2019

Multigenerational Cohorts, Gender, Experience, Technology and Voluntariness Effects on Efficiency and Productivity

Jason Larry White
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral dissertation by

Jason L. White

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Aridaman Jain, Committee Chairperson, Management Faculty
Dr. Raghu Korrapati, Committee Member, Management Faculty
Dr. Robert Kilmer, University Reviewer, Management Faculty

The Office of the Provost

Walden University
2019

Abstract

Multigenerational Cohorts, Gender, Experience, Technology and Voluntariness Effects on Efficiency and Productivity

by

Jason L. White

MS, Brown University, 1997

BE, The City College of New York, 1991

AAS, New York City Technical College, 1986

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

August 2019

Abstract

Since the beginning of the 2000s, unique challenges for a multigenerational workforce (MW) using different types of current technology (CT), informational and noninformational, at an increasing rate have surfaced. Necessary considerations were made among companies using these types of CT that changed frequently and influenced employee efficiency (EE) and organizational productivity (OP), leading to an under-identified impact on management decisions. The problem addressed in this study was the difficulty management had in managing work tasks and activities when CT was used in a MW. Most of the Baby Boomer generation will be retiring over the next decade, thus compromising and leaving a major gap in skills, experience, and talent. The purpose of this quantitative research study was to study the effects of multigenerational cohorts (MC), gender (GEN), CT, experience (EXP), and voluntariness of use (VU) (independent variables [IVs]), among a MW and their impact on EE and OP (dependent variables [DVs]). Two research questions were used that focused on the relationship between the IVs and DVs. Positivism was used as the theoretical framework. A convenience sampling approach was used to select participants. The participants were full-time employees between 23 and 71 years of age in the continental United States. Multiple and stepwise regression analyses was used to investigate the relationship between the IVs and the DVs. Results showed that only IVs type of CT and VU had a significant effect on EE and OP. These findings may contribute to positive social change by helping organizations create comprehensive and explicit business models of efficiency and productivity among a MW.

Multigenerational Cohorts, Gender, Experience, Technology and Voluntariness Effects on Efficiency and Productivity

by

Jason L. White

MS, Brown University, 1997

BE, The City College of New York, 1991

AAS, New York City Technical College, 1986

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

August 2019

Dedication

I dedicate all my work on this dissertation and my degree to my parents, Carlton and Violet White. All of their loving thoughts and prayers served well for me. They were there when I started this doctoral journey, and when my journey ended, they had to watch from above in heaven to see their son earn his degree. They are the reason why I am here and the reason why I worked so hard to get to this point. I know they would tell me that this is not the end, but only the beginning of many great opportunities to come. “Keep helping others, because that makes you strong; keep teaching others, because that makes you wise; keep being kind to others, because that proves you care about their well-being; and keep encouraging others, because that makes you a friend in the minds and hearts of everyone you encounter. You can be anything you want to be, but always be intelligent. Keep studying, keep working hard, but also take time to enjoy your life. You cannot talk about this subject all the time.”

Acknowledgments

To my dissertation committee, Dr. Aridaman K. Jain, Chair; Dr. Thomas Spencer, Methodologist, Dr. Raghu B. Korrapati, Core Faculty Member and Methodologist, and Dr. Robert A, Kilmer, University Research Reviewer; thank you for your extreme patience, your immeasurable efforts, and your judicious direction throughout the writing of my Knowledge Area Modules and doctoral dissertation. I will also like to thank the Senior Dissertation Editor for my Form & Style review, Mr. Timothy McIndoo for providing extremely helpful edits to improve my dissertation. I will always appreciate all you have done. I intend to take what I have learned from all of you and implement it in my ideas and my endeavors to continue to work hard in my field and continue to improve on being a scholar practitioner and promote positive social change – the missions of this university.

To my family – my inspiration, my friends – my support, and to all the people I have met prior to this journey and along this journey that provided some piece of knowledge, wisdom, or understanding to help me move forward and proceed to the end, it is with great humility and admiration I extend a heartfelt thanks and gratefulness to all of you. You are all very special to me and are all a part of this degree.

To the entire faculty I have interacted with at Walden University – on teleconferences, on videoconferencing, and certainly at the four residencies – thank you for also providing me everything I needed at the time that inspired me to move to the next stage of the journey.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

The landscape of workplace demographics at companies and businesses is constantly changing. Many workers in this type of work environment have a unique understanding with different types of current technology, such as informational and noninformational technology, and managers are virtually always looking to increase employee efficiency and organizational productivity (Gasparotti, 2014; Nitschke, 2014). According to Johnson (2015), it is quite possible that a span of as many as four generations could occupy a workplace environment for many years to come, from young adults in their early twenties who recently graduated from college and are experiencing their first full-time job working alongside their colleagues, to career employees who may be in their late fifties, early sixties, or even early seventies and are within a few years of retirement from their job (Holian, Hutton, & Bellamy, 2013; Kordbachch, Shultz, & Olsen, 2014; Johnson, 2015). At times, some retirees have returned back to work for various reasons, including boosting their income and paying off long-term debts (Brown, Pitt-Catsouphes, McNamara, & Besen, 2014).

Kapoor and Solomon (2011) stated that one in every five workers would be over the age of 55 starting in 2012. However, that ratio has increased to one in every four workers over the age of 55 in 2018. Currently, the principal generational segment of employees at companies and businesses, Baby Boomers, will be retiring over the next 10 years, leaving a void in skills, experience, and talent at the workplace (Eversole, Venneberg, & Crowder, 2012). Managers are challenged to develop business models and

training modules that produce an orderly and organized transfer of knowledge to younger employees. These models and modules will enhance the best business practices so work tasks and activities have a seamless transition between experienced and less experienced employees (Sumbal, Tsui, & Lee, 2015).

This phenomenon of having as many as four generations working together, known as a multigenerational workforce (MW), and having one in every five workers over the age of 55 years old, would not normally be a unique dynamic at companies. However, according to König (2015), the increasing use of and frequent changes in type of current technology – consisting of information technology (IT), such as computer software, electronic mail, (i.e., e-mail), and instant messaging, as well as noninformational technology, such as construction equipment, operating electrical and mechanical machines, and the use of motors and generators – had a unique impact on employee efficiency and organizational productivity among workplace demographics (Purcell & Rainie, 2014). The challenge for management to learn how to interpret and analyze the impact of type of current technology on employee efficiency and organizational productivity is one of the most significant aspects in assessing and engaging a skilled workforce for business opportunities in the future (Henkin & Butts, 2012; Zopiatis, Krambia-Kapardis, & Varnavas, 2012).

Modern workplace demographics are composed of a rich mix of age, gender, ethnicity, culture, and various approaches to perform and accomplish work tasks and activities. According to Smyrl (2011), several conditions existed that were the cause for several generations of employees to span in a single organization, such as current economic conditions that would force the decisions of an employee to delay retirement,

the risen average age for retirement with full benefits, or labor shortages that impeded workers from exploring other companies in the job market. Also, one of the biggest challenges that faced employees about to enter retirement was ensuring they had sufficient money saved to live relatively comfortable in their retirement years (Sargent, Lee, Martin, & Zikic, 2013). However, one of the biggest trials faced by managers currently is combining the right mix of experienced and inexperienced personnel using the latest in current technology to accomplish their work tasks and activities efficiently.

More training was usually necessary for employees 55 years old or older using current technology, as opposed to younger workers who graduated from college within the last 5 years and grew up with using current technology, as well as the potential to use current technology in academia and using it in their professional and private lives frequently (Cekada, 2012; Kulesza & Smith, 2013; Lazazzara, Karpinska, & Henkens, 2013). However, more "guidance and training" (Kulesza & Smith, 2013, p. 22) was needed for younger workers, particularly workers who graduated from college within the last 5 years, on noninformational technology due to their lack of experience. Managers were responsible for their employees to be trained properly throughout the company until their careers had come to an end (Vough, Bataille, Noh, & Lee, 2015). More changes in the workplace are expected, such as the creation of strategic business models and specific training modules in the type of current technology, as the age of the worker increases and they have an impact on employee efficiency and organizational productivity in the workplace.

Background of the Study

Since the beginning of the 2000s, unique challenges for an MW that use type of current technology at an increasing rate have surfaced in popularity among companies, influencing employee efficiency and organizational productivity as an underidentified impact on management decisions. In performing a comprehensive review of recent literature, I found that researchers demonstrated that a MW overlapped in range of years and were flexible in understanding their work environment. Bailey (2014) studied the efficiency of workers at businesses who use technology mandatorily and its impact on work productivity. Bridging generational gaps to understand the unique differences and perspectives of each cohort to create opportunities for collaboration, cooperation, and research information on safety, quality, and employee efficiency, along with employee convenience, could have long-lasting positive social change effects that will ultimately lead to an improved work environment (Romo, 2012; Barry, 2014; Bergum, 2015). Part of the improvement in the work environment mainly dealt with improving communication and IT use within the organization (Chesley, 2014a; Wesolowski, 2014). Extensive information on processes to improve effective communication that motivated positive action in organizations was implemented by managers to help improve organizational productivity (Canary & McPhee, 2011).

Another aspect of work environment improvement was to understand better the multiple work styles of a MW. Wei, Bao, Yao, and Wang (2016) examined the increase or decrease when employee efficiency and organizational productivity were impacted by learning technologies to perform project management tasks and activities. Cassata (2014), Johnson (2015), König (2015), Kulesza and Smith (2013) and Wei et al. (2016),

provided charateristic information on several work styles of multigenerational cohorts and how they incorporated the type of current technology in completing their work tasks and activities. Employees utilized work styles that worked best to balance the use of current technology and work experience to accomplish project goals effectively.

Work styles are the foundation of how employees organize their work, manages their time, teaches and learns information, interacts with other employees, contributes to the work group and ultimately improves the organization, communicates with peers and management, and creates patterns of success with ethics. Greater awareness can help build on strengths of a work style or minimize conflicts and problems. Some examples of different work styles are (a) employees who want to concentrate on the product, approach the project immediately, and will figure out what needs to be done during the process of accomplishing work tasks and activities, (b) employees who like to plan every detail possible prior to approaching a work task or activity, (c) employees who want to control the process of accomplishing work tasks and activities (and other contributing employees if necessary) to ensure the success of the project is achieved as they expected, or (d) employees who utilize their organizational skills to ensure all work tasks and activities are following the policies and procedures of the company, expectations are clear, and communication that motivates positive action is distinctly understood. In addition, critical training on the type of current technology among multigenrational cohorts was emphasized and the best means to maximize worker engagement across a MW (Meilink & Grimes, 2015; Nitschke, 2014; Pietrusewicz & Waszczuk, 2013; and Wiedmer, 2015).

The workforce was broken up into mainly four generational segments: Traditionalists, also known as the Silent Generation and the Lucky Few, Baby Boomers,

Generation X cohorts, also known as Busters, and Generation Y cohorts, also known as Millennials (Leong, 2012; Kilber, Barclay, & Ohmer, 2014; Holian, 2015). As of 2016, the largest generational segment in the current workforce is the Baby Boomers, who will be looking forward to retirement in the next 10 to 20 years, creating an experience gap in skills and talent at the workplace (Eversole, Venneberg, & Crowder, 2012). The Baby Boomer generation followed the Silent Generation, Generation Z, also known as Digital Natives, Founders, and Post-Millennials, which followed Generation Y, are likely to be in the workforce. However, currently their percentage of the workforce is expected to be very small. Developing strategies and applying motivation techniques for Digital Natives will be challenging for managers and key to their retention in the workplace (Anantatnula & Shtivastav, 2012; Thompson & Gregory, 2012; Rajput et al., 2013; Cloutier et al., 2015). It is not likely many workers born in the Silent Generation period (born before 1946) are still working or are active, full-time employees at corporations. Similarly, most individuals currently from the Digital Natives generation (born after 1994) have recently graduated or are close to graduating from college and will be entering the workforce in droves in the near coming years ahead and will likely outnumber the Baby Boomers quite rapidly (Woods, 2016).

A description of the generations was categorized by the characteristics and the behavior toward work culture. A depiction of the Traditionalist cohorts, their amount of the total population in the United States, their characteristics, their work ethics, and historical events during their lifetime are portrayed in Table 1.

Table 1

A profile of the Silent Generation/Traditionalists depicting their characteristics and work ethics

Who?	Population	Characteristics	At Work	Historic Events
• Grew up during the Great Depression and WWII • Either fought in WWII or were children • Behaviors are based on experiences during the Depression and WWII • Wealthiest generation • Men typically worked while women stayed home to raise children • Has largest lobbyist group, AARP	• 55 million • Majority are retirees • Largest voting population	• Behaviors are based on experiences from the Depression • Want to feel needed • Strive for financial security • "Waste not want not" attitude • Conformity • Conservatism • Traditional family values • Strive for comfort • Demand quality • Simplicity • Understands the nobility of sacrifice for the common good • Patriotic • Patience • Team players	• Loyal to employers and expect the same in return • Possess superb interpersonal skills • Enjoy flexible arrangements so they can work on their own schedule • Believe promotions, raises, and recognition should come from job tenure • Measure work ethic on timeliness, productivity, and not drawing attention	• Great Depression • WWII • The Cold War • McCarthyism • Started the Civil Rights Movement • Children were "seen, but not heard"

Note: From "Meet the Generations", Copyright 2012 by Marston Strategic Communications and Merrill Associates. Adapted with permission by the authors.

Traditionalists were born between 1922 and 1945 and are dwindling in number in the workplace, but many of them are reentering the workplace working part-time, based on personal declining economic situations and a desire to keep active in their older years (Fenzel, 2013). The aging population of the Traditionalists was the easiest to manage by management due to their extensive experience (Kulik, Ryan, Harper, & George, 2014). In some cases, retired workers found new jobs as contractors or consultants to their previous employment, utilizing the breadth and depth of their experiences to assist the organization in making business and/or technical decisions and to mentor current employees. Senior individuals embraced about three-quarters of the wealth of the

United States. Several Silent Generation workers were executives and presidents of some of the most well-established and influential companies in the United States. Lastly, the Traditionalists not only survived the Great Depression of the 1930s but were contributory in shaping the United States as an economic and military power, making many weapons to use during wartime and selling automobiles as an export to foreign countries.

A depiction of the Baby Boomer cohort, their amount of the total population in the United States, their characteristics, their work ethics, and historical events during their lifetime are portrayed in Table 2.

Table 2

A profile of the Baby Boomers depicting their characteristics and work ethics

Who?	Population	Characteristics	At Work	Historic Events
• Grew up during the Civil Rights Movement and the Cold War • Born during a spike in child births after WWII • Created the term "workaholic" • The largest generation • Single largest economic group • Sometimes referred to today as "Empty Nesters"	• 76 million • Makes up 28% of Americans	• Run local, state, and national governments • Largest workforce • Believe rules should be obeyed unless they are contrary to what they want; then they're to be broken • Experimental • Individualism • Social cause oriented • Free spirited • Can be less optimistic, cynical, and distrust government • Want products and services that show their success	• Work ethic is measured in hours worked • Less importance placed on productivity • Teamwork is critical to success • Relationship building is important • Expect loyalty from those they work with	• Assassinations of JFK, Robert Kennedy, and Martin Luther King, Jr. • Cold War • Walk on the Moon • Vietnam War • Protests and Sit-Ins • Civil Rights, Women's, and Environmental Movements • Watergate • Nixon Resignation • Self-discovery

Note: From "Meet the Generations", Copyright 2012 by Marston Strategic Communications and Merrill Associates. Adapted with permission by the authors.

Fenzel (2013) and (Chaudhuri & Ghosh, 2012) noted that with increased educational, financial, and social opportunities, the Baby Boomer generation, born from 1946 to 1964, was often portrayed as a generation of optimism, exploration, and achievement of being mentored by Traditionalists and mentoring Generation X and Generation Y cohorts. The workplace demographics began to evolve from a fairly racial homogeneous, paternalistic atmosphere to one of increased gender and ethnic diversity. The Baby Boomer generation saw increasing social and economic equality and came of age in a period when the United States was frequently torn by differing views on politics, war, and social justice.

A depiction of Generation X cohorts, their amount of the total population in the United States, their characteristics, their work ethics, and historical events during their lifetime are portrayed in Table 3.

Table 3

A profile of the Generation X/Busters depicting their characteristics and work ethics

Who?	Population	Characteristics	At Work	Historic Events
• Defined as "slackers" • They have the "carpe diem" attitude • First generation to develop ease and comfort with technology • "X" described the lack of identity that members of Generation X felt, not sure where they belonged • Experienced more divorces than any other generation • Had to learn to fend for themselves	• 50 million • Single parent families	• Quest for emotional security • Independent • Very self-reliant • Informality • Entrepreneurial • Expect immediate and ongoing feedback and is comfortable giving feedback to others • Reject rules • Mistrust institutions • Believe friends do not equal family • "Latchkey" kids • Multi-taskers • Suspicious of Boomer values • Value family time	• Casual, friendly work environment • Involvement • Flexibility and freedom • A place to learn • Work smarter, not harder • Want open communication regardless of position, title, or tenure • Value control of their time • Look for a person to whom they can invest loyalty, not a company	• AIDS • End of Cold War • Vietnam • Watergate • Nixon resignation • Computers • Grunge/Hip-Hop • Vietnam • MTV • Challenger explosion • Fall of Berlin Wall • Reaganomics

Note: From "Meet the Generations", Copyright 2012 by Marston Strategic Communications and Merrill Associates. Adapted with permission by the authors.

As Fenzel (2013) pointed out, Generation X, born from 1965 to 1980, grew up in an era where technology was emerging, but also when political and institutional incompetence was on the rise, such as the Watergate scandal, the Three-Mile Island accident, the Bhopal gas tragedy, the Iranian hostage crisis, and the Iran-Contra affair, to name a few examples. Generation X individuals also recognized as *latchkey kids* due to finding themselves home alone and taking care of themselves and

their siblings while their parents worked, spent less time with their parents than previous generations of children and found themselves treating their parents as older friends. Ungraciously dubbed the Boomerang Generation, many Generation X allies were forced to move back in with their parents while they were in their 20s.

A depiction of Generation Y cohorts, their amount of the total population in the United States, their characteristics, their work ethics, and historical events during their lifetime are portrayed in Table 4.

Table 4

A profile of the Generation Y/Millennials depicting their characteristics and work ethics

Who?	Population	Characteristics	At Work	Historic Events
• Grew up with technology- computers, cell phones, internet, etc. • Also known as the "Entitlement" generation • Boomer and late X'er parents raised them to be sheltered and to constantly build Millennials' self-esteem • Plagued with high levels of student debt • Second largest generation to be entering the workforce under the Boomers	• 80 million • More ethnically and racially diverse than older generations	• Ambitious yet clueless • Optimistic • Patriotic • Impatient • Entrepreneurial • Individualistic yet group-oriented • Want to be like peers but with a unique twist • Very informal • Busy • Short attention span • Acknowledge and admire some authorities • More culturally and racially tolerant • Acceptant of change • Un-trusting of "the man" • Achievement-oriented • Financially savvy • Want instant gratification • "Everybody wins!"	• Searches for the individual who will help them achieve their goals • Want open, constant communication and positive reinforcement from their boss • Search for job that provides great, personal fulfillment • Want to be close to their peers • Want leadership from bosses and supervisors • Look for opportunities to learn • Work to live, rather than living to work	• Oklahoma City bombing • Rise of the Internet • O.J. Simpson trial • Death of Princess Diana • CDs/DVDs • Columbine shootings • Y2K • Terrorism • Swine flu- 1988

Note: From "Meet the Generations", Copyright 2012 by Marston Strategic Communications and Merrill Associates. Adapted with permission by the authors.

Social psychologists have identified a new developmental period among Generation Y, born from 1981 to 1994, known as emerging adulthood, that is, the time period between adolescence and adulthood, typically between 18 and 25 years old, in which individuals are no longer fully dependent, but are not yet fully self-sufficient (Makel, 2012; Fenzel, 2013). It is believed due to the nurturing and protecting of Generation Y cohorts by their parents while growing up, providing for every one of their emotional, physical, and educational needs, rewarding their children for minimal effort, and, in some cases, increased the expectations of educational institutions by home schooling their children, these young workers had high expectations of recognition after being told they were so wonderful and expected rewards from others with minimal efforts on their part.

However, in contrast to the Generation X cohorts, Generation Y cohorts have closer relationships with their parents, and at many times offering to continue to live with them and to be supported by them to some extent as they enter the workforce. Moreover, they tend to seek the advice of their parents, seek the approval of parents or teachers, and look to managers and supervisors to provide the same nurturing, protection, advice, and approval as their parents provided.

A depiction of Generation Z cohorts, their amount of the total population in the United States, their characteristics, their work ethics, and historical events during their lifetime are portrayed in Table 5.

Table 5

A profile of the Generation Z/Digital Natives depicting their characteristics and work ethics

Who?	Population	Characteristics	At Work	Historic Events
• Also known as Generation M, Net Generation, Internet Generation • Grown up with world, wide, web. (Became available after 1991) • Born during minor fertility boom around US Global Financial Crisis • The children of Generation X	• 23 million and growing	• Highly connected to the use of communications • Like Instant Gratification • Thrive on acceleration and next, next, next • Independent people, lacking a community- oriented nature due to social media • Are very open book with little concern to privacy and personal information. Except for when it comes to money • Thrive on small bits of information. Think in terms of status's and Twitter language • Under a lot of pressure to succeed	• Very collaborative and creative • Will have to solve the worst environmental, social and economic problems in history • Will not be team players • Will be more self-directed • Will process information at lightning speed • Will be smarter	• 9/11 attacks - 2011 • Great Recession - 2008 to present • Terrorism - these individuals do not remember a time without war • Swine Flu outbreak - 2009 • Hurricane Katrina - 2005 • iPod - 2001 • Facebook – 2004

Note: From "Meet the Generations", Copyright 2012 by Marston Strategic Communications and Merrill Associates. Adapted with permission by the authors.

Generation Z, also known as Digital Natives or the Pluralist generation, born after 1994, will likely be the last generation with a European American majority. The most positive inference of Generation Z cohorts living in a United States that will be more ethnically diverse than ever before is that they will exist in the most diverse social circles, they will be the least likely to believe in the American Dream, they will start to reflect the Generation X parenting style in their mindset, and they will likely to be affected by blended gender roles in family parenting (Fenzel, 2013).

Generation Z cohorts have been identified in correlation with declining fertility rates over the last couple of decades but have bottomed out in 2011 and have increased every year since then. Lastly, Plural girls placed a higher value on being respectful, ethical, and trustworthy than Plural boys, whereas Plural boys favored being loyal and were notably fun to be around.

Of the five categories in Figures 1 through 5, variations of the characteristics of a particular generation and their behavioral work patterns were the most significant aspects of a MW that relied on different uses of current technology to perform their work tasks and activities. While trustworthiness of employees and work loyalty could not be predicted, behavioral patterns could be modeled to give managers a glimpse of employee interaction and better understanding of how to manage the work environment and the MW (Klein et al., 2012; Leong, 2012; Wiedmer, 2015).

Statement of the Problem

Since the beginning of the 2000s, increasing use of current technologies in many managerial organizations presented several unique challenges for an MW (Rajput, Marwah, Bali, & Gupta, 2013). The research problem is the difficulty management has in managing work tasks and activities, as well as other unique challenges a MW experiences at the workplace when using current technology. Chesley (2014b) indicated that one of the unique challenges that has not been clearly defined and measured was the use of current technology and its impact on employee efficiency and organizational productivity among an MW. Purcell and Rainie (2014) publicized that 7% of employees who used current technology, such as the computer, Internet services, and various software applications, to perform their work tasks and activities made them less

productive at work, while 35% of employees stated that they spent more time working on projects due to the mandatory use of current technology.

Managers in most conventional, high technology industries, labeled as small, medium, and large organizations, reported difficultly in managing work tasks and activities among a MW using current technology (Petrakis & Kostis, 2012; Heng & Yazdanifard, 2013; Samadi, Wei, Seyfee, & Yusoff, 2015). The general management problem is that no literature has been found that addresses the issue of how businesses can increase employee efficiency and organizational productivity when the current technology is mandatory to accomplish work projects among an MW. The specific management problem is that managers have not determined the relationship between the use of current technology among an MW and its impact on employee efficiency and organizational productivity (Bennett, Pitt, & Price, 2012).

There are specific dynamics that had a major impact on collective groups and workplace relationships, such as positive and negative attitudes, built-in biases based on overconfidence in the abilities of an individual, the unpredictable actions of individuals, interactions between individuals, and patterns of behavior within the group. In turn, the relationships impacted by these specific dynamics, some interactions albeit stereotypical, have had an impact on management activities and productivity (Bursch & Kelly, 2014; Finkelstein, King, & Voyles, 2015). Canary and McPhee (2011) identified several manners of communication that existed among employees and between management and workers that could be effective among a MW. Although much is known about a MW and how they can work together to achieve success on projects, there is not sufficient information with the emerging attention on the use of and frequent changes in current

technology among a MW, along with effective communication that inspires positive action, and how it affects employee efficiency and organizational productivity.

