment, leader-member exchange, supervisory trust, turnover intentions, promotion regulatory focus, prevention regulatory focus, job satisfaction, and work-life balance) – all except for perceived organizational support – through the regression analysis. However further examination of the interactions of transactional leadership by servant leadership was conducted using the PROCESS macro (Hayes et al., 2017) revealed that perceived organizational support also had statistically significant interactions at specific levels detectable through conditional regression, while turnover intention was not actually statistically significant.

Conditional moderation analysis revealed statistical significance at all three levels (low, medium, and high) of servant leadership for normative organizational commitment (low  $\beta = .42$ , medium  $\beta = .30$ , high  $\beta = .18$ ; *p-values* of .000, .000, and .05), leader-member exchange (low  $\beta = .50$ , medium  $\beta = .39$ , high  $\beta = .28$ ; *p-values* of .000, .000, and .000), and supervisory trust (low  $\beta = .37^{***}$ , medium  $\beta = .26^{***}$ , high  $\beta = .14^*$ ; *p-values* of .000, .000, and .05). Statistical significance was found at the low and medium levels of servant leadership for affective organizational commitment (low  $\beta = .40$ , medium  $\beta = .28$ , high  $\beta = .15$ ; *p-values* of .000, .000, and .07), promotion regulatory focus (low  $\beta = .39$ , medium  $\beta = .28$ , high  $\beta = .16$ ; *p-values* of .000, .000, and .07), prevention regulatory focus (low  $\beta = -.37$ , medium  $\beta = -.21$ , high  $\beta = -.06$ ; *p-values* of .000, .005, and .57), job satisfaction (low  $\beta = .34$ , medium  $\beta = .21$ , high  $\beta = .09$ ; *p-values* of .000, .000, and .25), and work-life balance (low  $\beta = .37^{***}$ , medium  $\beta = .24^{***}$ , high  $\beta = .10$ ; *p-values* of .000, .000, and .09.) Additionally, for perceived organizational support statistical significance occurs only at a low level of servant leadership (low  $\beta = .18$ , medium  $\beta = .09$ , high  $\beta = -.01$ ; *p-values* of .03, .20, and .93).

Partial support was also found for hypothesis 3, concerning the interaction effects of servant leadership on authentic leadership's relationship with the ten dependent variables. Results are presented in Table 4. Based solely on the regression equation, statistical significance was found for seven out of ten interactions on the dependent variables: affective organizational commitment, leader-member exchange, supervisory trust, turnover intentions, prevention regulatory focus, job satisfaction, and work-life balance – all except for normative organizational commitment, perceived organizational support and promotion regulatory focus. Further analysis of the interaction effects for servant leadership on authentic leadership at all three levels presented in Tables 2 and 3 reveal statistically significance the following dependent variables: affective organizational commitment (low  $\beta = .46$ , medium  $\beta = .35$ , high  $\beta = .24$ ; *p-values* of .000, .000, and .007), leader-member exchange (low  $\beta = .68$ , medium  $\beta = .62$ , high  $\beta = .55$ ; *p-values* of .000, .000, and .000), supervisory trust (low  $\beta = .41$ , medium  $\beta = .30$ , high  $\beta = .19$ ; *p-values* of .000, .000, and .01), promotion regulatory focus (low  $\beta = .62$ , medium  $\beta = .53$ , high  $\beta = .44$ ; *p-values* of .000, .000, and .000), and work-life balance (low  $\beta = .57$ , medium  $\beta = .46$ , high  $\beta = .34$ ; *p-values* of .000, .000, and .000). The interactions for turnover intentions is significant at the medium and high levels (low  $\beta = -.03$ , medium  $\beta = -.10$ , high  $\beta = -.18$ ; *p-values* of .64, .05, and .01), at the low level for prevention regulatory focus (low  $\beta = -.19$ , medium  $\beta = -.01$ , high  $\beta = .17$ ; *p-values* of .05, .89, and .12), and at both low and medium levels for job satisfaction (low  $\beta = .48$ , medium  $\beta = .30$ , high  $\beta = .13$ ; *p-values* of .000, .000, and .11).