Of the many aspects in using current technology in organizations, workers 54 years and older tended to need training, regardless of their tenure, in comparison to younger generation workers, from 23 to 36 years old, who grew up with using current technology and appeared to have easily mastered it with little or no training. Workers from ages 37 years old to under 53 years old tended to have a blend of understanding, where some workers may have been acclimated in using current technology and had some experience to perform their work, but still found using their skills and abilities to be productive and were able to establish measurable goals. This gap had a major impact on organizational success, growth, and tentatively increased share in the marketplace (Pietrusewicz & Waszczuk, 2013). This quantitative research study sought to fill this gap in understanding the impact current technology has on employee efficiency and organizational productivity in a MW. The two research questions were as follows: (a) How do multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use affect employee efficiency? and (b) How do multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use affect organizational productivity?

Purpose of the Study

The purpose of this quantitative, cross-sectional, research study was to identify the impact of multigenerational cohorts, gender, experience, voluntariness of use, and the type of current technology among an MW on employee efficiency and organizational productivity. I used two dependent variables (DVs): employee efficiency and

organizational productivity. The DVs encompassed five occupational values; (a) characteristics, (b) environmental behavior, (c) work styles, (d) organizational conduct, and (e) effective communication that motivates positive actions among several facets of those occupational values.

The independent variables (IVs) were multigenerational cohorts, gender, type of current technology, experience, and voluntariness of use (of current technology). Specifically, the groupings defining the multigenerational cohorts and gender IVs were (a) employees more than 71 years old; (b) employees from 53 to 71 years old; (c) employees from 37 to 52 years old; and (d) employees 23 to 36 years old. However, for the purposes of this research study, multigenerational cohorts and gender were taken as individual independent variables. These specific IVs fell into the categories of (a) Traditionalists, (b) Baby Boomers, (c) Generation X, and (d) Generation Y cohorts for multigenerational cohorts, and male and female for gender, Generation Z cohorts were not addressed in this research study. However, they are expected to grow into leadership roles in the workforce in the near future (Rose & Gordon, 2015).

I conducted a cross-sectional design to help identify factors that could help lessen concerns that have been identified by business managers in various industries when considering the adaptation of current technology in performing their work tasks and activities. I used a cross-sectional design in this quantitative research study using the resources provided by Survey Monkey for my population to better understand the personal, social, and environmental factors that could influence the use of current technology by a MW and determine its impact on employee efficiency and organizational productivity.

The cross-sectional design was best for this research because, unlike a longitudinal or experimental design, the unique topic and content, the variables that needed to be measured, the purpose of the data collection, and the nature and size of the organization in the interest of efficiency and effectiveness, were able to shed light on opportunities that other designs did not expose. A couple of those opportunities were when diverse types of current technology were introduced to an organization and training was provided that was employee-specific to the task or activity, and as current technology evolved it could be introduced at the academic level for students to become acclimated and attempt to shorten the learning time when students became employees at a company.

In this research study, I expanded on previous technology acceptance research that had used two data collecting instruments, the technology acceptance model (TAM) survey and the unified theory of acceptance and use of technology (UTAUT) questionnaire. To enhance the cross-sectional design, I created a survey instrument that contained items that answered my research questions, based on technology acceptance and use of technology criteria found in the literature review. By utilizing the TAM and UTAUT criteria found in the literature review, I was able to maintain the reliability and validity of the survey instrument located in Appendix C.

The potential social issues that may be addressed incorporate potential problems with efficient communication across generations, how each generation perceives using current technology, motivation and morale of workers, teamwork motives, performance expectations, worker principles, and varied learning styles to understanding and using technology (Coulter & Faulkner, 2014; Njoroge & Yazdanifard, 2014). This study may have far-reaching objectives and important future impacts on companies.

One of those far-reaching objectives is that companies could become more innovative and technology-driven to increase their customer base and manage their supply chains by sophisticated, real-time systems, Another far-reaching objective is the capability for companies to understand specifically the work psychology of the employee, probing into cognition, motivation, behavior, and performance, along with organizational psychology – from employee management to customer satisfaction and social engagement among employees – to understand better how psychological theory and research can be integrated into business academics and management practice. I attempted to identify and understand the protocol for each generational cohort group as they used current technology to work effectively on company projects. Lastly, understanding technology literacy among the MW may help managers to model strategy and assist their businesses to be more organized.

Background of the Survey and Questionnaire Instruments

Technology Acceptance Model

One survey instrument that attempts to model the role of user attitude towards type of current technology is the Technology Acceptance Model (TAM). The TAM was originally proposed by Fred D. Davis, a professor of Information Systems, back in 1989, which suggested that the perceived usefulness (PU), perceived ease-of-use (PEOU), and perceived behavioral control (PBC) of type of current technology are essential factors of its acceptance. Social norms (SN) are also factors of accepting type of current technology based on observation of other fellow coworkers using type of current technology to perform on work tasks and activities.

PU is described as the acceptance of the user by his or her independent likelihood that using an explicit application system will escalate his or her job performance within an organizational environment. PEOU is described as the degree to which an individual believed that using a particular system would be free from effort. PBC is described as the perceived ease or difficulty of an individual in performing the particular behavior, determined by the total set of accessible control beliefs. Control beliefs of an individual are about the presence of factors that may facilitate or hinder performance of the behavior. Lastly, SN are perceptions on whether an employee is expected by their colleagues to perform the recommended behavior (Davis, 1989).

The TAM itself is an information systems theory that models how users come to accept and use type of current technology. The TAM theorizes that the perceived practicality and the perceived convenience of using current technology was formed by the intention to use current technology to resolve an issue for a particular application, whether it was voluntarily or mandatorily. The model suggests that when users are presented with difference types of current technology, a number of factors influence their decision about how and when they may use it. Notably, PU was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.24). PEOU was defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989, p. 24). Behavioral intent is a measure of the likelihood an individual will adopt an innovation where his or her intentions are likely to predict actions.

The TAM has been continuously studied and expanded, the two major upgrades being the TAM 2 (Venkatesh & Davis 2000 & Venkatesh 2000) and the UTAUT,

(Venkatesh et al. 2003). Figure 1 depicts a theoretical extension of the TAM for cross-sectional and longitudinal field studies.

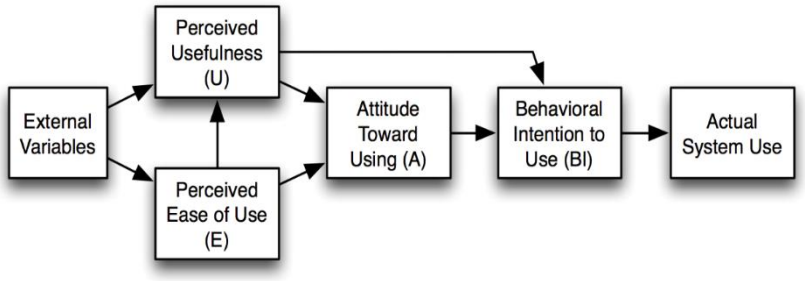

Figure 1. The technology acceptance model. *Note*. From Davis, 1989, *MIS Quarterly, 13*, pp. 319-340. Adapted with permission by the authors.

The TAM uses selected constructs, such as (a) perceived usefulness, (b) perceived ease-of-use, (c) perceived behavioral control, (d) subjective norm, (e) voluntariness of use (f) behavioral intention to use, and (g) attitude toward usage. The TAM survey has sought to delve into the features of usability and perceived usefulness so that the individual variability of his or her intention to use and adopt technology in the future could be studied. Over time, improvements were made in the TAM survey to help evaluate and measure the appropriateness of specific technological usefulness.

Unified Theory of Acceptance and Use of Technology

The UTAUT is a technology acceptance model formulated by Viswanath Venkatesh in 2003. The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. The theory holds four key constructs: (a) performance expectancy, (b) effort expectancy, (c) social influence, and (d) facilitating conditions; the first three being direct determinants of usage intention and behavior, and the fourth a direct determinant of use behavior. There are four other constructs that

pertain to the attitude of using technology as well as information and noninformation systems: (a) attitude toward using technology, (b) self-efficacy, (c) anxiety, and (d) behavioral intention to use the system. Gender, age, experience, and voluntariness of use are provided to moderate the impact of the four key constructs as well as the four other constructs on usage intention and behavior.

The UTAUT model is more comprehensive in that it encompasses eight former research models of IT usage behavior, the theory of reasoned action, technology adoption model, theory of planned behavior (TPB), combined TAM and TPB, diffusion of innovation theorem, social cognitive theory, the motivational model, and the model of PC utilization. Based on the constructs from the enumerated models, Venkatesh et al. (2003) proposed a unified model called UTAUT. The model posits to four core determinants of intention and usage performance expectancy, effort expectancy, social influence, and facilitating conditions, including four moderators of key relationships; age, (multigenerational cohorts), gender, experience, and voluntariness of use.

The lesser four constructs are attitude toward using technology, self-efficacy, anxiety, and behavioral intention to use the system. The *facilitating conditions* construct is used to predict behavioral intention. The UTAUT renames the old key constructs in TAM in the following manner; perceived usefulness has become performance expectancy, perceived ease-of-use has become effort expectancy, and subjective norm has become social influence. The four key moderators of the TAM and UTAUT models relate to the IVs in the research study and also relate to the DVs being measured in the research study, that is, employee efficiency and organizational productivity at a typical workplace.

The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behavior (theory) of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory) (Harms, Luck, Kraus, & Walsh, 2014). Subsequent validation by Venkatesh et al. of UTAUT in a study found it to account for an impressive 70% of the variance in Behavioral Intention to Use (BI) and about 50% in actual use. Figure 2 depicts the UTAUT.

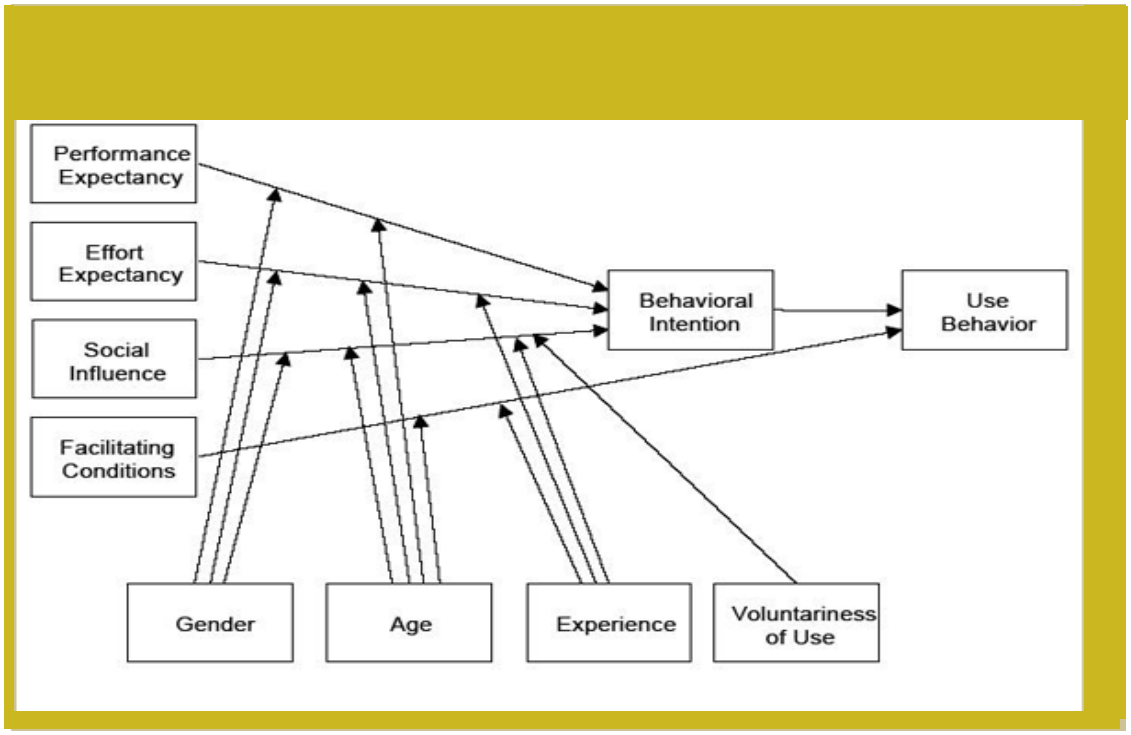

Figure 2. A flow diagram of the UTAUT that aims to explain user intentions to use an information system and subsequent usage behavior. *Note.* From Venkatesh, Morris, Davis, & Davis, 2003, *MIS Quarterly, 27,* pp. 425-478. Adapted with permission by the authors.

One of the most comprehensive improvements that took place gradually to the model is the UTAUT questionnaire, which also captures the needs and requirements of an

individual to utilize technology. I expanded the UTAUT model to other constructs, in this case, the use of current technology among a MW and its relationship with employee efficiency and organizational productivity, by creating a survey instrument to be administered to potential participants. A list of construct definitions was given in Appendix A.

The TAM survey and UTAUT questionnaire are established instruments. The criteria of the TAM and UTAUT models effectively capture the topic under examination. Establishing validity and internal consistency, by creating similar items from the two models in the survey for my research study, is proven by purporting to measure usability of perceived usefulness of technology and to measure appropriateness of technological usefulness to determine the relationship between the IVs and its impact on the DVs. The TAM and UTAUT models were observed in the literature review to measure perceived use of technology and perceived usefulness because of its proven reliability and internal consistency. The criteria from the models were helpful in creating a survey instrument.

The collected data helped in developing descriptive characteristics of current technology in an organization and those associated constructs (Hernaus & Poloski, 2014). Measuring attitudes of the employees toward using current technology may not yield new information if the use is mandatory, but the TAM and UTAUT constructs may easily be adapted for measuring the perception of employees using current technology as compared to the previous technology. Such an assessment is crucial for assessing the criteria for successful lifecycle management of products and services in an organization, to ensure quality products and services meet the needs of the user and customer.

Reliability. It was important to assess the quality of my measurement instrument and procedure used to collect data in my dissertation. I discuss the reasons why my study should be considered reliable.

TAM survey. The TAM was designed for modeling and understanding the perception of users on type of current technology. The reliability of the TAM survey instrument has been proven to yield the same results on repeated trials (Ahmad & Ahlan, 2015). One of the most widely used estimates of reliability for the TAM is internal consistency, which was measured using Cronbach's alpha. Generally, the reliability of the TAM was evaluated using a Cronbach's alpha value start from 0.5 upwards, but for several research studies, the value was suggested to be between 0.90 and 0.95 (Dunn, Baguley, & Brunsden, 2014; Peters, 2014).

UTAUT questionnaire. Each construct of the UTAUT experienced a high internal reliability using Cronbach's alpha, with the lowest value, facilitating conditions, equal to 0.790 (Simeonova, Bogolyubov, Blagov, & Kharabsheh, 2014). Understanding that the UTAUT model is composed of eight different models, as a result, there are many unique explanations researchers would be prepared to go into before arriving at any conclusions concerning the generalizability of the model and, thereby, challenging the reliability. However, the criteria of the UTAUT model found during the literature review was used to create a survey instrument. As the researcher, I performed replicability of the original model, collected and analyzed the data, and hence provided justification of its reliability.

Instrumentation and Operationalization of Constructs

Based on an extremely large body of literature in information systems (IS), the TAM was influenced by the Theory of Reasoned Action (TRA) and possessed constructs that have demonstrated theoretical and psychometric support. Davis (1989) proposed initially that important research efforts were devoted to establish the reliability and validity of the constructs. Many of the research studies successfully confirmed the ability of the TAM to provide details on the idea of user acceptance of technologies, thereby making the TAM as one of the most prominent models in IS. However, while the TAM provided a strong representation of determining user acceptance of technology, there were questions that still remained as to whether or not the TAM was a capable interpreter of user acceptance of current technology when the use of current technology was mandatory, particularly if the preceding technology was removed or became obsolete and users were left with no other alternative.

Another issue with the instrumentation of the TAM survey and the operationalization of its constructs was the concern of whether current technology would be *accepted* instead of just being *used*. Fan (2014) observed primarily that the acceptance, instead of just the use of current technology, was an important concern, recognizing the latter may be isolated as the former occurred but, more importantly, the acceptance of current technology was often an essential predecessor if the completed benefits of using current technology were totally appreciated, such as a return on investment. The completed benefits of the acceptance of current technology were a significant matter for system designers and management charged with implementing current technology within their organization. If familiarity bred acceptance, then the

frequent use of current technology should have increased the characteristics of PU and PEOU on acceptance. Conversely, if frequent use of current technology led to the discovery of problems, technical troubles, or glitches, then frequent use could have led to a weakened effect of PU and PEOU on acceptance.

The acceptance of current technology by employees should be measured to the degree in which workers perceive the use of current technology to be more advantageous than and/or easier to use than its predecessor. If selected items from the TAM can predict acceptance of current technology when it is mandated, especially when no other alternative technology exists, and/or can provide direction on the outcome of use over time of acceptance, then the significance of the TAM to applied research will increase extensively.

Significance of the Study

Approximately one in every four employees in the United States was over the age of 55 in 2018. This event would leave a major gap in skills, experience, and talent in the workplace. With most of the Baby Boomer generation retiring, using current technology will depend on younger generational cohorts, despite not having the experience required to work on complex projects. One of the objectives of various sizes of organizations is to achieve a balanced relationship of older and younger employees who can benefit from using current technology, while not decreasing their efficiency or diminishing the productivity of the organization. This research study is original in that it addresses an underresearched area of multigenerational collaboration in the use of current technology and its impact on employee efficiency and organizational productivity.

Many studies have investigated the dependent variables of employee efficiency and organizational productivity in many industries, but do not parse the aspect of type of current technology and its impact on these dependent variables (Eversole, Venneberg, & Crowder, 2012; Abri & Mahmoudzadeh, 2015; König, 2015). These studies, at best, provided an estimation of the notable impact on employee efficiency and organizational productivity without providing a strategic model for managers to use that pertain to their particular business practice. In essence, the findings curtailed the possible solutions to increase employee efficiency and organizational productivity by offering estimates that did not necessary build on each other to form a reasonable strategic model solution (Lam, 2015).

Therefore, there is the possibility of aggregate error in providing estimates. The results of this study may provide much-needed insights into how employees develop proficiency in using current technology and apply it to their work tasks and activities. The insights from the study may address specific areas at organizations that look to identify issues that lead to poor performance, reduced productivity, and rectify them in a manner that demonstrates visible growth and development. Hence, the aggregate error may be very limited, and bias error of parameters obtained by the models may be less than in previous studies.

The proper type of current technology by employees and management has been a force for positive social change by addressing the inequities that disrupt employee efficiency and organizational productivity. Due to catholic issues that impede employee efficiency and organizational productivity, focusing on the impact of a MW utilizing type of current technology and applying it to their budgets, schedules and projects, may aid

many organizations as they attempt to make their businesses more efficient and productive. The implication for positive social change is that the findings may help businesses create accurate models of efficiency and productivity among a MW, increase customer service, and increase quality of products and services.

Nature of the Study

The nature of the research study was a quantitative approach, with a cross-sectional design that utilized multiple linear regression analysis to examine the significance of the variables (Vasconcelos, 2013). Quantitative research was consistent with measuring how employees approached their work activities using current technology and determining its impact on employee efficiency and organizational productivity, using deductive reasoning and examining the relationships between the dependent and independent variables (Creswell, 2013).

The different types of current technology were inherent in the survey instrument taken by the participants in the research study (Venkatesh, 2000; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003). Using a qualitative research design was not consistent for examining relationships among and between the dependent and independent variables. The qualitative research approach would be helpful solely in understanding the experiences and observations of the employees by way of interviews as they use current technology on their work tasks and activities, but not describe the significance of the data collected (Bailey, 2014).

The positivism theory of Auguste Comte was influential when researching how employees developed and how organizations used employee development in using

current technology (Comte & Bridges, 1865). To elucidate how a viable research problem emerged, objective measures of multigenerational employee activities as it pertained to the use of current technology were analyzed across gender, age, and experience. This quantitative, cross-sectional research study helped to identify the relationship between multigenerational cohorts (MCs), gender, experience, voluntariness of use, and current technology among a MW and its impact on employee efficiency and organizational productivity. This study supported the aspect of positivism by correlating my research to be as scientific as possible and then analyzing, evaluating, and eventually producing the results in a scientific manner.

Independent and Dependent Variables

The independent variables (IVs) are multigenerational cohorts, gender, current technology, experience, and voluntariness of use. Specifically, the multigenerational cohorts are employees more than 71 years old (i.e., Traditionalists) employees 53 to 71 years old (i.e., Baby Boomers), employees 37 to 52 years old (i.e., Generation X), and employees 23 to 36 years old (i.e., Generation Y). As Creswell (2013) advised, I wrote definitions (or subsections) of the IVs to clarify the impact each independent variable had when answering the research questions. The DVs were employee efficiency and organizational productivity. The four occupational values for employee efficiency were characteristics, environmental behavior, work styles, and effective communication. The one occupational value for organizational productivity was organizational conduct.

Research Questions

The research questions addressed were the following:

RQ1 How do multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect employee efficiency?

RQ2: How do multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect organizational productivity?

In my quantitative research study, I discovered the relationship among dependent and independent variables. I used the research questions and the corresponding hypotheses for this study to assess and understand the relationship between employee efficiency and the use of current technology among a MW and, similarly, the relationship between organizational productivity and the use of current technology among a MW to perform their work tasks and activities at businesses (Anantatmula & Shrivastav, 2012, Creswell, 2013).

Hypotheses

In order to answer the research questions, I proposed to test the following two pairs of hypotheses:

Null Hypothesis H_{01}. Multigenerational cohorts, gender, current technology, experience, and voluntariness of use do not affect employee efficiency.

Research Hypothesis H_{11}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness of use) does affect employee efficiency.

A measure of employee efficiency was determined from Appendix C, items 6 through 12.

I used the following regression model for employee efficiency:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon, \quad \text{(Eq. 1)}$$

where

Y = measure of employee efficiency;

X_1 = type of current technology; 1 if informational, 0 noninformational;

X_2 = years of experience;

X_3 = voluntariness of use of current technology; 1 if voluntary, 0 mandatory;

X_4 = 1 if male, 0 female;

X_5 = 1 if MC was traditionalist, 0 otherwise;

X_6 = 1 if MC was baby boomer, 0 otherwise;

X_7 = 1 if MC was generation X, 0 otherwise.

ε = error term

Note: Whenever a dummy variable is zero, the effect is captured in β_0.

Hypothesis 1 is:

$H_{01}: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0,$

H_{11}: At least one β_i not equal to zero, for i = 1 to 7.

This same model also applied to Hypothesis 2 except the DV *Y* was organizational productivity.

Null Hypothesis H_{02}. Multigenerational cohorts, gender, current technology, experience, or voluntariness of use does not affect organizational productivity.

Research Hypothesis H_{12}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness) of use does affect organizational productivity.

I used the following regression model for organizational productivity:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$ (Eq. 2)

where

Y = measure of organizational productivity;

Hypothesis 2 is:

$H_{02}: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0,$

H_{12}: At least one β_i not equal to zero, for i = 1 to 7.

A measure of organizational productivity was determined from Appendix C, items 13 through 23. The IVs were the same as in RQ1.

I tested each of these pair of hypotheses. Hypothesis 2 was tested using a similar regression approach used for Hypothesis 1.

Definition of Key Terms

The following key operational definitions clarified the terms used in this research study.

Current technology: The use of modern scientific software applications and/or hardware equipment to solve practical problems in industry and business, and specific methods, materials, and devices used to solve practical problems.

Employee efficiency (sometimes referred to as *workplace productivity*): This is an assessment of the effectiveness of an employee or group of employees. Efficiency may be evaluated in terms of the output of an employee in a specific period of time in reference to a project schedule. Typically, the efficiency of a given employee was assessed relative to an average for employees doing similar work.

Experience: The amount of familiarity and understanding an employee gains while working in a specific field or occupation.

Gender: Male and female.

High intensive technology use: The use of technology more than 50% of the time to accomplish tasks and activities on a project at work.

Low intensive technology use: The use of technology less than 50% of the time to accomplish tasks and activities on a project at work.

Multigenerational cohorts: Groups of individuals from various different generations that consist of a collection of birth years, history, and sundry personalities as a result of their defining experiences.

Multigenerational workforce: A company or business that employs several generations of employees of various age groups, with various ideas and work styles to perform activities.

Organizational productivity: A measure of the efficiency of a company or business to utilize resources carefully and conserve on cost while converting resource inputs into useful outputs. The four definitive factors that affect the productivity of an organization are (a) environment, (b) organization, (c) management, and (d) employee-related factors, such as attitudes, reactions, abilities, skills, education, motivation, and personal beliefs to name a few.

Voluntariness of use: The free will of the employee to use current technology to accomplish work tasks and activities on a project.

Theoretical Framework

The theoretical framework for this research study was positivism by Auguste Comte, abiding in the understanding that information derived from sensory experience, interpreted through reason and logic, forms the exclusive source of all authoritative knowledge (Pearce, 2015). This theory addressed manners of how people obtained knowledge and how it was used in the development and learning of new information. The theoretical work of Comte has been used extensively in educational and social environments that claimed humans in general are better able to understand the information they have constructed by themselves when it came to employee efficiency and organizational productivity (Chaudhuri & Ghosh, 2012; Mill, 2013; Bellocchi, 2015; Pearce, 2015). In accordance with positivist theories, learning is a social advancement that involves values such as language, real-world situations, and interaction and collaboration among learners (Chaudhuri & Ghosh, 2012). These overarching values were considered to be central in the learning process.

The following five principles of positivism was used to guide my research study: (a) there is unity in the scientific method, (b) the aim of science is to explain and predict, (c) scientific knowledge is testable, (d) science does not equal common sense, and (e) science should be as value-neutral as possible (Giner- Sorolla, 2012; Kuhn, 2012). These five principles were used to outline the basic methodological elements in the social sciences used for scientific inquiry. However, the cycle of formulating hypotheses, testing and analyzing the results, and then formulating new hypotheses remained the same. This ongoing cycle to guide my research required creativity, imagination, and intelligence to develop more accurate, comprehensive, and useful methods and models to

encapsulate the five principles of positivism.

Survey Instrument

The survey instrument in Appendix C used for Section I, Demographic Characteristic Information, which used a combination of circled and write-in responses. The remaining sections, Section II, Employee Efficiency, and Section III, Organizational Productivity, used a 5-point Likert-type scale for responses. A five-point Likert scale was used, with scores ranging from 1 (*extremely unlikely*) to 5 (*extremely likely*). The survey instrument in Appendix C assisted in gathering data to answer the research questions and hypotheses and served as a viable tool in understanding the behavior, patterns, and motivation of employees toward the use of current technology.

Management tries to reduce the risk associated with the implementation of innovative technology that is meant to improve employee efficiency and organizational productivity. The survey instrument in Appendix C helped to better understand the reasons why some employees resisted using a type of current technology, determined a means of evaluating the importance of these reasons and created business models that improved the type of current technology by employees as well as the process of implementation so that employee acceptance was enhanced. Also, the survey instrument provided more direction for management on interventions and training that was valuable as well as useful in managing technology acceptance.

Assumptions

1. The TAM is a well-established, reliable, valid, and dependable survey instrument that may provide helpful criteria to create a survey instrument, administer it to a population of employees being sampled, and may yield convincing results.
2. The UTAUT is also a well-established, reliable, valid, and dependable questionnaire instrument that provides helpful criteria to create a survey instrument, administer it to a population of employees being sampled, and may yield convincing results.
3. The participants will fill out the survey instrument with instructions to (a) alert them that their identity will remain anonymous, (b) that their answers will remain confidential, (c) fill out the survey instrument completely, accurately, and honestly to their best of their ability, and (d) to record personal profile information, such as age, gender, date of birth, years of service on the job, etc., accurately, as this information is pertinent to categorizing the MW for the research study.
4. My sampling method was placing my survey online and expecting a sufficient number of participants to respond as my population (Frankfort-Nachmias & Nachmias, 2008). Placing my survey online was a deliberate method of sampling for research that involved sampling individuals, where every participant has the same probability of being chosen. The reason for choosing this method of placing my survey online was because my population is composed of two genders and various ages. In addition, the sample population may be further divided between male and female employees, between the ages of 23 and 36 years old (Generation

Y); male and female employees between the ages of 37 and 52 years old (Generation X); male and female employees between the ages of 53 and 71 years old (Baby Boomers); and male and female employees over the age of 71 years old (Traditionalists). Therefore, posting my survey online for respondents to participate was the most efficient method for examining the differences between a MW when considering the use of current technology to accomplish work tasks and activities. Also, posting my survey online for respondents to participate was useful in determining the organizational impacts on each grouping.

5. A multiple linear regression analysis appeared to be the most effective method to analyze the relationship between the independent and dependent variables for my cross-sectional design and to predict outcomes that may help design a comprehensive model for managers of business and companies to use to increase in a streamline manner employee efficiency and organizational productivity.
6. The population variances of the dependent variables are the same for all populations. The scores on the dependent variables are independent of each other.
7. In the case of using a multiple linear regression analysis, my independent variables (multigenerational cohorts – Traditionalists, Baby Boomers, Generation X, and Generation Y, gender – male and female, type of current technology – informational and noninformational, and voluntariness of use – voluntary and mandatory) were nominal variables. The independent variable experience was an interval variable.

8. A five-point Likert scale was used, with scores ranging from 1 (*extremely unlikely*) to 5 (*extremely likely*), concerning the survey located in Appendix C to measure my dependent variables, employee efficiency and organizational productivity.
9. Experience and voluntariness of use may or may not be associated with age and gender, but they will be observed to determine their impact on the dependent variables.

Limitations

1. The study was conducted within the United States utilizing the population provided by Survey Monkey as my sample. The population consisted of engineers (Electrical, Mechanical, Computer, etc.), along with medical, government and industry, and military personnel. Therefore, the transferability of the results outside the framework of this population was limited and the resulting outcomes of this study should not be generalized beyond this population.
2. Limitations may come from the sample size used depending on how many respondents are acquired from the survey instrument in Appendix C and if the responses to the instrument are sufficiently accurate to find valid statistical findings. The sample size may also compromise my ability to gather a broader range of information in my statistical evaluations, such as psychological and emotional behavior and how apt communication is effective between employees and pervasive throughout the organization.
3. The study may include blue-collar, white-collar, and pink-collar workers, and management staff from 23 years to 75 years old in the work environment. It will

not include the president, vice presidents, chief executive officers, chief finance officers chief operating officers, board of directors, or any high-level executive positions, in that these workers have low or virtually no need to utilize type of current technology that has an impact on employee efficiency and organizational productivity.

4. Concerning the various multigenerational cohorts, I may have to allow for overlap of a generation. For example, if a person were born in the last year of the Baby Boomers, but grew up among the Generation X cohorts and related more to their attributes and characteristics than the generation in which he or she was born.
5. The research study will depend heavily on the responses of the participants. However, the accuracy and authenticity of the responses cannot be verified.

Scope and Delimitations

The scope, or subject to be analyzed, was the relationship between my independent variables, that is, multigenerational cohorts, gender, experience, current technology, and voluntariness of use, and its impact on my dependent variables, that is, employee efficiency and organizational productivity. I chose to use the population provided by Survey Monkey, which consisted of engineers (Electrical, Mechanical, Computer, etc.), along with medical, government and industry, and military personnel. I did not choose random companies or former companies I worked for, or the current company I work for, because I thought it would be harder to get employees to take the survey if I did not know who to ask to present my research request.

I chose these four generations, Traditionalists, Baby Boomers, Generation X, and Generation Y cohorts, because many businesses in the United States and its territories still have as many as four generations working together on work tasks and activities. I did not choose Generation Z cohorts, because many of them are just either graduating or just starting to enter the workforce, and I did not think they would have a significant impact on the subject of my research proposal.

Lastly, I chose multigenerational cohorts, essentially the ages of the individuals, and gender as my demographic variables to help in understanding better the relationship of the IVs and its impact on the DVs. I did not choose demographic variables such as ethnicity, race, or religion. These variables would not be considered critical factors in determining the use of current technology by a MW and its impact on employee efficiency and organizational productivity. Also, these variables would not factor in understanding better the relationship of the IVs and its impact on the DVs.

Similarly, other independent variables, such as cultural aspects, difference in languages spoken, and current economic status (low income class, middle income class, upper income class) were not considered for this study. There is the possibility of expanding this research study, and the potential for developing a still more comprehensive model based on new findings when including these additional independent and dependent variables. The model may be used for future research alternatives beyond the scope of this research study.

Summary

The impact on workers of the use of technological information and equipment has become ever more important to understand as the use of current technology has developed into an inescapable part of most workplace environments (Meilink & Grimes, 2015). I created a survey instrument using criteria from the TAM and UTAUT models located in Appendix C. The survey instrument provided critical information available to analyze the effects of job-related technology use. As companies and businesses continue to use technology interwoven in their ability to complete projects, increased use of technology may have associated gains in employee efficiency and organizational productivity. The increased use of personal technology, such as smartphones and tablets, may assist many workers in managing their work-related activities, such as resolving project conflicts, mobile electronic mail, and scheduling calendar events (Chesley, 2014b).

Several challenges exist for managers to operate a MW at an optimum level. One of the biggest dynamic challenges today and going forward, may be how managers can incorporate the low intensive technology use of current technology with workers 71 years or older who have achieved a status at the workplace as subject matter experts, and have tenure and valuable work experience, but need training on current technology use, and combine high intensive technology use with younger workers 21 to 35 years old, who may have grown up in the use of current technology, but lack the work experience to apply it correctly and accurately to work assignments and tasks (Petrakis & Kostis, 2015). Every 15 to 20 years, a new generation of workers enter the workforce

replacing the outgoing retirees (Cassata, 2014). Expectations and work methods may change and adapt to the new class of workers as they implement work styles that are comfortable to them and as other workers may copy these work styles if it seems beneficial, efficient, and productive.

The interesting dynamic exhibited in the high technological globalized world of today is that younger workers feel more empowered with their heightened knowledge of type of current technology, and they are likely to interpret the advertisement of experience and technical advice of older people as obsolete, not worth listening to, and may alienate themselves further from the experienced-based world of the older generation (Lamb & Gentry, 2013). As coexisting generations continue to manifest in the workplace, it becomes crucial for managers to pay close attention to generational differences when incorporating current technology. In Chapter 2, I provide an important evaluation of the searched literature about the history of the type of current technology among a MW, going back to the industrial age of the early 20th century and continuing to the present innovative, technology-dependent age of the 21st century.

It may become important to discuss the MW of the past to gain a better understanding of when one generation leaves the workforce behind and a new one comes into place. The interesting dynamic that takes place as the use of current technology of the contemporary era, along with frequent changes in technology continue, is that it is likely to have an impact on employee efficiency and organizational productivity. I discussed the similar and dissimilar essentials of positivism as it pertained to the type of current technology in the workplace among a MW.

The literature review in Chapter 2 concludes with a report on relevant strategies to use to increase employee efficiency and organizational productivity by using models based on findings from the research, as well as a discussion on objectives for future research needs. I describe the research methodology in Chapter 3. The outcomes of the data analysis are presented in Chapter 4. Lastly, I presented a summary statement of the findings of the study as well as recommendations for additional future research in Chapter 5.

Chapter 2: Literature Review

Introduction

Research in the scope of type of current technology in a MW and how that impacts efficiency in employees and productivity in organizations lacks a sound theoretical framework that characterizes past actions and guides future efforts in research studies. A synthesis of the literature between generational cohort details and modern technology information revealed several dynamics that impact employee efficiency and organizational productivity.

According to Johnson (2015), due to more diversity, gender equality, and more available opportunities, Americans are living at a time where there has never been a more diverse group of individuals from diverse cultures in companies and businesses in modern times with a minimum of at least three generations. Since the early researchers who looked into the emergence of MWs around the United States began publishing their research in journal articles, substantive, practical, and conceptual ideas created a new dynamic in understanding better how many multigenerational cohorts can work together in the best professional manner possible. With the incorporation of current technology in a managerial organization, business, or company, a noticeable dependency manifested itself in the workplace, where informational and noninformational technology primarily drove the success of completed projects.

Strategy

A number of scholars have examined and provided useful insights on research directions in the broad field of examining the MW. These include very well-known

articles, such as those by Wiedmer (2015) and Meilink and Grimes (2015). However, as Cekada (2012) points out clearly, the challenges of managing the modern workforce have increased due to rapid advances in modern technology and communication. These challenges to management and changes in advanced technology and effective communication have altered how younger workers approach and treat older workers when it comes to training, guidance, and direction. As an example, a younger worker who may be already proficient in current informational technology may be interested only in inquiring about specific details of the work task or activity and the best way to accomplish it. Any further details that require understanding current informational technology may never be inquired about. Since there would be less interaction between younger workers and older workers in this particular scenario, there would be less need for guidance or direction to accomplish the work task or activity and thus create a divide between these workers.

Technology has turned into one of the biggest dividers in the workplace. The older Generation X cohorts tend to go online on a computer to accomplish a task, Generation Y cohorts go online and offline seamlessly to accomplish a task and do not make a distinction between the two, while Baby Boomers tend to go online moderately while maintaining a comfortable feeling of how they used to accomplish work tasks and activities. Traditionalists rarely go online to accomplish a work task or activity (Allah, 2011; Cekada, 2012). Allah (2011) performed a qualitative phenomenological research study on the personal and professional lived experiences of 20 management leaders in the business sector of Atlanta, Georgia, metropolitan area, who managed a MW using the random sampling of a population method to resolve the research questions of how

generational differences of workers affected employee efficiency and organizational productivity in a multigenerational work environment. Cekada (2012) compiled a report using a qualitative research design approach on understanding the significant needs and learning styles in training a MW and why managers shifted their focus from the aging worker to the MW. The research inquiry was addressed as to how can businesses best manage and train a workforce that may consist of four generations. Generational diversity is found in many managerial organizations, from the executive levels down to the staffed units. Hahn (2011) noted that Generation Z cohorts are probably the most techno-savvy group of all the other multigenerational cohorts, mainly due to being forced to grow up quicker and having to stay adolescent longer, more commonly known by the term *latchkey kids*. The media, particularly social media and its equivalents, with its rapidly expanding technology, provided major influences for this generational cohort group and shaping their thoughts and ideas on using the most current informational technology (Simon, 2013). Compared to Generation Y cohorts, current informational technology and instant communication continue to be a part of the lives of Generation Z. However, their growing-up period had more to do with after-school activities, choreographed in most cases with having a parent or parents at home to come to and use their type of current technology accordingly.

While some advances current technology, both informational and noninformational, have accomplished significant progress at businesses and organizations, the culmination of all current technology has yet to fulfill its promise of increased employee efficiency and enhanced organizational productivity.

Whadcock (2014) cited that the Solow Computer Paradox, also known as the Productivity Paradox, which stated that the more a business invests in information technology, productivity among employees may go down rather than up, may be the reason that recent innovation was less impressive than it had appeared. In addition, it may also have been the catalyst as to why employee efficiency and organizational productivity slowed down or came to a halt. Another explanation for the Solow Computer Paradox was that the use of current technology could increase productivity among its workers and in the organization, but only after a sufficient lag for the information and training to pervade through the organization and its employees. To look for better improvements in employee efficiency and organizational productivity in managerial organizations, further information needs to be researched, such as availability to training and the purchase of cost-effective technology, which could be applied to many work projects.

Positivism Theory

Positivism theory is a philosophy that originated out of the French Enlightenment with French philosopher Auguste Comte, which states positive knowledge is based on natural phenomena and their properties and relations. As Pearce (2015) noted, information derived from sensory experience – interpreted through reason and logic – formed the exclusive source of all authoritative knowledge. Through the combinational use of observation and reasoning, namely their consistent relationship to progression and similarity, the human mind in a positive state recognizes the impracticality of obtaining unconditional ideas, and surrenders the search for the source and purpose of the universe and for knowledge of the familiar reasons of occurrences. Therefore, the theory and

principle of positivism became a symbol of a recognized mode of thought and one of sufficient importance to induce an elevated perspective of the opinions of the time and take them into serious consideration.

The main principle of positivism came from positive knowledge of observable experiences, where scientific methodologies were the best way of achieving these goals; all else was metaphysics. Positivism philosophy was meant to substitute Rationalism, also known as the brainpower approach, by taking advantage of the doctrine of the natural sciences, such as biology, chemistry, geology, and physics (Mill, 2013). Rationalism was a theory (or methodology) that held the perspective that considered reason as the major source and assessment of knowledge, that is, the criterion of the truth was not sensory, but intellectual and deductive (*The Stanford Encyclopedia of Philosophy*, 2013). Science had become a powerful force during the time of Comte and was increasingly replacing the divine principles of religion as the major source for understanding what was true and false, since many issues deemed to be proven in a scientific manner was generally held to be verifiable. The major obstacle to this line of philosophical thinking was in the case when trying to verify truth or falsity with individuals, since the practice of psychology was not as predictable as performing scientific experiments. Table 6 describes the three stages of scientific knowledge discovered by Comte.

Table 6

Comte's Three Stages of Scientific Knowledge

Comte's three stages	Stage 1	Stage 2	Stage 3
Stage of knowledge	Fictitious knowledge	Metaphysical knowledge	Scientific knowledge
Foundations of belief	Faith and custom	Philosophy	Rational logic
Social base	Family	State	Humanity

Note. From "A general view of positivism", Copyright 1865 by Comte and Bridges.

Moreover, the basic principle of positivism was that all realistic knowledge was based on the positive information obtained from observable experiences. Any thoughts outside this area of verifiable facts were considered to be metaphysical, that is, abstract theory or only concerned with explaining the fundamental nature of being and the world that encompassed it. The positivism theory meant that solely analytical declarations were allowed to be acknowledged as true statements exclusively by means of reason alone. Table 7 lists the six tenets of Positivism by Comte (Mill, 2013).

Table 7

Six Tenets of Positivism

Tenet	Meaning
Naturalism	The principles of the natural sciences should be used for social science.
Phenomenalism	Only observable phenomena provide valid information.
Nominalism	Words of scientific value have fixed and single meanings. The existence of a word does not imply the existence of what it describes.
Atomism	Things can be studied by reducing them to their smallest parts (and the whole is the sum of the parts).
Scientific laws	The goal of science is to create generalized laws (which are useful for such as prediction).
Facts and values	Facts are to be sought. Values have no meaning for science.

Note. From "A general view of positivism", Copyright 1865 by Comte and Bridges.

Positivism also sought correlations between two variables, laws and tendencies also known as empirical regularities. Mill (2013) noted that the correlation between two variables allowed laws to be defined and for predictions to be made even though empirical regularities did not need to be casual in nature. Empirical regularities have also been used to justify inequality of salaries between men and women and to support racialism, such as skull size measurements and intelligent quotient assessments. Therefore, empirical origins that proved regularities normally arose during the course of an inquiry, developing from interests that were defined by what was already known, that is, interests that depended on acquired knowledge, and not on natural desires and emotions (Pearce, 2015). A legal system for applying positivism to research constituted two kinds of policies, namely, primary policies that govern conduct and secondary policies for recognizing the policies of the system, changing them, and resolving

disagreements occurring under them. Hershovitz (2014) noted that one of the secondary policies, that is, the policy of recognition, played an introductory role in a legal system however, other policies of the legal system delighted in their status of a legal position due to the fact that they satisfied criteria that the policy of recognition set out for identifying law. The policy of recognition in contrast was not validated by another policy of the system, but rather a social policy whose existence and content were secured by a social practice. This model of positivism, that is, the content of the legal practice according to the model of policies, consisting of a set of rights, obligations, privileges, and powers in force in a legal system, was fixed eventually by social facts about the practice that constituted the policy of recognition in the legal system.

Legal positivism required the content of a plan fixed with social facts about the adoption and acceptance of the policy of recognition. Legal positivism followed from plan positivism combined with the understanding that several notable laws were also plans for human beings and society as a whole (Hershovitz, 2014). When a plan has been strategized large enough to where the plan has a sufficiently large group of items to proceed, the planning itself presents problems where the solutions are complicated, contentious, and arbitrary. Consequently, it is mostly appropriate to have a reasonable plan for creating plans, where an important action in the development of a legal system is the emergence of a master plan for planning.

The master plan of a legal system played a foundational role, comparable to the role that the policy of recognition played in the legal system. Hershovitz (2014) stated that the ability of the master plan by distinction did not rest on some further plan, but

rather derived from the fact that individuals were planning creatures that were subject to rational pressure to plan and to stick by the plans they made, whether by thorough thinking or by haste. The lack of planning would essentially substantiate a failure to achieve their complicated end. Since the law was a manifestation of the rational capacity of individuals to create and share their plans in the generic sense, only those individuals who had accepted the master plan of the legal system were required to follow it rationally.

The model of plans revealed to the average individual that when properly understood, most forms of legal activity was planning activity and that laws in the generic sense were plans. However, these laws were challenged when differences were considered between plan positivism and postpositivism, namely critical realism and social constructionism. As Cruickshank (2011) stated notably with positivism, knowledge should be applied positively but, the method of positivism should be rejected, disagreeing that casual explanations had to be based on references to unobservable structures and not based on empirical regularities, that is, laws and tendencies. In a different approach to postpositivism, social constructionists backed a relativist rebuff of fact and determined that the duty of research was to promote an uncertainty that diluted any positive truth declaration stated. The so-called positive age was deemed to be significant in that not only natural scientific knowledge was applied positively to drive technical and medical progress, but also positively applied to science of society to policy-making.

The model of plans and the prospects of positivism essentially rejected the philosophy of metaphysics. The theory of postpositivism made the common fallacy of

epistemology by converting ontological inquiries about what reality was into epistemological queries about how individuals know reality (Cruickshank, 2011). This theory laid the foundation for the understanding that from the psychological perspective researchers needed to contemplate solely on the positive and negative reinforcements of behavior in order to predict how individuals would behave in their environment. Due to the fact that it could be measured; everything else in between, such as what an individual was thinking was deemed irrelevant, since what an individual was thinking could not be measured (Ferguson & Heene, 2012).

The task of the researcher was to insert skepticism that undermined any positive truth or knowledge assertions made, so as to cancel the positivist approach to hold a social constructivist perspective. The researcher would rather see knowledge associated with power than to delegitimize prevailing positive truth or knowledge assertions (Cruickshank, 2011). The positivist view of the surrounding environment, that is, by utilizing science as a means of obtaining the truth and understand the environment sufficiently, that a researcher may be able to predict and control it from a quantitative approach, was seen as the best method to answer research questions and address hypotheses. This positivist perspective allowed the researcher to measure some of the physical and physiological accompaniments that came with employee efficiency and organizational productivity and rebuff postpositivism.

Environments were seen by the positivist as deterministic and, therefore, an opportunity to use deductive reasoning to postulate theories that could be tested scientifically. The scientific approach would attempt to understand mindfulness actions, human dealings, or societal measures using methods from the natural sciences, while

claiming to maintain a stringent assessment of impartiality (Pearce, 2015). In the most pragmatic sense, the scientific approach to understanding mindfulness actions, human dealings, or societal measures using methods from the natural sciences manifested that there was a relationship between scientific inquiry and philosophical description of how individuals obtain knowledge. Therefore, the functionality of philosophy was to either organize or unify the sciences across a range of fields to recognize with clarity that the measured environment should be based on analyses of phenomena without speculation about anything else beyond those phenomena.

Critics of empiricism and positivism had a long history in the human and natural sciences. Although the approach to positivism, that is, to positively apply natural scientific knowledge, to drive technical and medical progress and apply a science of society to policy-making, detractors noted the use of the inductive method may had artificially created a closed system of fixed regularities that were closed to change in contrast to an open system that allowed change at the level of observable events (Cruickshank, 2011; Caldwell, 2013). The inductive method, that is, the observation of an empirical regularity that led to the conclusion that one was observing a relation of cause and effect, was later replaced with the hypothetico-deductive (H-D) method, due to the fact that when the H-D method was adhered to, the inductive method eventually failed since it could only describe events but not explain them. Therefore, with the inductive method, the researcher can directly observe relations of cause and effect, and with the H-D method, the researcher can directly observe fixed empirical effects of underlying causes. It is in this historical context that empiricism was the foundation for the theory of positivism and provided the sufficient scientific approach to be in accord

with the knowledge that stemmed from the ability of an individual to observe behavioral patterns.

Many researchers have expressed that the development of management and organizational research had been characterized by the dominance of positivism as an underlying philosophy. Cruickshank (2011) and Caldwell (2013) noted that two of the most important characteristics of the positivism methodology was (a) the claim that science should focus on only directly observable phenomenon, with any reference to the intangible or subjective being rejected as meaningless, and (b) theories should be tested in an H-D fashion by their confrontation with the facts neutrally collected from a readily observable external world. The desire to duplicate the methods of the natural sciences in the social sciences leads to a focus on the observable. From a positivist perspective, the intent of research was to generate and test laws that govern the manners in which organizations operate. The concern to develop causal propositions, buttressed by logic and data, underlined an emphasis on experimental and cross-sectional survey research designs. This study utilized the cross-sectional research design

In addition to the inductive and the H-D methods, principles were also associated with empiricism and, subsequently, positivism that supported the scientific approach. Five principles of positivism were used to guide this research study: (a) the unity of the scientific method, (b) the aim of science is to explain and predict, (c) scientific knowledge is testable, (d) science does not equal common sense, and (e) science should be as value-neutral as possible (Giner- Sorolla, 2012; Kuhn, 2012). There were several manners to outline the basic methodological elements in the social sciences used for scientific inquiry. However, the cycle of formulating hypotheses, testing, and analyzing

the results, and then formulating new hypotheses remained in the same manner. The ongoing cycle required creativity, imagination, and intelligence to develop more accurate, comprehensive, and useful methods and models. Figure 3 depicts the interlocking ideas for the ongoing cycle that encapsulates the five principles of positivism.