**TABLE 4. MODERATED REGRESSION RESULTS FOR SERVANT LEADERSHIP ON TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP**

<i>Dependent Variable</i>	<i>Authentic <math>\beta</math></i>	<i>Servant <math>\beta</math></i>	<i>Interaction <math>\beta</math></i>	<i>Charismatic <math>\beta</math></i>	<i>Servant <math>\beta</math></i>	<i>Interaction <math>\beta</math></i>	<i>Adj R<sup>2</sup></i>
Affective Organizational Commitment	.35***	.40***	-.16*	.19***	.38***	.43***	.17***
Normative Organizational Commitment	.49***	.20	-.11	.17***	.63***	.19	.19***
Leader-Member Exchange	.62***	.37***	-.09*	.49***	.67***	.39***	.45***
Supervisory Trust	.30***	.43***	-.16**	.22***	.40***	.40***	.23***
Perceived Organizational Support	.19***	.38***	-.10	.09***	.24***	.36***	.10***
Turnover Intentions	-.10*	-.19*	-.11*	.04**	-.23***	-.11	.06***
Promotion Regulatory Focus	.53***	.28**	-.13	.23***	.58***	.29**	.21***
Prevention Regulatory Focus	-.01	.30*	.25**	.03**	.06	.26*	.04**
Job Satisfaction	.30***	.25**	-.25***	.18***	.34***	.28**	.16***
Work-Life Balance	.46***	.32***	-.16***	.38***	.48***	.35***	.35***

For hypothesis 4, regarding servant leadership's moderating influence on the relationships between charismatic leadership and the ten dependent variables, partial support was found. Interaction terms were statistically significant for seven of the ten dependent variables, including leader-member exchange, supervisory trust, turnover intentions, promotion regulatory focus, prevention regulatory focus, job satisfaction, and work-life balance. Interactions were not statistically significant for affective organizational commitment, normative organizational commitment, and perceived organizational support.

Further analysis of servant leadership at three levels as a moderator indicate that it is statistically significant at all levels for affective organizational commitment. Additionally, statistical significance was found at the low and medium levels of servant leadership for perceived organizational support. Statistical significance was found at the high level for prevention regulatory focus. Interestingly, the moderating influence of servant leadership on the relationship between charismatic leadership and prevention regulatory focus was a cross-over interaction, meaning different directions for the regression slopes for servant leadership from high to low.

## DISCUSSION

The results from this research suggest that leaders should consider the breadth of their leadership

talents across many forms of leadership. These results also indicate that the qualities themselves are valuable in various combinations aside from the ascribed forms of servant, transformational, transactional, authentic, and charismatic leadership. Combinations of qualities can provide unique benefits based on the contextual parameters.

We find that leaders who try to embody any single form of leadership will likely lack certain qualities that will be more beneficial in specific circumstances. For instance, in times of stress and uncertainty, servant leadership qualities can improve transformation, transactions, authenticity, and charisma. Also, the results indicate that servant leadership is most beneficial to transactional leaders. This is most likely due to the lack of relationship depth, because, ultimately, the relationship is less personal and transaction-based. We surmise that servant leadership serves as a surrogate of high LMX, with the leader stepping up the level of service even when the social exchange is not reciprocated. Transactional leadership requires trust that there will be fairness within the transaction, and this could imply respect and concern for the subordinate, not simply ethicality.

Conversely, servant leadership seemed to have the least impact on transformational leadership. This might be because the qualities of transformational leadership, such as inspiring and challenging subordinates and providing them with growth opportunities that benefit the organization and the subordinate imply respect for the subordinate and concern for their improvement, thereby making transformational leadership a better proxy for servant leadership despite the differences in focus. The benefits to both authentic and charismatic leadership can be seen within the results as well. An authentic leader and, perhaps more importantly, a charismatic leader possessing servant leadership qualities could be perceived as more ethical, less narcissistic, and more caring. This can diminish concerns of abusive treatment and manipulation for the leader's benefit.

Perhaps most importantly, the differences in slopes found for the majority of interactions indicate that even "a little goes a long way" in terms of serving others. The impact of low levels of servant leadership have a greater magnitude of impact when compared to higher levels of servant leadership. Despite the diminishing returns from servant leadership qualities, the more that a leader embodies servant leadership, the greater the overall impact on subordinate outcomes.

## **CONCLUSIONS AND LIMITATIONS**

The results of this study provide very strong support for the positive impact of servant leadership on other forms of leadership. This is an area of the research in great need of further examination. Rather than simply creating taxonomies of leadership forms, the combined impact of various qualities that do not neatly fit within any labeled form of leadership should be examined. For instance, how does role-modeling within transformational leadership impact charismatic leadership's effectiveness. This study was conducted at the overall level of each form of leadership. Future studies could compare interactions across specific dimensions of leadership with a wide range of outcomes. This study limited itself to employee-centered outcomes, but outcomes at the team and organizational levels are worthy of examination.

This study had numerous limitations. First, while collected using multiple surveys, common method error is a serious concern. Second, examination of the forms of leadership at the overall level, rather than at the dimensional level limits the ability to define the mechanism by which servant leadership impacts other forms of leadership. Third, the sample itself is limited and replicability with individuals across other fields would provide greater support and generalizability. Fourth, the arguments within this study are fairly atheoretical, limited because of the lack of additional studies examining the influence of different forms of leadership on one another both theoretically and statistically.

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