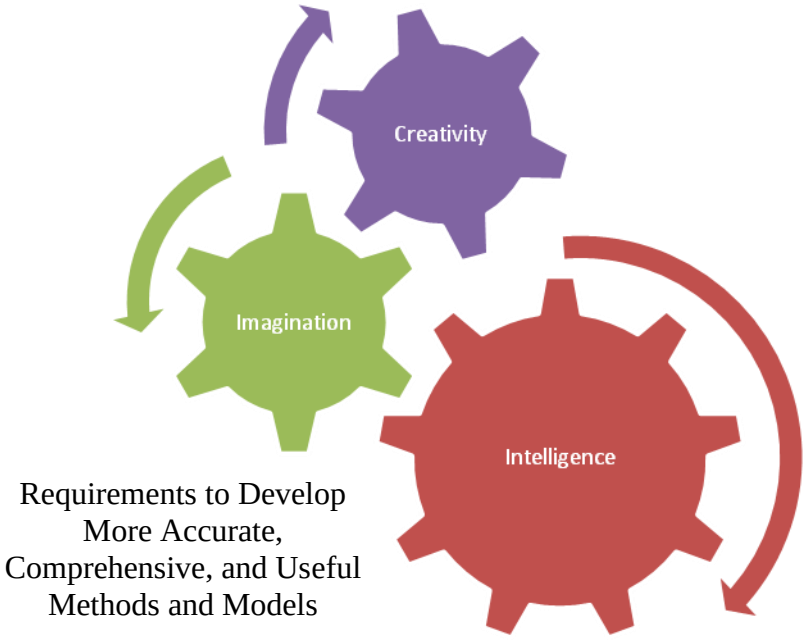

Figure 3. The interlocking ideas for the ongoing cycle that encapsulates the five principles of positivism. *Note.* From Kuhn, Copyright 2012, The structure of scientific revolutions. Adapted with permission by the authors.

The basic methodological elements of the scientific method assisted in offering important guidelines for proceeding to start a research study. Essential elements of the scientific method tended to observe, define a question, collect data and resources, form a hypothesis, test the hypothesis by conducting research, such as performing a cross-sectional design and collecting the data in a reproducible manner, analyze the data, draw conclusions that serve as a starting point for a new hypothesis, support or adjust the

theory, and lastly publish the results (Crawford & Stucki, 1990). Figure 4 depicts the scientific method steps represented as a research cycle or research wheel.

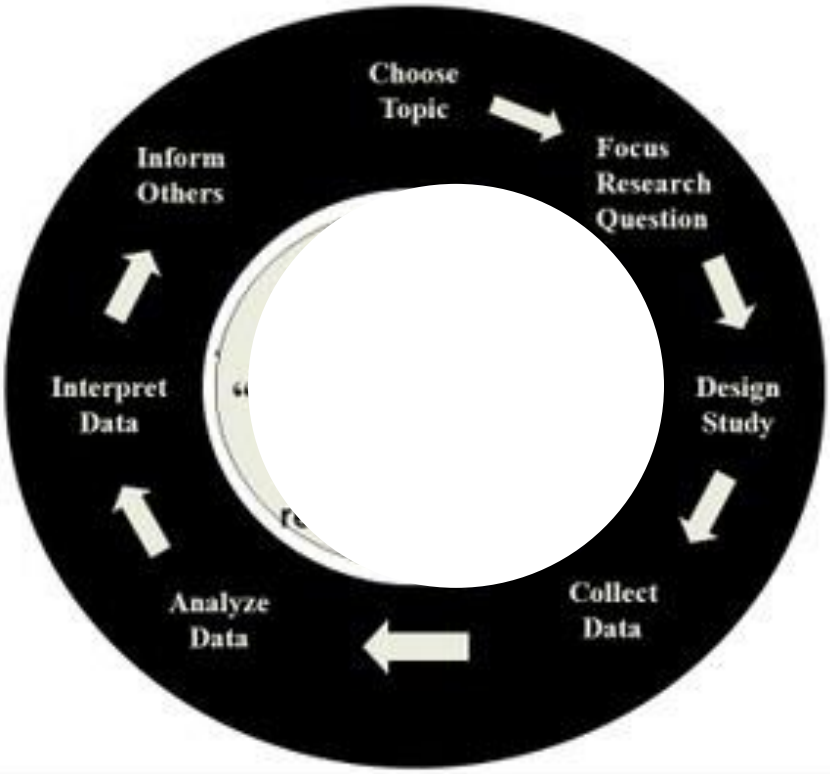

Figure 4. The research cycle (or research wheel) depicting the steps in the research process. *Note*. From Neuman and Robson, Copyright 2015, Basics of social research: Qualitative and quantitative approaches. Adapted with permission by the authors.

These essential elements of the scientific method provided the necessary information for iterations, recursions, interleavings, or orderings of the main activities in research, that is, characterizations, hypotheses, predictions, cross-sectional studies, and

experiments. Consequently, the scientific method depended increasingly on sophisticated characterizations of the unknowns or unsolved problems.

The principles of positivism are:

(a) Scientific knowledge is testable. Research ca be proved only by empirical means, not argumentations.

(b) Research should be mostly deductive, i.e., deductive logic is used to develop statements that can be tested (theory leads to hypothesis which in turn leads to discovery and/or study of evidence.

(c) Research should be observable with the human senses (arguments are not enough; sheer belief is out of the questions). Positivists should prove their research using the logic of confirmation.

The positivist uses of quantitative data are

(a) Use it to uncover and measure patterns of behavior.

(b) Produce precise mathematical statements about the facts they are investigating.

(c) Seek to discover the laws of cause and effect that determine behavior.

(d) Research should be detached and objective.

(e) Positivists researchers should check their subjective feelings, values or prejudices at the door as it can affect their research and findings.

Figure 5 provides the process for implementing the scientific method.

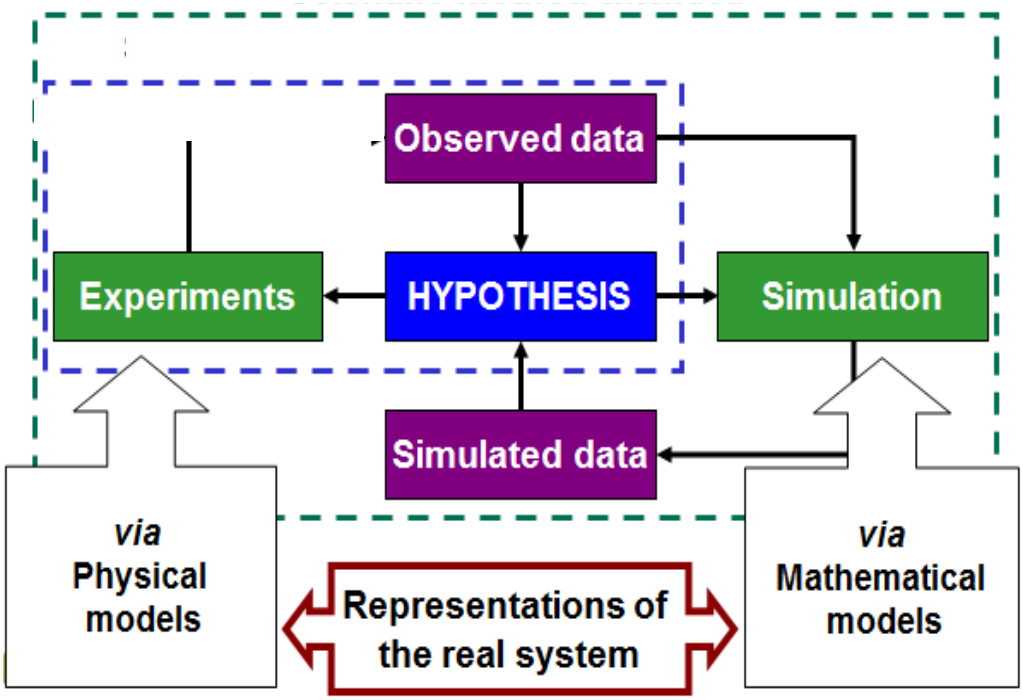

Figure 5. Process for implementing the scientific method. *Note.* From "Cambridge Machine Learning Group" by Y. Gal, 2015, *The Source of Deep Learning*, p. 1. Copyright 2015. Adapted with permission of the author.

The scientific method can be broken up into two sub-methods; the experimental method and the nonexperimental method. The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables (Nichols & Edlund, 2015). The nonexperimental method, or the descriptive method, does not involve as much manipulation, assignment, or control as a true experiment. Hypothesis testing was more flexible, and data gathered could be used to formulate theories or hypotheses that could be more rigorously tested from a cross-sectional design (Vasconcelos, 2013). Both experimental and nonexperimental methods make significant contributions to the study of cultural practices based on the data collected and measured statistically by analysis,

and based on the natural environment, respectively. Figure 6 depicts the scientific method including both experimental and nonexperimental methods and the associated research methodologies.

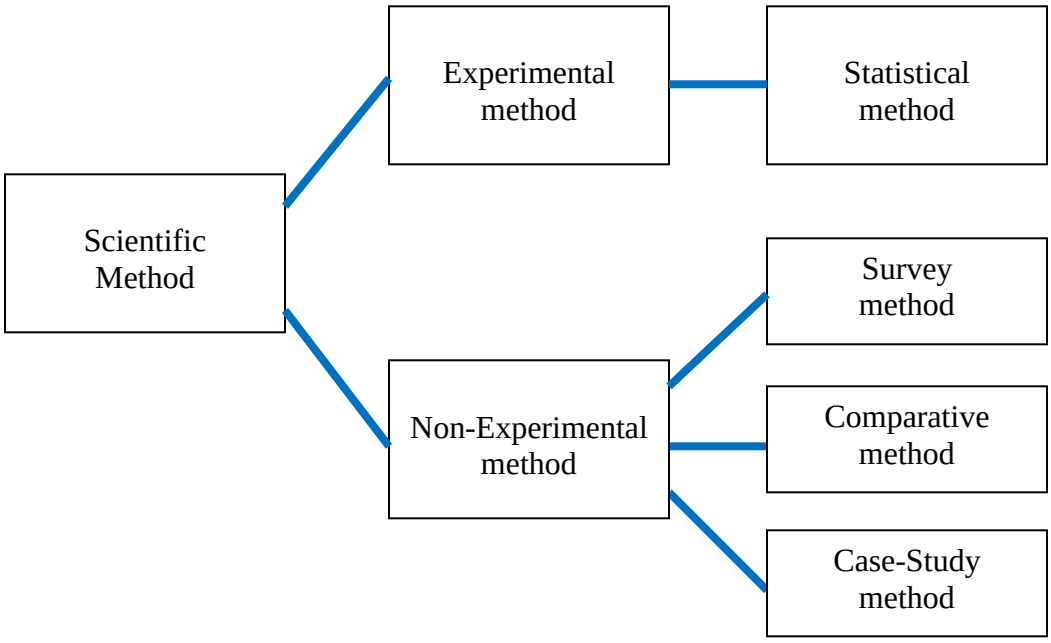

Figure 6. Breakdown of the scientific method between experimental and nonexperimental methods. *Note.* From "Ways of Knowing Competing Methodologies in Social and Political Research" by J. Moses and T. Knutsen, 2012. Copyright 2012. Adapted with permission of the author.

Experimental and Cross-Sectional Concerns with Positivism

When applying positivism as a theoretical framework and using the scientific method for experimental and cross-sectional research, there are certain methodological issues that need to be addressed. Nichols and Edlund (2015) stated that one of the most significant methodological issues was conducting valid studies that allowed claims to result from the findings. The concern of this methodological issue was resolved by conducting appropriate laboratory experiments and cross-sectional studies which justified

the most internally valid research method available to the researcher. In this instance, experimental and cross-sectional research became more descriptive instead of prescriptive. Furthermore, laboratory experiments and cross-sectional studies also proved to have considerable external validity along with internal validity.

Another methodological issue was the concerns regarding the methods by which laboratory and observation studies were conducted. These concerns included pre-experimental crosstalk, demand characteristics, expectancy effects, and post-experimental inquiries for experimental studies, and small number of samples, no application of actual usage, self-selection bias, and specialized single tasks difficult to generalize for cross-sectional studies (Nichols & Edlund, 2015). In each of these concerns, participants generally obtained knowledge from a variety of resources regarding pre- and post-experimental procedures that had a significant impact on the results and subsequent findings in the experiment. Similarly, participants generally obtained knowledge from a variety of resources regarding observational field procedures that had an important influence on the results and subsequent findings in cross-sectional studies. Relatively few studies have empirically examined these concerns in a manner that provided researchers the data necessary to address them, despite important theoretical attention paid to each of these topics in the 1960s and 1970s

Experimental Issues. Pre-experimental crosstalk occurred when former participants in an experimental study conversed or interacted with and discussed experimental details with future participants. Edlund et al, (2014) stated that the informing of future participants of key experimental details, otherwise known as crosstalk, could be significantly reduced by combining a classroom-type training module

with laboratory-based treatment of the subject pools for past study participants. The researchers in the study provided valuable guidance in minimizing the prevalence of crosstalk by effectively demonstrating how past participants could be isolated successfully from future participants in the research study.

One of the possible solutions examined by the researchers in a study to reduce crosstalk was to design activities that were intended at detecting crosstalk without relying on self-reported rates. An incentive was given to the participants in the research study to earn extra credit if they could guess the number of beans in a jar, with the idea that the experimenters would provide the participants with a fake, yet reasonable, so-called *accurate* number of beans in the jar (Nichols & Edlund, 2015). The notion for this action was that the number served as a means to detect participants who received the so-called accurate number from previous participants. In the end, the researchers attempting to reduce crosstalk by (a) providing a classroom-based treatment placed into the course textbook, syllabus, and reiterated by the classroom instructors, and (b) providing a laboratory-based treatment, combined both treatments to provide the largest decline.

Another important experimental concern with positivism dealt with the use of human participants and the effect of their responses. Potential extra-experimental effects in the laboratory, otherwise known as *demand characteristics*, existed when an issue with the experiment procedure placed a demand on participants to perform in a certain manner (Nichols & Edlund, 2015; Edlund et al., 2014). The major apprehension in utilizing participants in laboratory experiments was that they might be predisposed to perform as *good contributors*, that is, researchers searching for the true nature of the experiment while participants act in manners to confirm the hypotheses of the experimenters.

Demand characteristics, combined with the previous concern of participant crosstalk, posed important threats to reliability, validity, and the reproducibility of experimental outcomes.

When it came to internal validity, external validity, and threats to validity of a scientific theory, the theory-based predictions, or knowledge claims, had to be consistent with the data obtained by the senses and design of the researcher. Klein, Doyen, Leys, Magalhães de Saldanha da Gama, Miller, Questienne, and Cleeremans (2012) noted that the positivist research methodology, otherwise known as methodological individualism, emphasized micro-level experimentation in a lab-like environment that eliminated the complexity of the external world, for example, social, psychological, and economic linkages between unemployment and crime or suicide. Policies were prescribed based on the results developed from the scientific method, for example, job training for the unemployed, antidepressants for the suicidal, and prison time for the criminal.

The results from the scientific method observed by psychologists yielded results that had internal validity, that is, the relations observed in the experiment were valid within that specific context. The results obtained using experimental methods provided valuable insights into the nature of reality, but the conclusions may lack external validity. Thus, the relationships observed in the laboratory may not be the same in the more complicated external world where a much greater number of features interact with each other.

Researchers originally began to analyze the potential effects of demand characteristics through the examination of basic verbal conditioning skills. Experimental researchers attempted to expand the number and specificity of post-experimental

questions in an attempt to better understand the degree of awareness in verbal conditioning research and the effect of this awareness on the findings (Horton, Rand, & Zeckhauser, 2011). In general, experimenter participants were deemed as either aware or unaware when the post-experimental interviewed occurred. Aware participants in the experiment performed better on the experimental activity than the unaware participants; analyzing unaware participants resulted in no significant effects.

Beyond the demand characteristics induced by the experimental design, experimenter expectancy effects were also problematic. Edlund and Nichols (2015) suggested that experimenters in research influenced the conclusions of the research study they conducted, intentionally or unintentionally. Experimenters and researchers often knew the intention and hypotheses of the experiment and at times unintentionally acted in manners that confirmed their expectations, thereby inserting intentional personal bias in the research study. Experimenters and researchers potentially could communicate verbal or nonverbal gestures to participants that hinted to the desires of the researchers, and alluded participants could alter their behavior if experimenters verbally or nonverbally rewarded certain responses.

Because of the intentional or unintentional personal bias inserted in an experiment or research by some researchers, the associated studies produced inconsistent outcomes regarding the transmission of experimenter expectations. Edlund, Hartnett, Heider, Perez, and Lusk (2014) stated that research studies and experiments should be controlled to distinguish between verbal and nonverbal conditioning and, in addition, considered the role that the experimenter and researcher incentives played in a majority of previous research studies. Although it was not a common occurrence for most researchers to offer

incentives to experimenters to obtain certain results due to the unethical nature of the action, researchers had to ensure studies were conducted in a moral and principled manner for honest results. Researchers needed to concentrate on convenient forms of experimenter expectancy rather than form their own expectations of experiments they performed.

Another vitally important, yet understudied area of methodological research in the scientific method under positivism is the detection of participant knowledge and suspicion (or deception) concerning postexperimental procedures or intent. Nichols and Edlund (2015) noted that if the research should involve deception, it was essential to identify those participants who learned or thought they learned the true nature of the research study. If the research did not involve deception, it was essential to identify the participants who deciphered the true nature of the study so as to not invalidate the data. The process of conducting research and collecting data from participants in an experiment became convoluted, in that it became difficult to distinguish between naïve participants and non-naïve participants. Participants that entered the experiment, with prior knowledge as a result of crosstalk and participants becoming suspicious during the experiment as a result of inadequate concealed experimental procedures, addressed light on the cause of awareness during research studies and experiments.

Concerns associated with detecting awareness during a research experiment addressed the issue of postexperiential inquiries in addition to the motives why participants did not disclose their suspicions. Blackhart, Brown, Clark, Pierce, and Shell (2012) stated that basic findings collected from several participants revealed information that confederates had provided ostensibly during the research experiment. The results

from the research showed a high likelihood of admitted awareness by the participants during postdebriefing questions and a low rate of awareness disclosure during predebriefing inquiry. Admitted awareness in pre-debriefing inquiry signified the importance of being aware of pre-experimental crosstalk due to its unpredictable impact, the potential to limit the validity of the research study, and the possibility that in the research study the participants may perform different than naïve participants. Once again, many researchers had determined that the laboratory-based treatment was the best method to reduce pre-experimental crosstalk.

Cross-sectional Issues. Cross-sectional designs are also based on positivism as a theoretical framework associated with the scientific method. The positivist assumption base is used to map out factors, such as the characteristics of a sample population, the trend of certain characteristics or behavior of that sample population, and the significance of the trend, as well as to what extent it has pervaded through the sample population (Edlund et al., 2014). Other factors may influence the trend of certain characteristics or behavior among a sample population that produce a truth or scientific fact. In essence, all of these factors contributed to the reproduction of the positivist paradigm, where the focus was on establishing objective scientific facts about the characteristics and behavior of a population through the scientific method and quantification.

With the positivist approach, cross-sectional studies addressed associations between the levels of dependent and independent variables and utilized all the variations of each variable in an organization. Further traditional wisdom had long recognized that the positivist research was easily accepted for the reason that its research tradition had been successfully established (Nichols & Edlund, 2015). Cross-sectional studies may

have less detailed measures than other studies, but they used more powerful statistical techniques and tended to use large sample population sizes. Thus, cross-sectional studies became the dominant form of research in information systems.

Historical Context of a Multigenerational Workforce

The Great Depression brought mass suffering to all regions of the country and to all ethnic groups that brought national income down by 50% and unemployment rose approximately 25% of the total labor force. From a historical standpoint, prior to World War II many young people did not go to college and would likely work at a manufacturing company, work on a farm, or join the military (Lee & Mather, 2008). In many cases of the African American community, even though African Americans served in every war since the Civil War, segregation laws kept African Americans and European Americans from serving together in the same combat and non-combat units (Trotter, 2016). In addition, African Americans faced barriers in trying to get work in manufacturing companies. The Great Depression had African Americans linger longer in poverty than any other ethnic group at the time and suffered greater than any other ethnic group long before the Stock Market Crash of October 29, 1929, also known as Black Tuesday. Moreover, African Americans who became farmers were not given the same opportunities to market their crops to grocer like farmers of the European American communities.

Latinos and Hispanics have existed in the country for centuries but were marginalized when European immigration to the United States took place in the late 1800s (Faville, 2013). In the beginning, the Asians, particularly the Chinese inhabitants, immigrated to the United States in the 1800s and took many farm-related jobs, especially

to find gold in the mountains of California (Teachers Curriculum Institute, 2013). The Coolies were forced into the United States to build the railroad tracks (Gandhi, 2013). By introducing these cultures, the MW became not solely a workforce of different generations, but also became a multicultural workforce that provided dynamics that did not have a major impact on employee efficiency and organizational productivity, but rather instead exposed working relationships that indirectly had an impact on divided work, such as the issue where most of the labor-intensive work was given to African Americans, Asians, Latinos, and Hispanics, as well as productivity based on slave labor or indentured servitude, ineffective communication that produced negative results, and the provision of unequal, work-related opportunities for all workers.

In the decade of the 1950s as the automobile industry became stronger in car sales domestically and abroad, African Americans, Latin Americans, and Asian Americans started to enter into the manufacturing companies in larger numbers than in the previous decade. This transition from prior to the 1950s also entered younger workers into managerial organizations and provided the origins of a MW (Trotter, 2016). Transitioning from indentured labors to manufacturer workers in a business or company was not immediately seen as a workforce composed on multiple generations since many of these workers did not work side-by-side with European American workers. As the MW in the early stages started to develop, the division of work activities and tasks were delegated in a manner that reflected which cultures would receive manual work (blue collar) and which cultures would receive work that was perceived to require a high intelligence to be successful to complete the job (white collar).

Perspective of a MW

With the advent of a new MW beginning to emerge from the 1950s on, the age of the employees working in managerial organizations started to become younger. A system of behaviors and psychological procedures inside a group and outside a group, called in-group/out-group dynamics, where decision-making behavior could be better understood, would heighten the differences in behavior between young employees and older generations of employees (Johnson & Anderson, 2016). Groupings in a managerial organization developed their own culture, and in addition their own values and their own norms and expectations regarding behavior. Behavior deviation from in-group norms, actions that established employees already familiar with the corporate culture, its values and expectations regarding behavior, was a clear sign to researchers that people in the in-groups tended to jump to negative conclusions when judging the norms of the behavior of others.

Particularly, younger workers received more negative stereotyping than any other multigenerational worker, such as having a poor work ethic, tended to want coddling, felt entitled because they were there at the workplace and should get rewarded for doing their job, and exhibit disgraceful face-to-face communication skills. Younger workers with limited work experience and/or unfamiliar with general workplace culture were more deemed to be part of the out-group norms, that is, new employees to the corporate culture and its values and expectations regarding behavior and bring unique behavior norms learned outside the workplace (Johnson & Anderson, 2016). By taking the time to understand behavior deviations among a MW and, subsequently, better understand employee efficiency and organizational productivity during the process of accomplishing

goals, current technology was utilized as needed to complete tasks and activities to achieve project goals. In return, managers of businesses and companies were in a better position to communicate with their employees the goals that needed to be accomplished, the technology that was required to complete tasks and activities successfully, and subsequently, engage better with their customers in an increasing global and diverse economy.

After determining learning styles among a MW, the type of training needed to use current technology, the proper preparation, and the environment that was conducive to learning current technology was considered strongly. Cekada (2012) noted that Baby Boomers are relatively comfortable in the technology they have learned during their time at the company however, Generation X and Generation Y cohorts tended to receive their information based on individual preferences, such as constant access to type of current technology both professionally and personally attained and are more visually literate than previous generations. Due to these attributes of the multigenerational cohorts, Baby Boomers tend to resist change and find it uncomfortable when forced to change their work style due to training. On the other hand, Generation X and Generation Y cohorts are more comfortable with images and graphics than with written words, and therefore can merge text, sound and images easily enough to transfer between the real world and virtual world almost simultaneously.

Multigenerational cohorts, mainly through diverse tasks and activities, were exposed to increases in technology to perform their work tasks and activities on a global scale. Zmorenski (2013) stated that the Internet had become the foundation for many of the unprecedented technological advancements in type of current technology that were

performed to accomplish technical tasks, work goals and responsibilities. Technology-driven productivity had enabled employees to become more efficient in accomplishing their work tasks and activities, and thus improving economic growth for the company and increasing the standard of living for employees. Therefore, technological advances played a critical role in increasing productivity in a managerial organization and, thus, the standard of living of societal communities.

Basic Changes in the MW Population

Several changes to a MW using current technology to perform tasks and activities have been initiated gradually and in part, mainly due to the aspect of workers becoming aware of performing work tasks and activities in one manner and are not made aware that strategic changes could make their work performance on projects easier. There are four basic changes that have occurred over the last five decades that have provided significant dynamics in the type of current technology for many MWs: (a) an increase in population and mobility, (b) the influx of international workers who were naturalized American citizens, (c) the reduction in talent from young working people, and (d) increasing changes in the employment of women (Molinsky, 2013). When type of current technology impacted the production of a project to completion, Traditionalists and Baby Boomers were accustomed to performing tasks and activities in a certain manner as a feeling of security and certainty. compared to Generation X and Generation Y cohorts who tended to create new growth and change in their work performance as technology changed over the years. Among these four groups, they all eventually became a part of the culture that had embraced the type of current technology to be more efficient and productive in their work tasks and assignments.

Along with efficiency and productivity at the workplace, employees, primarily among the Generation X and Generation Y cohorts, preferred and, in some cases, demanded mobility to perform their work tasks and activities. Lam (2015) noted that mobility to perform work tasks and activities had gone far beyond using mobile device management (MDM), and the need for a full suite of technology was required to address the full demand platform of mobility requirements. MDM and information technology service management (ITSM) were not sufficient for accomplishing completion of projects when it came to cloud-based collaborative tools, such as Microsoft Office 365 and Google Apps for Work. The four major multigenerational cohorts in a typical enterprise, that is, Baby Boomers, Generation X, Generation Y, and Generation Z, enabled teamwork when using current technology was seen to bridge different generations of workers on many projects. Each successive generation demonstrated a new mindset in the use of current technology, inclusive of MDM and ITSM, going from being technology-centric to outcome-centric.

Conflicts and problems in the workplace among a multigenerational population could hamper employee efficiency and organizational productivity if not addressed promptly. Generational gaps between workers that led to conflicts and problems with work tasks and activities in the workplace were resolved when the acquisition of knowledge and experience of older workers was conveyed to and shared with the younger generation workers (Deyoe & Fox, 2012; Harvey, 2012; Heng & Yazdanifard, 2013). A delicate balance had to be enacted by management between older, more experienced workers with less technology exposure, developing a knowledge-sharing behavior with younger, less experienced workers with a decided advantage in

understanding current technology and the expectation the younger workers would positively influence the older workers to learn current technology with a positive attitude (Samadi et al., 2015). By becoming familiar with the dissimilarities between workers of differing skills and proficiencies in the workplace, management can devise meaningful strategies to increase performance among their workers in efficiency and productivity, such a promoting and atmosphere in the workplace with organizational values, morals, ethics, and expectations are appreciated and considered reasonable.

With the advent of type of current technology increasing among the generational workforce, collaboration has become paramount in a variety of current technologies that engage working together. Some of those current technologies included audio conference equipment, video teleconferencing, and instant messaging software have revolutionized unified communication and collaboration (UCC) to make employees more efficient and effective for project solutions (Lam, 2015). UCC has changed the modern managerial organization by utilizing type of current technology to improve teamwork and bringing employees that may be separated by using collaboration tools and increasing a variety of devices and communication methods. Some of those devices and methods, such as web conferencing and digital whiteboards, allowed complex information to be distributed globally in seconds to enhance the flexibility and versatility of UCC. As of 2014, over 1.2 billion individuals access the web using mobile devices.

Subsequently, with changes in the MW at many managerial organizations, wage and employment structures had to be altered – in many cases an increase in wages and specific titles that pertained to a particular expertise in technology – for workers who become precisely intelligent in the type of current technology. Molinsky (2013) noted

that current technological change in managerial organizations tended to have a correlation with an increase in skill demand and has supported and required new work practices with the type of current technology. However, ambiguities exist at the establishment and national levels that have led to two paradoxes: (a) the paradox of productivity has had a much larger impact at the establishment or firm level than at the national level of type of current technology, and (b) the paradox of wage inequality, where wages increased for employees using advanced technology at the national level then at the establishment or firm level. The relationships between the type of current technology among multigenerational teams and productivity growth, informational and noninformational current technology, and wage inequality tended to demonstrate that type of current technology slowed productivity growth and, subsequently, wage inequality due to the difficulties of commercialization of major technical innovations (Ferri-Reed, 2014).

Multigenerational Workforce Challenges with Current Technology

There are several challenges that appeared in MWs utilizing type of current technology to become more efficient and productive on work tasks and activities. One challenge is the ability of employees to gain sufficient access through both social and technological methods while maintaining information technology (IT) security, and have these actions correlate with information employee efficiency and productivity (Abri & Mahmoudzadeh, 2014). When the effect and impact of IT on labor productivity in detail was analyzed among a MW, it facilitated management to derive business strategies that could be applied for employee efficiency. Some of these strategies used hardware, software, and communication technologies in the production process that provided an

opportunity for the multigenerational cohorts to improve their efficiency and productivity on new types of current technology and overcome increased workloads from prior years at managerial organizations.

Another challenge several managerial organizations faced utilizing type of current technology among a MW was large and persistent gaps between the productivity of IT-using companies and traditional businesses, both at the firm-level and the industrial level. Productivity improvement had a crucial role in Gross Domestic Product per capita and firms that adapted to the use of IT, a major driver of productivity and an accelerator of economic growth in many industries and improved the production process and labor productivity (Abri & Mahmoudzadeh, 2014). Most of the general-purpose technology that provided a wide range of beneficial effects throughout the entire economy had come from firms to industries, in the appearance of goods and services and reshaping the whole system of production and distribution. By focusing on the intensity of using IT in industries, economic and productivity growth tended to be higher and investment in human capital also reaped complementary benefits.

As an example, the impact of technological advancement on employee performance in the banking sector had significant influence on the motivation and training of employees. Imran, Maqbool, and Shafique (2014) stated that most of the firms that involved the employee in management and working for technological advancement implementation invested in employee training to improve the employee knowledge, skills, and development prior to the introduction of type of current technology. Similarly, Dauda and Akingbade (2011) also agreed that even though the computer may have been the greatest invention that had influenced organizations,

nations, and human interactions in nearly all facets of life, its performance and usefulness, nevertheless, it depended mainly upon the knowledge, discernment, intelligence, and value of those individuals who created them and made use of them. The employees were mostly the individuals who created, initiated, used, and managed ideas that were the bases and directions of technology. Organizational and employee efficiency required that management in its strategic position should have provided the planning, motivation to the workforce, and created the organizational environment that was conducive for inter-group collaboration to utilize type of current technology in the most beneficial manner on work tasks and activities (Barry, 2014).

Lastly, there was another challenge several companies faced in the utilization of type of current technology among a MW was when productivity changed over time and if those changes had a significant impact on technical efficiency among workers in a managerial organization. The engineering managers tended to concentrate on the production process to improve product quality and decrease production cost however, almost every manager in virtually every current technological landscape depended on employees carrying out a broad array of compound machinery, equipment, and services for everyday safety, security, mobility, and economic welfare. The safety, efficiency, and comfort of the employee were paramount to managers in providing a work environment that was conducive in laying a foundation for improving productivity (Bergum, 2015). As an example, agriculture production in several countries, such as China and India, have exhibited and impressive growth despite fluctuations and shift of focus in government policy. The Malmquist Performance Index (MPI) was used to determine technical change, that is, technical change magnitude, input bias and output bias, technical

efficiency change, scale efficiency change, and output-mix effect (Yu, Liao, & Shen, 2014). Productivity in agriculture was calculated by assembling components of common subsectors within agriculture, such as crop, livestock, fishery, and forestry, with using four major agriculture inputs, that is, area, labor, machinery, and fertilizer, that allowed the examination of expansion of technology, input- and output-induced shifts of technology frontier, technical change, scale efficiency change and the change in productivity caused by output-mix. The advantage of this approach was the flexibility to statistically test the hypothesis regarding different components of the MPI, the natural and bias of production technology, returns to scale, and functional form by imposed constraints on parameters.

Summary

Researchers have conducted several scientific trials using the scientific method under the positivism theoretical framework to determine distinctions between multigenerational cohorts in terms of how they utilize type of current technology in the workplace. Multigenerational cohorts in an organization are separated not only by their ages, but also by their experiences, history, likes, dislikes, and cultural features (Eversole, Vennberg, & Crowder, 2012; Fenzel, 2013). The dissimilarities between multigenerational cohorts had a direct impact on the work styles when it came to accomplishing their work tasks and activities (Harvey, 2012; Johnson, 2015). These work styles are based on the distinction between older, experienced workers who may not be knowledgeable on the use of current technology to accomplish their work tasks and activities and younger workers who may have proficiency in using current technology, inside and outside the workplace, but lack the necessary work experience to apply their

knowledge of current technology to accomplish their work tasks and activities (Kapoor & Solomon, 2011; Lam, 2015).

The literature review offered an intentional investigation into understanding better how the dependent variables, namely, employee efficiency and organizational productivity, relate to workplace styles as well as the attributes and characteristics of a MW. A thorough examination of the theoretical framework for this research study delineated its potential to be useful across multiple disciplines in other countries, including the nursing, psychology, and human resources industries, and companies in Iran, China, Turkey, and India.

The research methodology selected for this study was described in Chapter 3. Also, I provided details regarding the sample size, location, survey instrument tools, data collection method, and data analysis. In addition, I discussed the rationale for the methodology used in this research study.

Appendix A lists the construct definitions. Appendix B is a list of current technologies in organizations. Appendix C was the survey that was given to the participants in Survey Monkey. Lastly, Appendix D is a list of tables containing output data from IBM SPSS.

Chapter 3: Research Method

Introduction

The purpose of this quantitative, cross-sectional research study was to identify the effects of multigenerational cohorts, gender, experience, current technology, and voluntariness of use on employee efficiency and organizational productivity. As the researcher, I attempted to classify and comprehend what each generation had to offer in utilizing current technology to accomplish their work tasks and activities that contributed effectively to a MW effectively. In addition, as the researcher I discovered if managing a MW is likely to be an important activity that will continue for several years into the future.

Also, in this chapter I describe the methodology to examine the relationships between employee efficiency, organizational productivity, and the type of current technology among a MW within the United States. Research on this topic will contribute to the available literature on better understanding the impact that current technology has on a MW to accomplish their work tasks and activities.

I addressed the research design that was used to answer the research questions. Moreover, I discuss the methodology, design procedures, survey instrumentation, data collection method, data and statistical analyses method, threats to validity, ethical issues, and findings and conclusion of the research study. Lastly, I present a brief summary of this chapter.

Research Questions and Statistical Hypotheses

As stated in Chapter 1, the research questions that guide this study are as follows: (a) How do multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect employee efficiency? (b) How do multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use affect organizational productivity?

Regression Model

The dependent variables are employee efficiency and organizational productivity. The independent variables are multigenerational cohorts, gender, current technology, experience, and voluntariness of use. The independent variables (IVs) in Hypothesis 1 are the same as in Hypothesis 2. The data were obtained from the survey instrument (see Appendix C), which was uploaded in Survey Monkey.

In order to answer the research questions, I propose to test the following two pairs of hypotheses:

RQ1: How do multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect employee efficiency?

The first hypothesis is about employee efficiency:

Null Hypothesis H_{01}. Multigenerational cohorts, gender, current technology, experience, and voluntariness of use do not affect employee efficiency.

Research Hypothesis H_{11}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness of use) does affect employee efficiency.

A measure of employee efficiency was determined by Section I of the survey instrument located in Appendix C. A five-point Likert scale was used, with scores ranging from 1(extremely unlikely) to 5 (extremely likely). The total value of questions in the survey in Appendix C was added and then the average taken for a measure of employee efficiency. The statistical information helped to make an assessment of the efficiency of an employee or group of employees. Hypothesis 1 is:

$H_{01}: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$,

H_{11}: At least one β_i not equal to zero, for i = 1 to 7.

where

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$, (Eq. 1)

where

Y = measure of employee efficiency;

X_1 = type of current technology; 1 if informational, 0 noninformational;

X_2 = years of experience;

X_3 = voluntariness of use of current technology; 1 if voluntary 0 mandatory;

X_4 = 1 if male, 0 female;

X_5 = 1 if MC was traditionalist, 0 otherwise;

X_6 = 1 if MC was baby boomer, 0 otherwise;

X_7 = 1 if MC was generation X, 0 otherwise.

ε = error term

Note: Whenever a dummy variable is zero, the effect gets captured in β_0.

This same model also applies to Hypothesis 2.

RQ2: How do multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect organizational productivity?

The second hypothesis is about organizational productivity:

Null Hypothesis H_{02}. Multigenerational cohorts, gender, current technology, experience, and voluntariness of use do not affect organizational productivity.

Research Hypothesis H_{12}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness of use) does affect organizational productivity.

A measure of organizational productivity was determined by Section II of the survey instrument located in Appendix C. A five-point Likert scale was used, with scores ranging from 1(extremely unlikely) to 5 (extremely likely). The total value of questions in the survey in Appendix C was added and then the average taken for a measure of organizational productivity. The statistical information helped to make an assessment of the productivity of an organization.

Organizational productivity is defined as the successful work by employees at a company or business at various stages of the project, such as project initiation, project planning, project execution, and project closure, better known as the Project Management Life Cycle. The four definitive factors that affect the productivity of an organization are (a) environment, (b) organization, (c) management, and (d) employee-related factors, such as attitudes, reactions, abilities, skills, education, motivation, and personal beliefs to name a few. Organizational productivity is defined as an organization (or business or institution) that produces the desired results with a minimum expenditure of energy, time, money, personnel, and materials. These results depend on two significant parts: (a) the

specificity of goals and the formation of those goals, and (b) maximizing performance by minimizing the effects of varying environmental and internal constraints.

For Hypothesis 2 we have again:

$H_{02}: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0,$

H_{12}: At least one β_i not equal to zero, for i = 1 to 7.

where

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$, (Eq. 2)

where

Y = measure of organizational productivity;

X_1 = type of current technology; 1 if informational, 0 noninformational;

X_2 = years of experience;

X_3 = voluntariness of use of current technology; 1 if voluntary 0 mandatory,

X_4 = 1 if male, 0 female;

X_5 = 1 if MC was traditionalist, 0 otherwise;

X_6 = 1 if MC was baby boomer, 0 otherwise;

X_7 = 1 if MC was generation X, 0 otherwise.

ε = error term

Note: Whenever a dummy variable is zero, the effect gets captured in β_0.

The IVs are the same as in RQ1

Dependent Variables. The dependent variables were measured as listed in Table 3 and reflected in the survey instrument located in Appendix C. The responses to select for each item are Extremely Unlikely, Moderately Unlikely, Neither Likely nor Unlikely, Moderately Likely, and Extremely Likely. Employee efficiency was measured using

items in Section I of the survey located in Appendix C. Organizational productivity was measured using items in Section II of the survey located in Appendix C. These are a series of Likert-type scale items to obtain the mean.

Independent Variables. The independent variables were measured as listed in Table 4 and reflected in the survey instrument located in Appendix C. The responses to select for type of current technology are informational and noninformational. The responses to select for voluntariness of use are voluntary and mandatory. In the survey, the informational and voluntary responses have been assigned a number 1, and the noninformational and mandatory responses have been assigned a number 0. I added up all of the combined scores from the survey in Appendix C for each variable and took the average (mean) for a score result.

The values of the two dependent variables, employee efficiency and organizational productivity, were calculated by the frequency of the item chosen. A five-point Likert scale was used, with scores ranging from 1(extremely unlikely) to 5 (extremely likely). The responses by each participant were measured by tallying all the like scores and taking a weighted average of the total. I used the IBM SPSS data analysis tool to determine the significance of the data.

Research Design and Rationale

The research design for my dissertation is cross-sectional. The research design comprised the outline for the collection, measurement, and analysis of data. I ensured I effectively addressed the research questions. The study was grounded in a positivist position, namely that the goal of obtaining knowledge was to describe the phenomena

that we experience and to preserve what can be observed and measured. The scientific method illustrated the belief of the positivist in the attainment of new knowledge by iterations, recursions, interleavings, and orderings of the main activities in research in an attempt to solve unknown or unsolved problems. In my study, I utilized a nonexperimental scientific method and critically investigated the natural phenomena, guided by the theoretical framework and hypotheses about the assumed associations amid such phenomena. The testing of the hypotheses was more flexible and the collection of data was acquired to formulate hypotheses that could be rigorously used and tested in a cross-sectional design.

I used a cross-sectional, quantitative research design approach to identify relationships between the type of current technology and worker productivity among a MW. I selected the participants from an organizational business environment using anonymous employees from MWs who volunteer for the study. As the study proceeded, I utilized the research design to evaluate the relationship between the independent variables (multigenerational cohorts, gender, current technology, experience, and voluntariness of use), and the dependent variables (employee efficiency and organizational productivity). Researchers that have studied issues under the positivism theoretical framework attempted to understand the environment well enough to try to predict and control it. The environment itself was deterministic, that is, the environment was operated by laws of cause and effect that could be discerned if the unique approach of the scientific method was applied (Cruickshank, 2012).

I used my created survey instrument, based on the criteria of the TAM and UTAUT models found in the literature review, to collect the data that is relevant to my

research study. A qualitative research design approach was not considered for this research study because the data collected was numerical in nature, it was collected at one time, and the nature of the study made it virtually impossible to obtain additional qualitative data in the form of interviews or further observations.

Methodology

In the methodology section, I describe the rationale for the procedures used to identify, select, and analyze information applied to understanding the research problem, allowing the reader to critically evaluate the overall reliability and validity of the research study. The methodology of this research study answers two main questions: How was the data collected or generated? And, how was it analyzed? (Johnson, 2015). To successfully address the research questions in this research study, the quantitative research approach was used.

The objective of the study is to identify the relationship between MC, gender, current technology, experience, and voluntariness of use among a MW and their impact on employee efficiency and organizational productivity. An integrated group of all the participants, consisting of multigenerational cohort workers and their acceptance of the current technology to perform their work tasks and activities, along with their intention to use the technology, was based in the survey instrument located in Appendix C.

Population and Sample

The participants for the research study were selected from the population provided by Survey Monkey, which consisted of engineers (electrical, mechanical, computer, etc.), medical, government and industry, and military personnel. The targeted population was full-time employed workers from ages 23 to 75 years old. The size of the

population was unknown.

I was able to get access to a sample from this population through primarily getting my research study approved by the Institutional Review Board (IRB) to ensure my research study is conducted in accordance with all federal, institutional, and ethical guidelines. Secondly, I conducted a survey of a variation of employees by using the instrument located in Appendix C. The population consisted of a number of Traditionalists, Baby Boomers, Generation X, and Generation Y cohorts. The study population, or accessible population, was the sample of individuals that chose to participate in taking the survey in the research study.

I placed my survey online at Survey Monkey and 275 people responded. The participants that consisted of my population were industry specific, such as engineering and government personnel. From the population, each participant was given a number, such a Participant 1 equal to *P1*. This action was done to keep researcher bias at a minimum and to avoid introducing systematic error in the research study.

Instrumentation and Materials

G*Power software was used to determine an approximate sample size for my research study. Using an effect size of 0.15, an alpha of 0.05, and a power of 0.95, the minimum required sample size is 107 participants. I used the survey located in Appendix C to collect the data from the participants to address the research questions. The survey instrument used for this research study provided descriptive information in measuring the technology acceptance and use of technology by employees in performing their work tasks and activities.

The survey instrument located in Appendix C allowed two demographics to be revealed, multigenerational cohorts and gender, two work characteristics to be examined, experience and voluntariness of use, and how different types of current technology related to the dependent variables. Age was used to determine which multigenerational cohort category the participant would fit. In addition, the other independent variables (gender, current technology, experience, and voluntariness of use) were used to determine the impact on the dependent variables (employee efficiency and organizational productivity) among a MW.

Reliability of TAM and UTAUT Models. The TAM and UTAUT models are established models and individually reliable. The criteria of the TAM and UTAUT modes effectively capture the topic under examination. The validity of the two models are proven by purporting to measure usability, perceived usefulness of technology, and to measure appropriateness of technological usefulness to determine the relationship between the IVs and its impact on the DVs. The criteria of these models address the research topic for this proposal. The correlation of these models also addresses the features that focus on the research topic, thereby establishing internal consistency. The properties of the models to examine perceived usefulness and perceived ease-of-use of technology establish reliability of both models.

Operationalization for Each Variable

Independent and Dependent Variables

The independent variables are multigenerational cohorts, gender, current technology, experience, and voluntariness of use. The dependent variables are employee efficiency and organizational productivity. Each independent variable has been given a

definition and can be measured quantitatively, except experience, to determine behavior or other attributes, such as conduct and performance, to help in the findings of the research study. For the dependent variable employee efficiency, the items in Section I of the survey instrument located in Appendix C was used to calculate a weighted average of the total responses and obtain a measurement value for each participant. Similarly, to obtain a measurement value for organizational productivity, the items in Section II of the survey instrument located in Appendix C was used calculate a weighted average of the total responses to obtain a measurement value for each participant.

The independent variables are defined as follows:

(1) Type of current technology – the branch of knowledge that deals with the creation and use of modern technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science.

(2) Experience – the number of years working at a job;

(3) Gender – male and female;

(4) Multigenerational Cohort – groups of individuals from various different generations that consist of a collection of birth years, history, and sundry personalities as a result of their defining experiences; and

(5) Voluntariness of Use – The free will of the employee to use type of current technology to accomplish work tasks and activities on a project.

The dependent variables are defined as follows:

(1) Employee efficiency – (sometimes referred to as workforce productivity) is an assessment of the efficiency of an employee or group of employees. Efficiency may be

evaluated in terms of the output of an employee in a specific period of time in reference to a project schedule. Typically, the efficiency of a given employee was assessed relative to an average for employees doing similar work;

(2) Organizational productivity - a measure of the efficiency of a company or business to utilize resources carefully and conserve on cost while converting resource inputs into useful outputs;

The dependent variables are comprised of five occupational values:

(1) Characteristics – the features of qualities belonging typically to the employee and serving to identify their abilities in some manner.

(2) Effective Communication – the mostly used verbal speech or other means of relaying information that get an idea across in clear and simple terms to another individual within listening distance. Effective communication is balanced and validated when the listener acknowledges they understood the verbal speech completely.

(3) Environmental Behavior – the manner in which the employee acts or conducts his or herself towards others and towards their work tasks and activities at their workplace

(4) Organizational Conduct – when both team group and individual performance, as well as activity within the organization is scrutinized by management, including internal and external perspectives of employee performance on work tasks and activities of a project.

(5) Work Styles – the foundation of how the employee organizes his or her work, manage his or her time, teach and learn, interact with other employees,

contribute to the workgroup and ultimately the organization, communicate with peers and management, and create patterns of success with ethical practices.

The social issues that were addressed in this research study included the gap that currently exists between the type of current technology at an organization by its MW and its impact on employee efficiency and organizational productivity. I anticipated that the five attributes of the dependent variables, namely characteristics, behavior, work styles, organizational conduct, and effective communication had an influence in understanding better the gap that currently exists.

Measurement of the Variables. The DVs and IVs were defined by conceptual definitions (constructs) that explain the concept the variable is attempting to capture and by operational definitions, i.e., definitions of how variables were measured. Gender is an independent variable with two levels, male and female. The variable, multigenerational cohorts, has four levels; (a) Traditionalists, (b) Baby Boomers, (c) Generation X, and (d) Generation Y.

As previously stated for the dependent variables, the survey instrument consisting of the items in Sections I and II located in Appendix C was used to calculate a weighted average of the total responses and obtain a measurement value for each participant. The responses to the IV current technology were (a) Informational (score of 1) and (b) Noninformational (score of 0). I used the number of responses to obtain a measurement value of current technology for each participant. The responses to the IV voluntariness of use were (a) Voluntary (score of 1) and (b) Mandatory (score of 0). Similarly, I used the

number of responses to obtain a measurement value of voluntariness of use for each participant. Table 6 shows the operationalization of the dependent variables.

Table 6

Dependent Variables

Dependent Variable	Survey Items
Employee Efficiency	**1.** - Employee efficiency is improved when using type of current technology based on the project schedule. **2.** - My interaction with the type of current technology available at my job would help me to be more efficient in my work tasks and activities than if I did not use that technology. **3.** - Using the type of current technology available at my job helps me to complete my work tasks and activities efficiently. **4.** - My efficiency is impacted by becoming skillful at using the type of current technology available at my job. **5.** - I am more efficient on a work task or activity using the type of current technology available at my job if I have a lot of time to complete the job for which the type of current technology is provided. **6.** - Employee efficiency would improve using the type of current technology available at my job than if I did not use that technology. 7. - Employee efficiency is enhanced when using the type of current technology at my job to accomplish critical aspects of my work tasks and activities.
Organizational Productivity	8. -The job environment I work in allows me to use type of current technology to be productive in my work and contribute to the productivity of the organization. 9. - The organization has the resources (budget, skilled employees, environment) to use the type of current technology to increase productivity. 10. - To my understanding, management agrees the type of current technology on my job impacts productivity at the organization positively. 11.- My intent to use the type of current technology on my job as needed for my work tasks and activities positively impacts organizational productivity. 12. - Organizational productivity is improved when employees are fully trained on type of current technology. 13. - Organizational productivity is enhanced when using the type of current technology available at my job compared to the previous technology available at my job.

	14. - Organizational productivity is improved when the type of current technology available at my job is utilized to improve business practices and decentralize decision-making processes. 15. - Organizational productivity is improved when the type of current technology available at the job is the major reason. 16. - Organizational productivity is increased at my job when the necessary conditions are facilitated (training, applicable work tasks and activities, motivation from management) to use type of current technology. **17.** - Organizational productivity can improve using the type of current technology available at my job. **18.** - Organizational productivity will improve when I intend to use the type of current technology available at my job on the next project I am assigned.

Table 7 shows the operationalization of the independent variables.

Table 7

Independent Variables

Independent Variable	Survey Items
Gender	Male Female
Age	24 – 36 years old (Generation Y) 37 – 52 years old (Generation X) 53 – 71 years old (Baby Boomers) More than 71 years old (Traditionalists)
Experience	How many years of work experience do you have in service?
Type of current technology	Is the primary use of technology on your job informational or noninformational?
Voluntariness of Use	Is the use of current technology on your job voluntary or mandatory?

Survey Design and Administration

I examined acceptance of type of current technology by employees in an organization. Criteria of the TAM, as provided in Davis et al. (1989), and the UTAUT

models from the literature review, served as a significant source of important background data. The survey instrument created for this research study was used to analyze technology acceptance and the use of technology. The process of creating items for a survey instrument to analyze technology acceptance and the use of technology has frequently been done in the past with no significant effect on PU or PEOU. (See Ma and Liu 2004 for a detailed review.) The survey instrument was administered via the web using Survey Monkey to potential participants that included engineers (electrical, mechanical, computer, etc.), medical, government and industry, and military employees.

The survey instrument located in Appendix C was made available to all the potential participants on Survey Monkey who wish to participate anonymously and voluntarily. The intent is to capture employee perceptions of the use of current technology as close as possible to the actual use when performing their work tasks and activities.

There were several reasons for using this web-based administration:

- The web was the most cost-effective method of reaching the entire population of potential participants.
- The survey can be actively promoted via Survey Monkey, one of the most useful survey sites on the Internet.
- Links could be provided in all electronic material to provide easy access to the survey instrument.
- The survey could be accessed from the computer of the employee if they had web access, making completion accessible and easy. If the employee did not have a designated computer, a prescribed time could be made available for employees to

take the survey.

Promotion of the instrument was crucial in obtaining a reasonable size of the population. Survey Monkey helped me set up my sample population to meet the requirements of my research study and the requirements of Walden University for doctoral dissertation research. By taking these steps, the acceptance of the survey instrument and the role of the employees in taking the survey fell right in place with my objectives. Acceptance was measured on whether perception of current technology by employees was more useful and easier to use than its predecessor.

- Employees electing to respond to the survey were asked to enter a unique, alphanumeric number of their choice up to 15 characters. Subjects were promised confidentiality; no effort was made to connect their unique, alphanumeric number to their responses. The unique, alphanumeric number was collected for one reason; to detect any duplicate responses.

- **Data Analysis Plan**
- My data analysis plan includes how my collected data was cleaned, transformed, and analyzed. The survey instrument located in Appendix C was administered to the participants using Survey Monkey, a software application that facilitates surveys to be taken by the public in a convenient manner.
- I anticipate my data to have univariate outliers, missing data from surveys and questionnaires, incomplete surveys and questionnaires, or surveys and questionnaires not completed at all. I used a multiple linear regression analysis for my hypothesis testing. I believe a multiple linear regression analysis was the most effective statistical procedure to conduct hypothesis tests and produce

findings that could be analyzed for cause and effect relationships. A multiple linear regression analysis was consistent with its use in other research studies that wanted to understand better the relationship between multiple dependent and independent variables.

- I used the IBM Statistical Package for Social Sciences, or SPSS, software version 24.0, for my data analysis of the collected data. SPSS software assisted in assessing reliable outcomes of identifying perceived use of technology associated with a MW and its impact on employee efficiency and organizational productivity. Along with using a multiple linear regression analysis, I used descriptive statistics shown in Tables D1 and D5, mean scores, standard deviations, and frequencies for organizing and summarizing the collected data. Using a Binary Scale of one or zero for current technology and voluntariness of use allowed me to understand the attitudes and behavior of the participants for a particular item. The Binary Scale assisted in determining and recording the collected data by observing mean difference in scores that measured the constructs between the multigenerational cohorts when current technology was used to accomplish work tasks and activities.

- **Threats to Validity**

- To make sure I reduced as minimally possible threats to validity of my research study and particularly my measured data, the utilization of the created survey instrument, based on criteria from the TAM and UTAUT models noted in the literature review with proven records for both reliability and validity for measuring the phenomena under pre-described conditions were used similarly

There were eight distinct threats to validity. These threats were selection, selection by maturation, regression, mortality, maturation, history, testing, and instrumentation.

- Validity, unlike reliability, was concerned with assessing the intended purpose of a measure supporting the data. Reliability and validity were interdependent factors. Measures showing reliability did not ensure validity. Since the current study was a survey design, the threats to internal validity were not valid or applicable. Threats to statistical conclusion validity were conditions that could inflate the Type 1 and Type II error rates. For example, violations of statistical test assumptions could increase the chances of falsely concluding there was a functional relationship between variables of concern (Type 1 error). Therefore, several threats to statistical conclusion validity were examined. Although validity evidence was weaker than that supporting its reliability, the findings and results lent construct validity to the measure of vocational needs.

- **Ethical Procedures**
- My research study plan to find participants and start the process of collecting data commenced upon approval from the Institutional Review Board (IRB) at Walden University. Upon approval, I obtained participants from the sample population provided by Survey Monkey. I included in the survey a statement that informed the participant that their responses were done anonymously and their identity was kept private and confidential. In addition, I wrote a separate statement that explained the confidentiality agreement and encouraged the participants to participate in the survey and answer all of the items.

- In addition, I implemented this research study in agreement with the Ethical Principles of Psychologists and Code of Conduct (American Psychological Association [APA], 2002). In compliance with APA guidelines, I provided all participants with an agreement about confidentiality and informed consent agreement. It explained in greater detail the purpose of the study, the voluntary nature of the study, the potential risks and benefits of participation, and the right of the participant to terminate participation at any time without any consequence. As the researcher, I provided the results of the survey to Survey Monkey for any participants who wish to see the results of the survey upon completion of the research study.

- **Summary**

- In this chapter, I described the research methodology I used to obtain and process data to address the research questions and associated hypotheses. I used a quantitative, cross-sectional study to identify the work styles of multigenerational cohorts in the workplace when faced with using type of current technology to accomplish their work tasks and activities. The study consisted of a targeted sample of 275 participants. The survey instrument located in Appendix C was used to collect the data. I conducted a multiple linear regression analysis to analyze the data and address the research questions.
- A description of the data collection instrument located in Appendix C was presented. The locations where the survey instrument was delivered were identified, and the associations with the sample populations from which the sample was drawn were examined. I discussed my plan for data collection and

analyses to illustrate the manner in which statistical methods was used to derive the findings from the survey. Factors that affected reliability, validity, and ethical practice were also examined.

-
-

Chapter 4: Results

Introduction

The purpose of this quantitative, cross-sectional, research study was to identify the impact of multigenerational cohorts, gender, experience, current technology, and voluntariness of use among a MW on employee efficiency and organizational productivity. On January 12, 2018, I received Institutional Review Board (IRB) approval for this dissertation. I conducted this research study under the Walden University IRB approval number 01-12-18-0362387. An informed consent letter was created as an introduction to a survey entitled Engineering, Productivity and Use of Technology, or EPUT.

Ethical Research

The informed consent consisted of the following information: (a) inviting participants to read an introductory statement and agree to the consent form information prior to taking the survey, (b) expressing the purpose of the research study, (c) expressing the benefit of participating in the research study, (d) expressing the voluntary nature of the research study, (e) expressing potential risks to the study and how all of them have been minimized, (f) expressing and assuring the privacy of each participant and their responses, and (g) providing correspondence and contact information if the participant has any questions about taking the survey or their rights as a participant. In addition, participants were made aware that they would not receive any incentive or compensation for taking the survey.

My role as the researcher was theoretically nonexistent since I was conducting a quantitative study. The eligibility criteria for the participants was they had to be

employed and had to use a type of current technology, informational and noninformational, to perform their work tasks and activities. The participants who took the EPUT survey acted independently. The informed consent letter described the confidentiality of the research study to candidates. Each respondent had a unique alphanumeric code to ensure there were no duplicate responses. The research study was grounded using a positivist position and conducted using the cross-sectional method, described in Chapter 3. The implementation of the multiple regression method of data analysis helped generate a research design to produce respondent data for thoughtful and insightful analysis.

Context for the Study

In this chapter, I present the results on the effects of gender, multigenerational cohorts, experience, current technology, and voluntariness of use of technology on employee efficiency and organizational productivity among a multigenerational workforce. A research method using the EPUT survey was distributed using Survey Monkey. Survey Monkey is a data-collection service provided in a website that provides a platform for a researcher to create a survey to help collect and understand data. As described in Chapter 2, a combination of generational cohort details and modern technology information revealed various dynamics that impacted employee efficiency and organizational productivity.

Currently, Americans are living at a time where many companies and businesses have at least three generations, and many have four generations, of employees working together on projects that use modern technology. Early researchers noted the emergence of a MW in the United States and commenced with publishing their research in journal

articles. However, with the incorporation of modern technology to accomplish work tasks and activities in companies and businesses, a noticeable dependency manifested in the workplace where modern technology primarily drove the success of completed projects.

In the EPUT survey I conducted, there were 23 items and I had 275 respondents with 275 participants who responded to the employee efficiency items and 249 participants who responded to organizational productivity items, for a total of 26 missing. Since 26 respondents did not answer items 13 to 23 in the EPUT survey, I had to clean the data by finding the average employee efficiency only for those 26 respondents who responded to items 6 to 12. This action also caused values for employee efficiency to change. I did not include the 26 respondents in calculating the average organizational productivity values and left these entries blank. The Likert-type scale consisted from a value of 1 (*extremely unlikely*) to 5 (*extremely likely*). Therefore, my average values for employee efficiency and organizational productivity were revised and I had to fit new regression models. The respondents consisted of both genders, various age groups, such as Traditionalists, Baby Boomers, Generation X, and Generation Y, and various years of work experience. Respondents completed the EPUT survey and the data were collected for further analysis. The 23 items in the survey were created to explore the following two research questions:

RQ1 How does multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect employee efficiency?

RQ2: How does multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect organizational productivity?

These research questions were created to determine the relationship, if any, among the dependent variables (employee efficiency and organizational productivity) and the independent variables (multigenerational cohorts, gender, type of current technology, experience, and voluntariness of use). In addition, I have two pairs of hypotheses to test to help answer the research questions:

The first hypothesis is about employee efficiency:

Null Hypothesis H_{01}. Multigenerational cohorts, gender, current technology, experience, or voluntariness of use do not affect employee efficiency.

Research Hypothesis H_{11}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness of use) does affect employee efficiency.

The second hypothesis is about organizational productivity:

Null Hypothesis H_{02}. Multigenerational cohorts, gender, current technology, experience, or voluntariness of use does not affect organizational productivity.

Research Hypothesis H_{12}. At least one of the independent variables (multigenerational cohorts, gender, current technology, experience, or voluntariness of use) does affect organizational productivity.

In this chapter, I provided a description of the research study, demographics of the respondents, data collection and analysis, evidence of reliability and validity, evidence to minimize bias in the survey and research study, and lastly the results of the study. In addition, I studied the relationship of the independent variables and its effect on the dependent variables, inclusive of demographic characteristics, to determine if significant relationships existed and if these relationships were helpful in improving employee efficiency and organizational productivity.

Location

The EPUT survey was conducted between January 14, 2018 and February 7, 2018. I was able to collect data from respondents within the United States by using Survey Monkey as the data collection instrument for this research study. Regional data within the United States was not collected for this survey.

Evidence of Reliability, Internal Consistency, Validity, and Minimization of Bias

Reliability and Internal Consistency

The EPUT survey was distributed to a population of 275 participants. The completion rate for the survey was 90% based on Survey Monkey metrics. The reliability of the survey instrument was measured using Cronbach's alpha coefficient. The EPUT survey consisted of revised items from the TAM survey and UTAUT questionnaire, which were previous tested for reliability and found to be reliable instruments.

Since the Cronbach's alpha coefficient was found to be high ($\alpha = .952$), the result implies good reliability and the survey instrument can be used to assess the effects of

multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use and its impact on employee efficiency and organizational productivity (Bhatnagar, Kim, & Many, 2014). I also compared the data from the EPUT survey by comparing odd number items versus even number items and comparing scores for correlation for internal consistency. The Cronbach's alpha for the odd number items in the survey was .902 and the Cronbach's alpha for the even number items in the survey was .889. The result was the odd and even numbered items of the statistical test, that is Cronbach's Alpha, measured the same construct.

Validity

In my approved proposal, I checked that the test items corresponded to what was supposed to be covered in the EPUT survey. The EPUT survey was distributed at the same time to all the multigenerational cohorts. The score and the interpretation determined the validity of the survey instrument. The data collected was used to show improvement after instructions from the findings of this research study. In the EPUT survey, I was able to measure employee efficiency and organizational productivity. Validity was demonstrated based on two conditions: the demonstration of reliability using the Cronbach's alpha coefficient as a condition of validity and I was able to measure what was intended in the survey, that is, employee efficiency and organizational productivity when considering the effects of multigenerational cohorts, gender, type of current technology, experience, and voluntariness of use.

Minimization of Bias

I conducted the survey using the same items for all respondents. None of the respondents encountered each other or were in any way influenced by the responses of other participants in the survey.

Sample Demographics

All four generational cohorts were represented in the study, but Traditionalists, while present, were underrepresented in the study. Selected data from the results demonstrated important demographic characteristics. Gender was compared with multigenerational cohorts to determine the breakdown of the number of males and females that fell into each of the generational cohorts. Table 8 depicts the demographic comparison of gender and multigenerational cohorts.

Table 8

Demographic Comparison of Gender and Multigenerational Cohort Participants

Gender	Multigenerational Cohort
Male (31.64%)	
2.30%	Traditionalists (born before 1946)
31.03%	Baby Boomers (born from 1946 to 1964)
45.98%	Generation X (born from 1965 to 1980)
20.69%	Generation Y (born from 1981 to 1994)
Female (68.36%)	
1.06%	Traditionalists (born before 1946)
34.58%	Baby Boomers (born from 1946 to 1964)
25.00%	Generation X (born from 1965 to 1980)
39.36%	Generation Y (born from 1981 to 1994)

Gender was also compared with number of years of work experience to determine the breakdown of the number of males and females who have worked in their field. Among males, the years of work experience ranged from 3 years to 58 years. Among females, the years of work experience ranged from 1 year to 50 years. The demographic

comparison between gender and the use of informational or noninformational technology was equated to determine which gender tends to mostly use informational or noninformational type of current technology. Table 9 depicts the demographic comparison of gender, multigenerational cohorts, and type of current technology, informational and noninformational.

Table 9

Demographic Comparison of Gender, Multigenerational Cohorts, and Type of current technology (Informational/Noninformational) among Participants

Gender	Multigenerational Cohorts	Type of current technology
Male	Traditionalists	2.29% - informational 0.00% - noninformational
	Baby Boomers	26.44% - informational 4.60% - noninformational
	Generation X	38.64% - informational 6.82% - noninformational
	Generation Y	15.88% - informational 3.41% - noninformational
Female	Traditionalists	1.06% - informational 0.00% - noninformational
	Baby Boomers	29.79% - informational 4.79% - noninformational
	Generation X	20.21% - informational 4.79% - noninformational
	Generation Y	27.18% - informational 12.23% - noninformational

The demographic comparison between gender and the type of current technology on a voluntary or mandatory basis was equated to determine which gender tends to mostly use type of current technology on a volunteer basis, and which gender tends to mostly use type of current technology as a mandatory requirement. Table 10 depicts the

demographic comparison of gender, multigenerational cohorts, and type of current technology, voluntarily or mandatorily.

Table 10

Demographic Comparison of Gender, Multigenerational Cohorts, and Type of Current Technology (Voluntary/Mandatory) among Participants

Gender	Multigenerational Cohorts	Type of current technology
Male	Traditionalists	0.00% - voluntary 2.29% - mandatory
	Baby Boomers	7.95% - voluntary 22.73% - mandatory
	Generation X	12.50% - voluntary 32.95% - mandatory
	Generation Y	7.95% - voluntary 12.50% - mandatory
Female	Traditionalists	0.00% - voluntary 1.06% - mandatory
	Baby Boomers	5.85% - voluntary 28.72% - mandatory
	Generation X	7.98% - voluntary 17.02% - mandatory
	Generation Y	9.04% - voluntary 30.32% - mandatory

Research Methodology

A quantitative method was conducted for this research study. Participants responded to the EPUT survey created in Survey Monkey to collect the required data. The survey consisted of 23 items and was designed from 1 (*extremely unlikely*) through 5 (*extremely likely*) using a 5-point Likert-type scale. For data analysis, descriptive statistics included frequency and percentages while the inferential statistics included multiple and stepwise regression analyses of the data.

Findings

Profile of Respondents

The summary statistics for the demographic characteristic information of the respondents are presented in the output data from IBM SPSS. The participants for the research study were selected from the population provided by Survey Monkey, which consisted of engineers (electrical, mechanical, computer, etc.), medical, government and industry, and military personnel. The targeted population was full-time employed workers from ages 23 to 75 years old. The size of the population was 275 respondents.

From the total of 275 respondents, 68.36% were female respondents and 31.64% were male respondents. In the four categories of a multigenerational workforce, 33.45% identified themselves as Generation Y cohorts, 31.64% identified themselves as Generation X, 33.45%identified themselves as Baby Boomers, and lastly, 1.45% identified themselves as Traditionalists. Work experience among the respondents ranged from as little as one year of service to as much as 58 years of service.

Respondents were asked if the type of current technology used in their work tasks and activities was informational (computer software, Email, teleconferencing, etc.) or noninformational (use of hardware, use of construction equipment, machinery tools, etc.). Those who participated in the survey, 80.36% of the respondents acknowledged they used informational technology, while 19.64% of the respondents acknowledged they used noninformational technology. Lastly, respondents were asked if the type of current technology used in their work tasks and activities at their place of employment was used voluntarily or mandatorily. Those who participated in the survey, 75.27% of the respondents acknowledged they used type of current technology mandatorily at their

place of employment, while 24.73% of the respondents acknowledged they used type of current technology voluntarily at their place of employment.

Informational vs. Noninformational Current Technology

From the findings, I concluded that after examining the results of the multiple regression and stepwise regression analyses, gender did not have an impact on employee efficiency and organizational productivity. As indicated in Table 6, among the four multigenerational cohorts using informational or noninformational type of current technology, there was similar use between male and female Traditionalists and Baby Boomers. Male and female Generation X and Generation Y cohorts demonstrated dissimilar use of the type of current technology. Generation X male respondents used informational technology 38.64% of the time at the workplace compared to female respondents who used informational type of current technology 20.21% of the time at the workplace, a difference of 18.43%. Male respondents used noninformational technology 6.82% of the time at the workplace compared to female respondents who used noninformational type of current technology 4.79% of the time at the workplace, a small difference of 2.03%.

Generation Y statistics showed similar differences. Generation Y male respondents used informational technology 15.88% of the time at the workplace compared to female respondents who used informational type of current technology 27.18% of the time at the workplace, a difference of 11.30%. Male respondents used noninformational technology 3.41% of the time at the workplace compared to female respondents who used noninformational type of current technology 12.23% of the time at the workplace, a difference of 8.82%.

Voluntary vs. Mandatory Use of Current Technology

As indicated in Table 7, among the four multigenerational cohorts voluntarily or mandatorily using type of current technology, there was not a difference between male and female Traditionalists. However, there was a difference between male and female respondents among Baby Boomers, Generation X, and Generation Y cohorts. Baby Boomer male respondents used informational type of current technology voluntarily 7.95% of the time at the workplace compared to female respondents who informational used type of current technology voluntarily 5.85% of the time at the workplace, a difference of 2.10%, which was not a significant difference.

Nevertheless, Baby Boomer male respondents used informational current technology mandatorily 22.73% of the time at the workplace compared to female respondents who used informational current technology mandatorily 28.72% of the time at the workplace, a difference of 5.99%. Generation X male respondents used informational current technology voluntarily 12.50% of the time at the workplace compared to female respondents who used informational current technology voluntarily 7.98% of the time at the workplace, a difference of 4.52%. Male respondents used informational type of current technology mandatorily 32.95% of the time at the workplace compared to female respondents who used informational type of current technology mandatorily 17.02% of the time at the workplace, a difference of 15.93%.

Generation Y statistics showed similar differences. Generation Y male respondents used informational current technology voluntarily 7.95% of the time at the workplace compared to female respondents who used informational current technology

voluntarily 9.04% of the time at the workplace, a difference of 1.09%. Male respondents used informational current technology mandatorily 12.50% of the time at the workplace compared to female respondents who used informational current technology mandatorily 30.32% of the time at the workplace, a difference of 17.82%.

Statistically, I performed a paired samples *t*-test on the data in Tables 9 and 10 in Table 8 to determine if the difference of the paired samples was significant. Based on the results of Table 11, none of the four, paired data were significant. In my opinion, these results were indicative of a very small sample.

Table 11

Paired Samples t-Test for Tables 9 and 10

	Paired Differences			95% Confidence Interval of the Difference				
	Mean	Std Deviation	Std Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair-1 Male Informational – Non-informational	17.11	12.65	6.32	-3.02	37.23	2.705	3	.073
Pair-2 Female Informational – Non-informational	14.11	9.85	4.93	-1.57	29.79	2.863	3	.064
Pair-3 Male Voluntary – Mandatory	-10.52	8.57	4.28	-24.15	3.11	-2.456	3	.091
Pair-4 Female Voluntary – Mandatory	-13.56	10.38	5.19	-30.07	2.95	-2.614	3	.079

Relationships between Dependent and Independent Variables

There were two dependent variables, employee efficiency and organizational productivity. The following regression model was used.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon,$$ (Eq. 1)

where

Y = measure of employee efficiency;

X_1 = type of current technology; 1 if informational, 0 noninformational;

X_2 = years of experience;

X_3 = voluntariness of use of current technology; 1 if voluntary, 0 mandatory;

X_4 = 1 if male, 0 female;

X_5 = 1 if MC was traditional, 0 otherwise;

X_6 = 1 if MC was baby boomer, 0 otherwise;

X_7 = 1 if MC was generation X, 0 otherwise.

ε = error term

Note: Whenever a dummy variable is zero, the effect gets captured in β_0. Generation Y is included in the constant of the regression equation.

Hypothesis 1 is:

$H_{01}: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0,$

H_{11}: At least one β_i not equal to zero, for i = 1 to 7.

This same model also applies to Hypothesis 2 except the DV *Y* is organizational productivity.

β_i is a measure of the effect of $X_{j=1\ to7}$ on the response taking the effect of the other variables into account. Two groups of respondents (male and female) were involved.

Multiple Regression Analysis and Discussion

To approach the research questions –

RQ1 How does multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect employee efficiency?

RQ2: How does multigenerational cohorts, gender, experience, current technology, and voluntariness of use affect organizational productivity?

A multiple linear regression analysis was conducted to evaluate the prediction of employee efficiency and organizational productivity from multigenerational cohorts, gender, current technology, experience (from work), and voluntariness of use (of current technology). The results of the multiple linear regression analysis for the dependent variable employee efficiency revealed the independent variables gender, multigenerational cohorts, and experience to be not statistically significant predictors in the model ($p > .05$). The results of the multiple linear regression analysis for the dependent variable employee efficiency revealed a statistically significant impact by the independent variables, current technology and voluntariness of use. Table 12 summarizes the regression coefficient and the R-squared values for employee efficiency

Table 12

Regression Coefficients and R-squared Values for Employee Efficiency

Model	Standardized Coefficients Beta	95.0% Confidence Interval for β		Significance (p)	Unstandardized β	R^2
		Lower Bound	Upper Bound			.085
Constant		3.497	4.102	.000	3.799	
Type of Current Technology	.175	.141	.863	.007	.502	
Experience	-.145	-.030	.004	.128	-.013	
Voluntariness of Use	-.151	-.744	-.091	.013	-.417	
Gender	-.085	-.511	.087	.163	-.212	
Traditionalist	.041	-.881	1.705	.531	.412	
Baby Boomer	.042	-.429	.639	.699	.105	
Generation X	.044	-.292	.517	.585	.113	

The results of the multiple linear regression analysis for the dependent variable organizational productivity revealed statistically significant impacts by the independent variables, type of current technology and voluntariness of use. Based on the unstandardized beta results in Tables 12, Traditionalists, followed by Generation X cohorts and lastly Baby Boomers improved on employee efficiency. In the regression model for employee efficiency in Table 12, the significant IVs type of current technology and voluntariness of use exhibited low p values, .007 and .013, respectively, and a low

R-squared value of .085. Table 13 summarizes the regression coefficient and the R-squared values for organizational productivity.

Table 13

Regression Coefficient and R-squared Values for Organizational Productivity

Model	Standardized Coefficients Beta	95.0% Confidence Interval for β		Significance (p)	Unstandardized β	R^2
		Lower Bound	Upper Bound			.097
Constant		3.441	4.071	.000	3.756	
Type of Current Technology	.180	.067	.672	.017	.369	
Experience	.009	-.014	.015	.940	.001	
Voluntariness of Use	-.217	-.668	-.134	.003	-.401	
Gender	-.019	-.281	.217	.799	-.032	
Traditionalist	-.003	-.940	.902	.968	-.019	
Baby Boomer	.049	-.372	.534	.724	.081	
Generation X	.072	-.225	.485	.472	.130	

Based on the unstandardized beta results in Tables 13, Generation X cohorts and Baby Boomers improved. Lastly, Traditionalists declined on organizational productivity.

In the regression model for organizational productivity in Table 13, the significant IVs type of current technology and voluntariness of use exhibited low p values, .017 and .003, respectively, and a low R-squared value of .097. Each low R-squared value, despite noisy and high-variability data shown in Figure 13 for employee efficiency and

Figure 14 for organizational productivity, still provided information in the regression model. The regression model equations indicated that the predictor variables still provided information about the response even though the data points fell further from the regression equations.

Employee Efficiency

The data, shown in Table 8, for the regression model for employee efficiency using unstandardized beta values is,

$$Y = 3.799 + .502X_1 - .013X_2 - .417X_3 - .212X_4 + .412X_5 + .105X_6 + .113X_7 + e,$$

(Eq. 3)

Since at least one β_i is not equal to zero, for i = 1 to 7, we reject H_{01}. The R^2 (R-squared) value of .085 associated with this regression model, shown in Table 8, suggested that the independent variables accounted for 8.5% of the variation in employee efficiency, which means that 92.5% of the variation of the variables cannot be explained by multigenerational cohorts or any of the other independent variables. Similarly, as mentioned previously for low R-squared values, referring to Figures D7 and D8, each low R-squared graph illustrated that despite noisy and high-variability data, information was provided in the regression model.

Table D1 shows the descriptive statistics for employee efficiency. This table describes the basic features of the data in my research study, such as the mean, the standard deviation of the IVs and the number of respondents, and simple summaries about the sample and the measures. The total number of respondents who participated in all of the items of the EPUT survey were 275.

The Durbin-Watson value of 1.872 for employee efficiency means that there was no autocorrelation in my sample. The regression coefficients of the independent variables experience, gender, and the cohorts Traditionalists, Baby Boomers, and Generation X were not statistically significant when analyzed as indicated in Table 8. The regression coefficients of the independent variables type of current technology and voluntariness of use were statistically significant when analyzed.

Organizational Productivity

Similarly, the data shown in Table 9 for the regression model for organizational productivity using unstandardized beta values is,

$$Y = 3.756 + .369X_1 + .001X_2 - .401X_3 - .032X_4 - .019X_5 + .081X_6 + .130X_7 + e,$$

(Eq. 4)

Since at least one β_i is not equal to zero, for i = 1 to 7, we reject H_{02}. For the data shown in Table 9, the R^2 (R-squared) value of .097 associated with this regression model suggested that the independent variables accounted for 9.7% of the variation in organizational productivity, which means that 91.3% of the variation of the independent variables cannot be explained by multigenerational cohorts or any of the other independent variables. Again, as addressed and explained previously in Figures D7 and D8, the low R-squared values are able to provide significant trends despite noisy and high variability data. The total number of respondents who participated in all of the items of the EPUT survey were 275.

The Durbin-Watson value of 2.116 for organizational productivity means that there was no autocorrelation in my sample. The regression coefficients of the independent variables experience, voluntariness of use, gender, and the cohorts

Traditionalists, Baby Boomers, and Generation X were not statistically significant when analyzed as indicated in Table 9. The regression coefficients of the independent variables type of current technology and voluntariness of use were statistically significant when analyzed.

Stepwise Regression Analysis and Discussion

Although the overall R-squared was low, I concluded that among both male and female respondents, the results showed that there were no significant differences between gender on increasing or decreasing employee efficiency or organizational productivity. The significant independent variables, namely type of current technology and voluntariness of use had an impact in understanding better employee efficiency when type of current technology and voluntariness of use were entered in the stepwise regression.

Nominally, the overall R-squared in each model was low, suggesting the variables used did not have strong predictive powers. Because the variables did not demonstrate strong predictability, as a cross check I decided to switch and run a stepwise regression analysis to determine automatically which of the significant independent variables that are substantially contributing, affecting, and best predicting employee efficiency and organizational productivity.

Table 14 summarizes the stepwise regression coefficient values for employee efficiency.

Table 14

Stepwise Regression Coefficients for Employee Efficiency

Model	Standardized Coefficients Beta	95.0% Confidence Interval for β		Significance (p)	Unstandardized β
		Lower Bound	Upper Bound		
Constant		3.508	3.972	.000	3.740
Voluntariness of Use	-.190	-.658	-.159	.001	-.408
Informational Current Technology	.162	-107	.648	.006	.378

Table 15 summarizes the stepwise regression coefficient values for organizational productivity.

Table 15

Stepwise Regression Coefficients for Organizational Productivity

Model	Standardized Coefficients Beta	95.0% Confidence Interval for β		Significance (p)	Unstandardized β
		Lower Bound	Upper Bound		
Constant		3.508	3.972	.000	3.740
Informational Current Technology	.230	.226	.713	.000	.470
Voluntariness of Use	-.224	-.640	-.195	.000	-.418

For employee efficiency, the regression coefficient [β_3 = -.408 95% C.I. (-.658, -.159) p = .001 < .05] associated with voluntariness of use and the regression coefficient entered [$\beta_{1=}$ .378 95% C.I. (.107, .648) p = .006 < .05] associated with type of current technology. This demonstrates that employee efficiency is dependent on a negative slope, -.408, multiplied by voluntariness of use and a positive slope, .378, multiplied by type of current technology, with an intercept at 3.728. Since at least one β_i is not equal to zero, for i = 1 and i = 3, we reject H_{01}.

I have included in Appendix D Table D1, which shows the descriptive statistics for employee efficiency. This table describes the basic features of the data in my research study, such as the mean, the standard deviation of the IVs and the number of respondents, and simple summaries about the sample and the measures. All 275 participants responded to all the items in the EPUT survey.

The data shown in Table 11 for the stepwise regression models for employee efficiency are

$$Y = 3.728 + .378X_1 - .408X_3 + e,$$ (Eq. 5) Final Step

For employee efficiency, the maximum Mahalanobis Distance (MD) is 6.243 under residual statistics shown in Table D9. The value of 6.243 is less than the maximum critical number (around 12 or 13) and indicates there were no outliers in the analysis. The assumption of normality of errors was violated due to the errors of the EE model were not distributed normally in Figure 11. Using the scatterplot in Figure 13, the homoskedasticity showed essentially a flat line for employee efficiency.

For organizational productivity, the regression coefficient [β_1 = .470 95% C.I. (.226, .713) p = .000 < .05] associated with type of current technology and the regression coefficient entered [β_3 = -.418 95% C.I. (-.640, -.195) p = .000 < .05] associated with voluntariness of use. This demonstrated that organizational productivity was dependent on positive slope, .470, multiplied by type of current technology and a negative slope, -.418, multiplied by voluntariness of use, with an intercept of 3.740. Since at least one β_i is not equal to zero, for i = 1 and i = 3, we reject $\boldsymbol{H_{02}}$.

Table D4 shows the descriptive statistics for organizational productivity. This table describes the basic features of the data in my research study, such as the mean, the standard deviation of the IVs and the number of respondents, and simple summaries about the sample and the measures. There were 26 participants who did not respond to items 13 to 23 in the EPUT survey, hence the total number of respondents were 249.

The data, shown in Table 12, for the stepwise regression models for organizational productivity are,

$$Y = 3.740 + .470X_1 - .418X_3 + e,$$ (Eq. 6) Final Step

Since at least one β_i is not equal to zero, for i = 1 to 2, $\boldsymbol{H_{12}}$ is accepted and $\boldsymbol{H_{02}}$ is rejected.

For organizational productivity, the maximum MD is 6.294 under residual statistics shown in Table D10. This value is less than the maximum critical number (around 12 or 13) and indicates there were no outliers in the analysis. Using the

scatterplot in Figure 14, the. homoskedasticity showed essentially a flat line for organizational productivity, which indicated no assumptions have been violated.

Independent Samples *t*-test Analysis and Discussion

I performed an independent samples t-test on the type of current technology and voluntariness of use for employee efficiency shown in Tables 16 and 17, respectively.

Table 16

t-test on Type of Current Technology[a] for Employee Efficiency[b]

	Levene's Test for Equality of Variances						95% Confidence Interval of the Difference		
Employee Efficiency	F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Equal variances assumed	1.860	.174	-3.152	272	.002	-.4369	.1386	-.7098	-.1640
Equal variances not assumed	-	-	-3.529	94.685	.001	-.4369	.1238	-.6827	-.1911

a. Predictors: TCT = Type of Current Technology
b. Dependent Variable: EE = Employee Efficiency

Table 17

t-test on Voluntariness of Use[a] for Employee Efficiency[b]

	Levene's Test for Equality of Variances						95% Confidence Interval of the Difference		
Employee Efficiency	F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Equal variances assumed	.984	.322	3.575	272	.000	.4541	.1270	.2040	.7041
Equal variances not assumed	-	-	3.480	109.533	.001	.4541	.1305	.1955	.7127

a. Predictors: UCT = Voluntariness of Use (of Current Technology)
b. Dependent Variable: EE = Employee Efficiency

The t-test for employee efficiency reiterated and validated that the independent variable type of current technology was significant, $p = .002$ (equal variances assumed) and $p = .001$ (equal variances not assumed) and the independent variable voluntariness of use was significant, $p = .000$ (equal variances assumed) and $p = .001$ (equal variances not assumed).

I performed an independent samples t-test on the type of current technology and voluntariness of use for organizational productivity shown in Tables 18 and 19, respectively.

Table 18

t-test on Type of Current Technology[a] for Organizational Productivity[b]

	Levene's Test for Equality of Variances						95% Confidence Interval of the Difference		
Employee Efficiency	F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Equal variances assumed	.137	.711	-4.256	247	.000	-.5347	.1256	-.7822	-.2873
Equal variances not assumed	-	-	-4.288	71.807	.000	-.5347	.1247	-.7833	-.2861

a. Predictors: TCT = Type of Current Technology
b. Dependent Variable: OP = Organizational Productivity

Table 19

t-test on Voluntariness of Use[a] for Organizational Productivity[b]

	Levene's Test for Equality of Variances							95% Confidence Interval of the Difference	
Employee Efficiency	F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std Error Difference	Lower	Upper
Equal variances assumed	1.585	.209	4.172	247	.000	.4788	.1148	.2527	.7048
Equal variances not assumed	-	-	3.960	96.025	.000	.4788	.1209	.2388	.7187

a. Predictors: UCT – Voluntariness of Use (of Current Technology)
b. Dependent Variable: OP = Organizational Productivity

The t-test for organizational productivity reiterated and validated that the independent variable type of current technology was significant, $p = .000$ (equal variances assumed) and $p = .000$ (equal variances not assumed) and the independent variable voluntariness of use was significant, $p = .000$ (equal variances assumed) and $p = .000$ (equal variances not assumed).

Applying Bonferroni correction, the alpha equal to .05 was divided by the number of independent variables on the same dependent variable, that is, $\alpha_{altered} = .05/2 = .025$, the significance cut off value, and $\alpha_{crritical} = 1 – (1 - .025)^2 = .049375$ which is less than .05. Because of the multiple hypotheses being tested simultaneously, the Bonferroni adjustment will protect against a Type I error.

Summary

Informational type of current technology was used more than noninformational type of current technology among the respondents. The mandatory use of current technology was higher than the voluntary use of current technology. Using multiple regression analysis, the independent variables that were significant were type of current

technology and voluntariness of use for employee efficiency and organizational productivity. The stepwise regression analysis revealed that the significant independent variables type of current technology and voluntariness of use had an impact in understanding better employee efficiency and organizational productivity.

The Independent samples *t*-test validated the independent variables type of current technology and voluntariness of use were significant variables for employee efficiency and organizational productivity. Lastly, I used Bonferroni correction due to having multiple hypotheses being tested simultaneously. The Bonferroni adjustment protected against having a Type I error, that is, the rejection of a true null hypothesis.

Although the overall R-squared was low for employee efficiency in Table D7, I concluded that there was adequate evidence that voluntariness of use was the only variable able to explain 4.5% of the variability in employee efficiency. When the independent variable type of current technology was entered into the stepwise regression model, the R-squared value increased to .071, which meant that entering type of current technology into the model increased the understanding of the variation of employee efficiency by 2.6%.

Similarly, although the overall R-squared was low for the model of organizational productivity, in Table D8 I concluded that among both male and female respondents, there was adequate evidence that with the independent variable type of current technology, the model was able to explain 6.8% of the variability in organizational productivity. When the independent variable voluntariness of use was entered into the stepwise regression model, the R-squared value increased to .117, which meant that

entering voluntariness of use into the model increased the understanding the variation of organizational productivity by 4.9%.

Future studies can focus on the impact type of current technology has on future generations as Generation Y, known as Millennials, and Generation Z, known as Digital Natives, become older, obtain more work experience, and develop skills to use both informational and noninformational to apply to their work tasks and activities, and if the type of current technology will still be allowed to be used on a volunteer basis.

This research study had its limitations in which it was based on data from a survey accessible to only the population within the United States and was open only to participants who used type of current technology at their place of employment. It is expected that the outcome of this study will be useful in identifying appropriate training modules and occupational programs, as well advance better communication and appropriate behaviors within the workplace as necessary elements to improve employee efficiency and organizational productivity. There were no impacts to generalizability, trustworthiness, validity, and reliability that arose from the execution of the research study anticipated in Chapter 1. The substantial amount of data collected from the survey instrument used via Survey Monkey was not generalized beyond the sample population that participated in the study. The survey instrument was grounded in two established surveys that previously were approved for reliability, validity, and trustworthiness (Davis, 1989; Venkatesh et al., 2003). Chapter 5 will contain a summary of my research, my conclusions from answering the research questions, my interpretation of the findings, implications for positive social change, my recommendations for action by management and recommendations for further research.

Chapter 5: Summary, Conclusions, and Recommendations

Overview of the Study

The purpose of this research study was to investigate the effects of gender, multigenerational cohorts, experience, type of current technology, and voluntariness of use of technology on employee efficiency, organizational productivity among a multigenerational workforce. The research questions were as follows:

RQ1: How do multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use affect employee efficiency?

RQ2: How do multigenerational cohorts, gender, experience, type of current technology, and voluntariness of use affect organizational productivity?

I sought to determine if any of the four multigenerational cohorts – Traditionalists, Baby Boomers, Generation X, and Generation Y – experienced ease or difficulty with the use of two different types of current technology, informational and noninformational, at their workplace. In addition, I also sought to determine if the voluntary or mandatory use of informational or noninformational current technology had an effect on employee efficiency and organizational productivity.

Several researchers have addressed the issue of managing a MW in terms of refining the efficiency for the employee or improving the productivity of the organization (Locmele-Lunova & Cirjevskis, 2017; Johnson & Anderson, 2016; Perreira & Berta, 2016). However, few, if any, have considered the impact of the use of current technology, divided into informational and noninformational

uses of technology, and if the use of the technology was used voluntarily or mandatorily. It was important to break down the type of technology used and how management chooses to implement the use of technology to accomplish work tasks and activities among employees. Management has often modulated the use of technology based on either competitive businesses or business sectors marketing their latest technology that had the potential to increase market share.

In addition, management has also allowed the industry to dictate the tone of business and project goals when deciding to transform the manner work tasks and activities are accomplished, and a key element is the type of skills of employees who were hired to meet those goals. Moreover, management at times tended to use profit margins and improving shareholder value as their guidance as to whether to introduce new technology into a business with less regard to the abilities of the workforce to adapt to it. The hiring new employees became strategic. At times, they were tired to other important objectives, such as current and projected projects that require proficiency in the use of current technology and hiring employees with minimum experience in a specialized field or with specialized skills to work on current and project projects.

I conducted a cross-sectional investigation of how the added element of the use of current technology affected employee efficiency and organizational productivity among a multigenerational workforce. An advancement within the work environment socially at times meant employees learned and adapted to the latest technology available. Employees received or sought training on a type of current technology, but they also socialized and communicated undoubtedly with their fellow coworkers about the type of current technology. Some employees socialized by collaborating with fellow employees

who may have already known something about the type of current technology used at the workplace. In other cases, some employees may have interacted with management, vendors, and customers to ask questions, work together on real-world situations, and subsequently work together to accomplish goals. These components were considered to be essential in the learning process among a multigenerational workforce.

From a positivist perspective, I generated a survey instrument to retrieve data from employed respondents and tested business policies and procedures that govern the manner in which organizations operate. My concern was to develop fundamental items in a survey, supported by logic and previous data in literature, and highlight an emphasis on a cross-sectional design for this research study.

Interpretation of the Findings

The findings I obtained in Chapter 4 led to the following conclusions.

Demographic Conclusions

Questions 6 through 12 in the EPUT survey pertained to employee efficiency. Questions 13 through 23 pertained to organizational productivity. Of the 275 respondents who participated in the EPUT survey I distributed, 26 of the respondents only answered items 6 to 12, which means they only chose to participate in items pertaining to employee efficiency and not participate in items 12 to 23 that pertained to organizational productivity. Due to the 26 respondents who did not participate in the organizational productivity items in the EPUT survey, I had to clean the data by deleting zero values for non-respondents and calculate the average organizational productivity by using only the data from respondents. The results that emerged from the data analyzed

in Tables 6 and 7 were both male and female multigenerational cohorts used informational type of current technology on a mandatory basis more than used noninformational type of current technology on a voluntary basis.

Conclusions Answering Research Question 1

The first research question asked how do multigenerational cohorts, gender, type of current technology, experience, and voluntariness of use affect employee efficiency. The result that emerged from the stepwise regression data collected in Table 14 was independent variables type of current technology and voluntariness of use were significant variables to explain employee efficiency. Gender, experience, and multigenerational cohorts did not have a significant effect on employee efficiency.

Informational Type of Current Technology Resulted in Higher Employee Efficiency. As shown in Figure 7, informational technology (coded as 1) resulted in higher employee efficiency by .378 compared to noninformational technology (coded as 0). In other words, informational technology resulted in higher employee efficiency by .378. Table 20 shows the data for employees who used informational and noninformational current technology in groups of work experience for employee efficiency. Figure 7 shows the average employee efficiency by years of experience and the type of current technology. This figure illustrated that informational technology yielded higher employee efficiency than non-information technology and work experience had no effect.

Table 20

Average EE for Informational and Noninformational Current Technology

Years of Work Experience	No. of employees who use non-informational tech (0)	No. of employees who use informational tech (1)	Average employee efficiency for those who use non-informational tech (0)	Average employee efficiency for those who use informational tech (1)
1-5	7	7	3.59	4.65
6-10	7	22	3.65	3.84
11-15	4	28	3.89	4.18
16-20	7	20	3.31	3.94
21-25	2	14	4.79	4.30
26-30	4	22	4.04	4.18
31-35	0	19		4.35
36-40	2	20	4.29	4.27
41-58	1	21	4.00	3.63

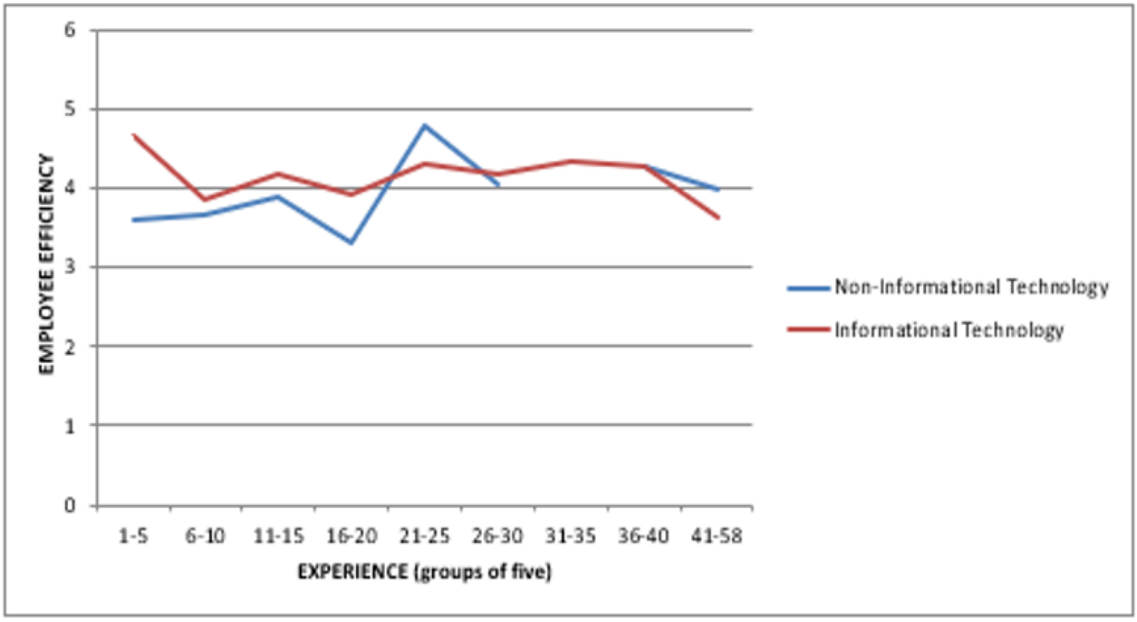

Figure 7. Average employee efficiency by years of experience and the type of current technology, informational versus noninformational.

Mandatory Use of Current Technology Resulted in Increased Employee Efficiency. The results of the stepwise regression for employee efficiency were given in Table 14. Voluntariness of use reduced employee efficiency by .408. Therefore, the mandatory use of informational current technology has increased employee efficiency by .408 compared to voluntariness of use. As indicated in Table 14, these effects are statistically significant at 1%.

Table 21 shows the data for employees who used current technology mandatorily and voluntarily in groups of work experience for employee efficiency. Figure 8 shows the average employee efficiency by years of experience and the type of current technology voluntarily and mandatorily, illustrating that mandatory use of current technology yielded higher employee efficiency than the voluntary use of current technology.

Table 21

Average EE for Using Current Technology Mandatorily and Voluntarily

Years of Work Experience	No. of employees who use current technology voluntarily (1)	No. of employees who use current technology mandatorily (0)	Average employee efficiency for those who use current technology voluntarily (1)	Average employee efficiency for those who use current technology mandatorily (0)
1-5	6	14	3.00	4.12
6-10	14	29	3.70	3.80
11-15	10	32	3.77	4.14
16-20	8	27	4.32	3.77
21-25	2	16	3.29	4.36
26-30	11	26	3.69	4.16
31-35	4	19	2.46	4.35
36-40	7	22	3.53	4.27
41-58	6	22	3.33	3.64

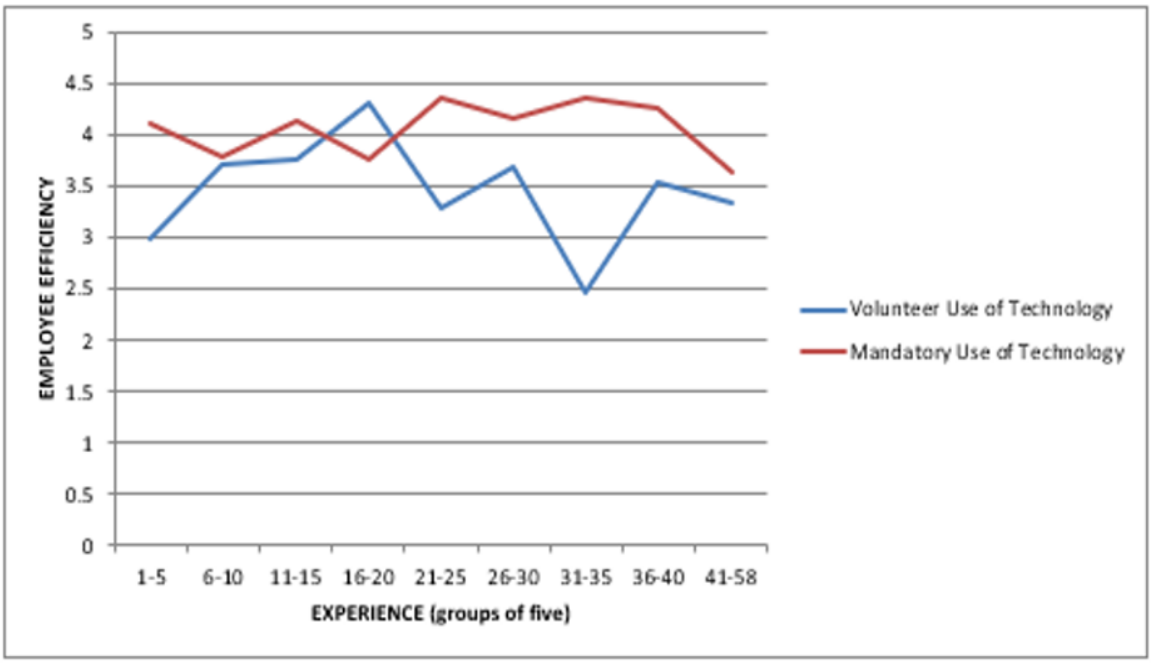

Figure 8. Average employee efficiency by years of experience and the type of current technology, voluntary versus mandatory.

Conclusions Answering Research Question 2

The second research question asked how do multigenerational cohorts, gender, type of current technology, experience, and voluntariness of use affect organizational productivity. The results shown in Tables 6, 7, 11, and 12 were informational current technology was used more than noninformational current technology. Mandatory use of current technology was used more than voluntary use of current technology. Each of these issues were central to understanding organizational productivity at the workplace. The stepwise regression models for organizational productivity showed that type of current technology and voluntariness of use were significant independent variables to understand organizational productivity.

Informational Type of Current Technology Resulted in Increased Organizational Productivity. This is not a surprising finding considering organizations tended to use similar, if not the same, informational type of current technology that other organizations use in the same business sector. A fair and careful interpretation of this finding was that organizations generally were more productive when they adopted the latest informational technology for their employees to use.

The multigenerational cohorts tended to use informational type of current technology more than noninformational type of current technology according to the respondents in the survey. I obtained from the findings in the data analysis that employees using informational type of current technology correlated with improving organizational productivity. In my interpretation, the employees who used informational current technology had higher organizational productivity than the employees who used

noninformational current technology. Table 22 shows the data for employees who used informational and noninformational current technology in groups of work experience for organizational productivity. Figure 9 shows the average organizational productivity by years of experience and the type of current technology, informational versus noninformational, illustrating information current technology increased organizational productivity more than noninformational current technology. This figure illustrated that informational current technology yielded higher organizational productivity than non-information current technology. The experience variable has no effect on organizational productivity.

Table 22

Average OP for Using Informational and Noninformational Current Technology

Years of Work Experience	No. of employees who use non-informational tech (0)	No. of employees who use informational tech (1)	Average organizational productivity for those who use non-informational tech (0)	Average organizational productivity for those who use informational tech (1)
1-5	6	7	3.92	4.53
6-10	7	22	3.79	3.83
11-15	3	27	3.48	4.12
16-20	6	17	3.20	4.35
21-25	2	14	3.86	4.18
26-30	4	19	3.91	4.31
31-35	0	16		4.34
36-40	2	20	4.32	4.28
41-58	1	15	4.00	4.16

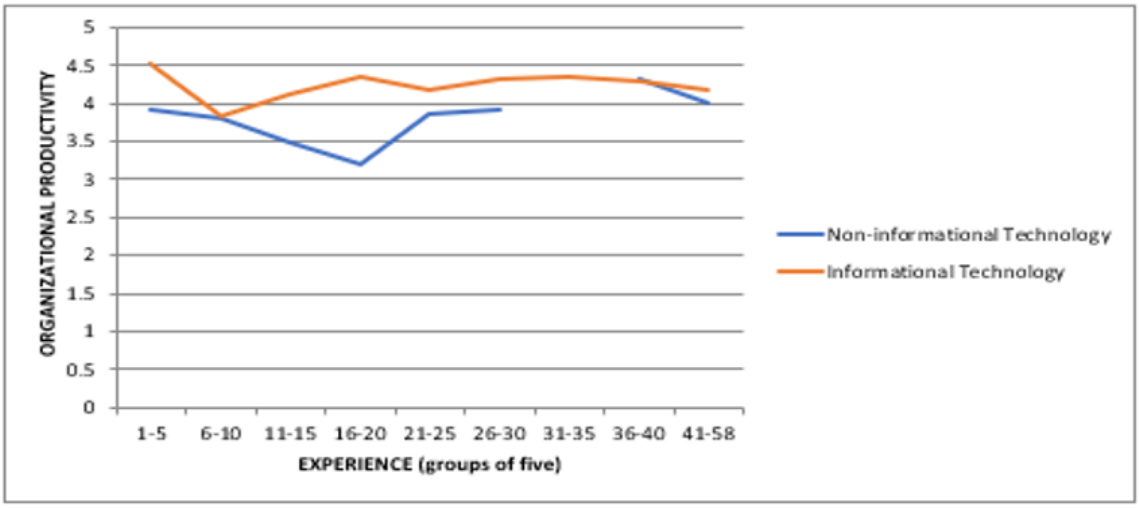

Figure 9. Average organizational productivity by years of experience and the type of current technology, informational versus noninformational.

Mandatory Use of current technology Resulted in Higher Organizational Productivity. This was not a surprising finding considering the general thought that as management tries to keep up with other similar businesses in the sector, and generally in the marketplace, forcing employees to use the type of current technology ensures that they remain relevant. Also, management making their employees use the latest type of current technology allows them to compete with other companies that produce the same products and/or services. This finding may be deemed appropriate considering the opportunities management provides for their workforce to help the organization become more productive, such as provide standard procedures/policies to learn how the organization does business and for management to hold meetings with their employees to discuss how their want their organization to grow and become more productive.

Table 23 shows the data for employees who used current technology mandatorily and voluntarily in groups of work experience for organizational productivity.

Figure 10 shows the average organizational productivity by years of experience and the type of current technology, voluntary and mandatory, illustrating mandatory type of current technology increased organizational productivity more than the voluntary type of current technology. This figure illustrated that the mandatory use of current technology resulted in higher organizational productivity than voluntary use. The experience variable has no effect on organizational productivity.

Table 23

Average OP for Using Current Technology Mandatorily and Voluntarily

Years of Work Experience	No. of employees who use current technology voluntarily (1)	No. of employees who use current technology mandatorily (0)	Average organizational productivity for those who use current technology voluntarily (1)	Average organizational productivity for those who use current technology mandatorily (0)
1-5	5	13	2.98	4.25
6-10	13	29	3.85	3.82
11-15	10	30	3.85	4.06
16-20	7	23	4.16	4.05
21-25	2	16	3.00	4.27
26-30	10	23	3.75	4.24
31-35	4	16	2.43	4.34
36-40	5	22	3.78	4.29
41-58	6	15	3.65	4.16

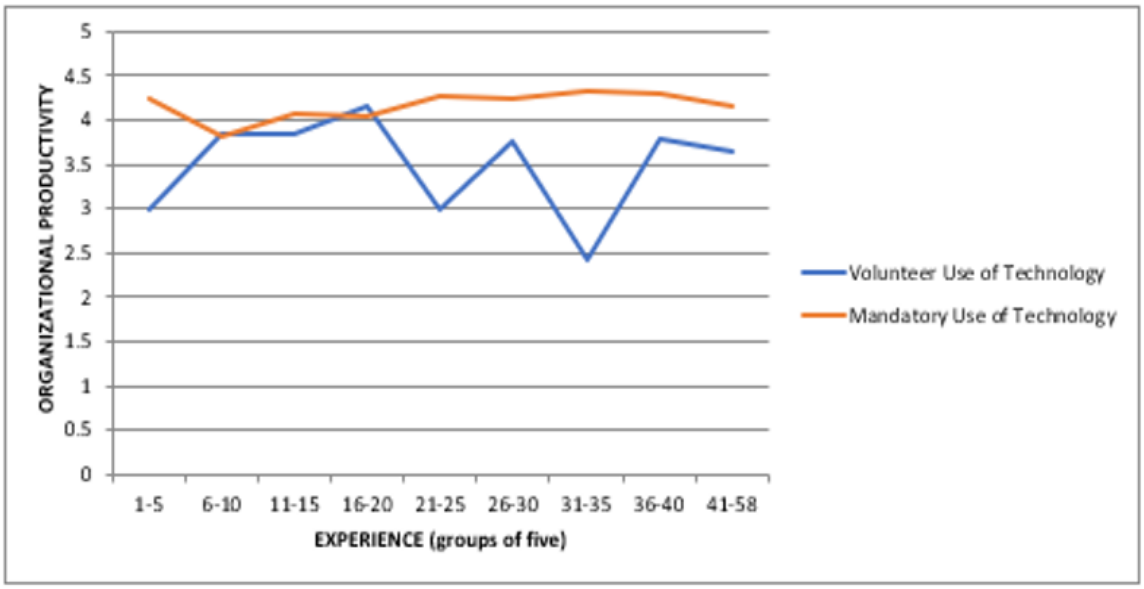

Figure 10. Average Organizational Productivity by years of Experience and the Type of current technology, Voluntary versus Mandatory.

I examined the assumption of normal distribution for the error term. Figures 11 and 12 are the histograms of residuals of employee efficiency and organizational productivity, respectively, along with the curves of the corresponding normal distributions. In Figure 11, the histogram is not close to the normal distribution because the histogram has a peak on the right side. The normal distribution does not appear to be a good fit. I can conclude that it is not a normal distribution without performing a statistical test.

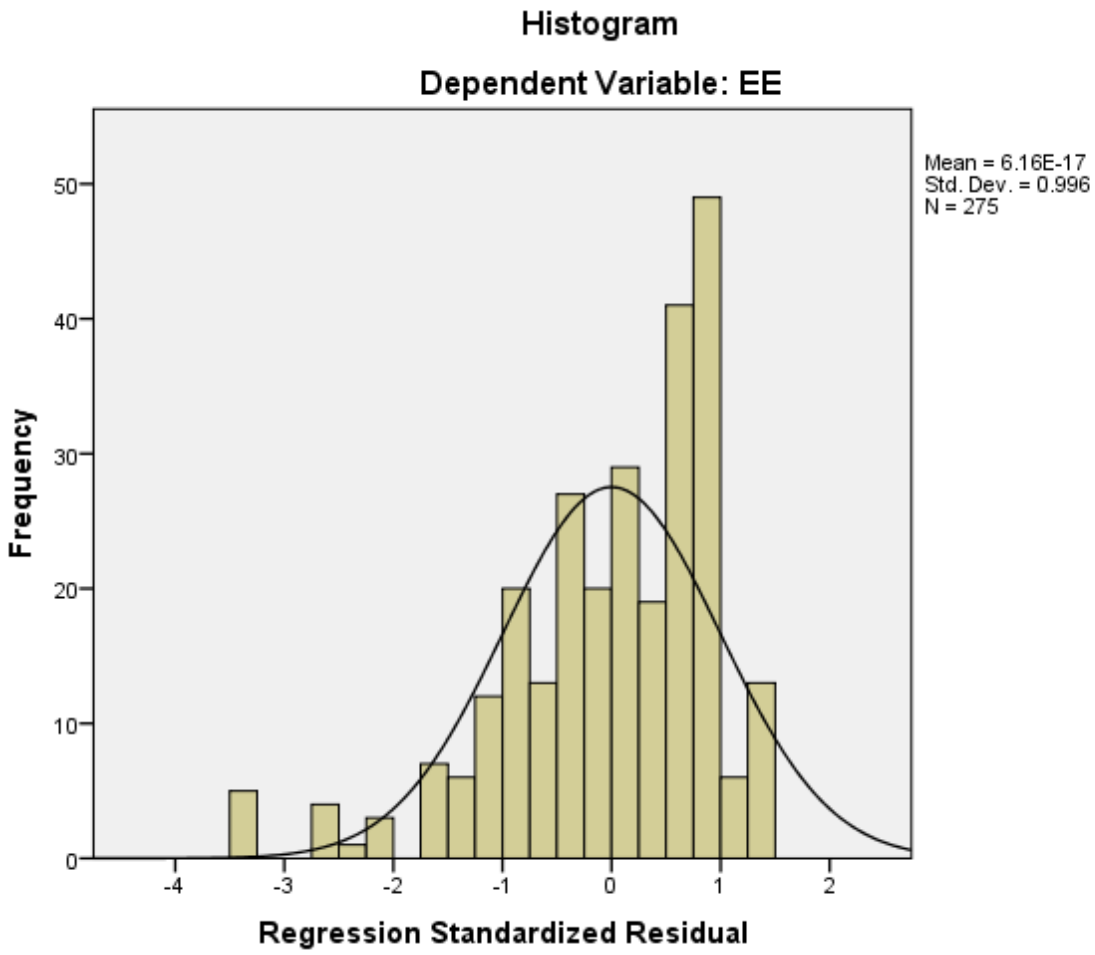

Figure 11. Histogram of Frequency versus Regression Standardized Residual for Employee Efficiency.

Figure 12 shows a histogram of residuals for organizational productivity along with the curve of normal distribution. In Figure 12, the histogram appears to be reasonably symmetrical and not too far off from the normal distribution. I did not perform a statistical test to check it.

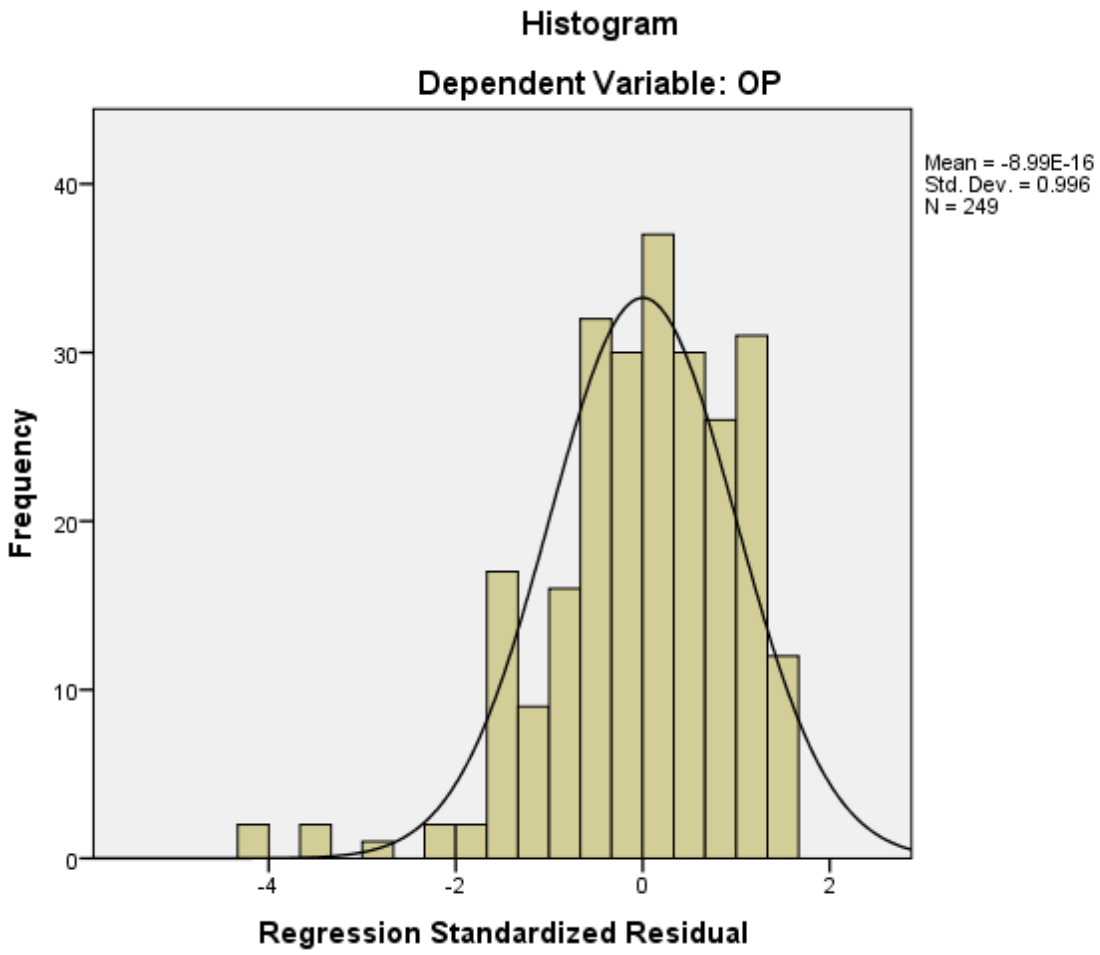

Figure 12. Histogram of Frequency versus Regression Standardized Residual for Organizational Productivity.

Figure 13 gives a scatter plot of standardized residual versus standardized predicted value for employee efficiency. The lack of any patterns in this plot illustrates that the residuals have homogeneous variances for employee efficiency in testing assumptions for multiple linear regression.

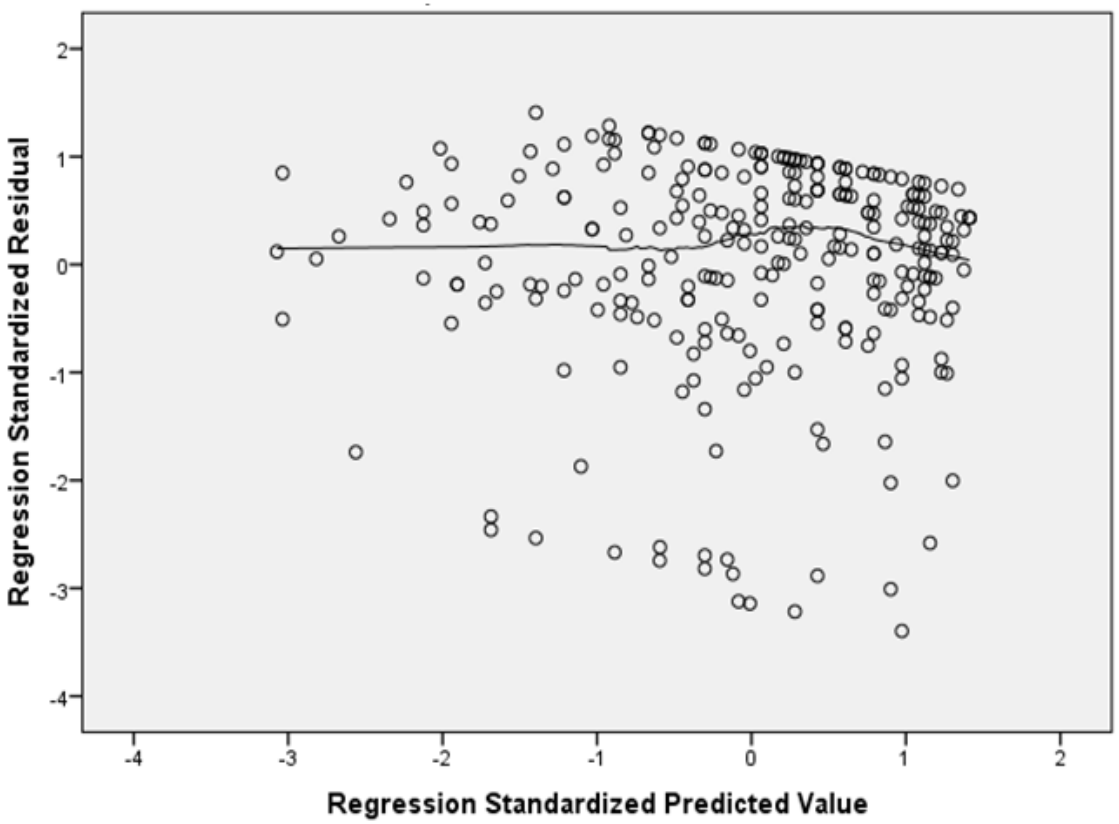

Figure 13. Scatterplot of Regression Standardized Residual versus Regression Standardized Predicted Value for Employee Efficiency.

Figure 14 gives a scatter plot of standardized residual versus standardized predicted value for organizational productivity. The lack of any pattern in this plot illustrates that the residuals have homogeneous variances for organizational productivity in testing assumptions for multiple linear regression.

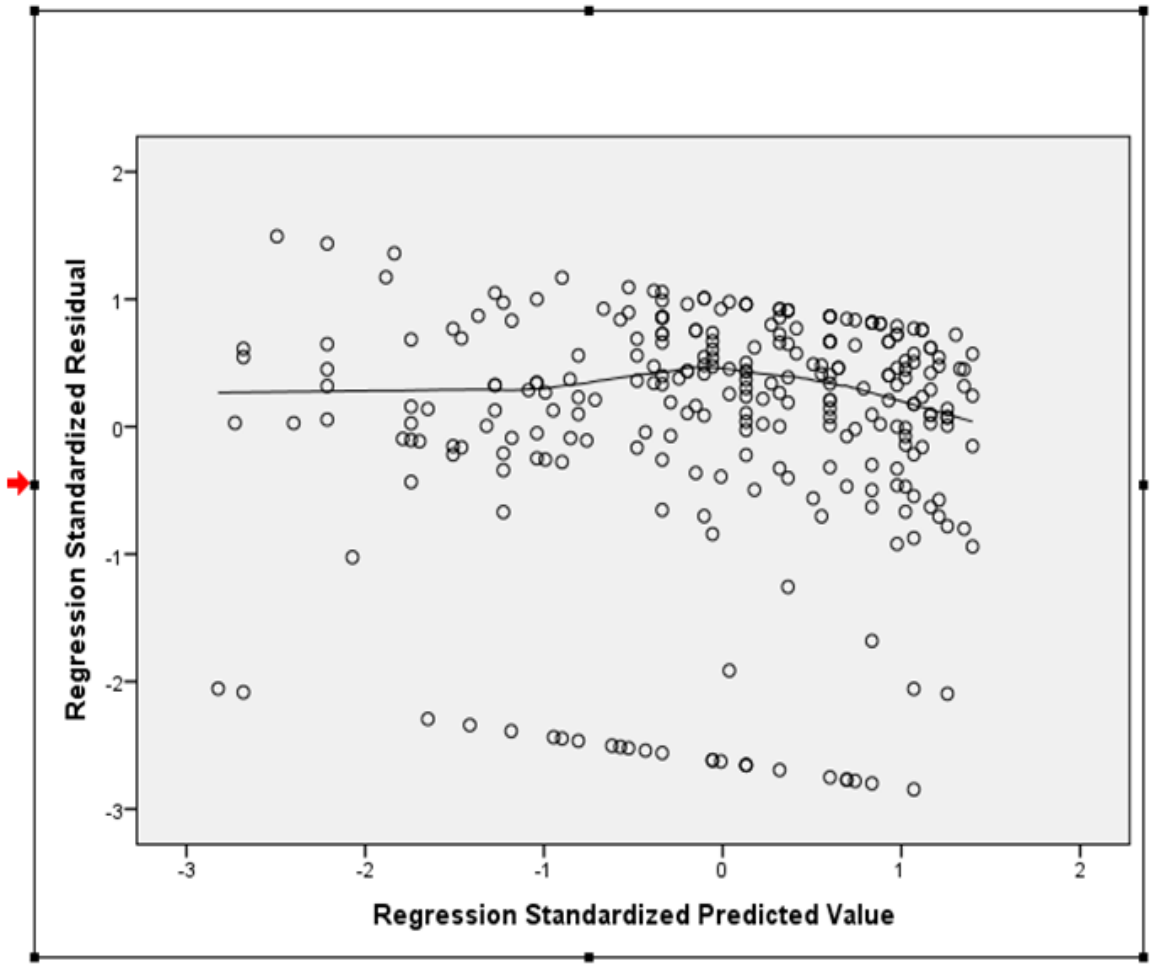

*Figure 14***.** Scatterplot of Regression Standardized Residual versus Regression Standardized Predicted Value for Organizational Productivity.

In Figures 13 and 14, I verified the regression assumptions of homogeneous variances of the error terms in the regression models.

Implications for Positive Social Change

The findings from the data analysis have significant implications for positive social change. As of the writing of this document, the results from the data analyzed provide the opportunity to improve both employee efficiency and organizational productivity by the use of informational current technology and promoting the mandatory use of current technology. This could be done by management at companies keeping up with the latest technology available that is sensible and applicable to the business goals of the company. The training modules can be utilized by management to educate employees on the type of current technology that is applicable to their work tasks and activities and make them more efficient with less time and expense. When properly implemented, the information in the training modules would have the potential to be a useful tool to allow employees to collaborate more efficiency and manage their time more effectively.

Some of the methods managers established to train employees were not a productive use of time or were not motivating or appealing. According to Sumbal, Tsui, and Lee (2015), traditional training methods were not living up to their expectation and resulted in managers being challenged to develop training modules to assist in employee efficiency and organizational productivity. With the constant improvement in technology, it is currently easier for managers to employ a variety of interactive training modules that accommodate different learning techniques. By integrating a combination of training modules, managers can develop more effective manners to give their workforce the skills they need to be efficient and help the organization be productive.

Recommendations for Action by Management

My recommendations for action are given below:

1. To improve employee efficiency and organizational productivity management should use informational current technology instead of noninformational current technology, if there is a choice.

Rationale: Informational current technology is widely used by many companies when there is a choice to improve their business models. If informational current technology is not available, noninformational current technology would be used.

2. To improve employee efficiency and organizational productivity, management should use informational and noninformational current technology mandatorily. The effects are statistically significant at 1% as indicated in Tables 11 and 12.

Rationale: Management implementing measures to improve employee efficiency are crucial to competing with similar businesses. The use of informational and noninformational should be available to management to assist in improving employee efficiency. Management implementing measures to improve organizational productivity are central to making the workplace environment more cohesive and interconnected. The use of informational and noninformational should be available to management to assist in improving organizational productivity.

Recommendations for Further Research

Improving employee efficiency and organizational productivity among a multigenerational workforce has received considerable attention for a few decades. However, few researchers, if any, have addressed the impact of the use of informational or noninformational type of current technology and whether the use of the type of current technology is voluntary or mandatory among a multigenerational workforce. In my research study, I have considered Traditionalists, Baby Boomers, Generation X and Generation Y. I have not considered Generation Z cohorts. My recommendation is to include Generation Z cohorts along with the other cohorts.

The type of current technology and the type of use (voluntary or mandatory) did have an impact on employee efficiency. Both H_{01} and H_{02} were rejected. The type of current technology and voluntariness of use did have an impact on organizational productivity. Therefore, future research on the impact of the type of current technology and voluntariness of use on employee efficiency can be conducted to obtain empirical evidence for a deeper understanding on the behavior of employees to improve their efficiency. Similarly, future research on how the type of current technology and voluntariness of use impact organizational productivity can be conducted to gain a deeper understanding on managing a multigenerational workforce in a business environment that improves work tasks and activities on programs and projects.

Personal Reflections

I entered into this research study using the personal experiences of my time working in an engineering environment and my curiosity of learning how to manage a multigenerational workforce when using type of current technology to accomplish their work tasks and activities. However, to bind my own personal thoughts and opinions about the subject matter, I chose a quantitative, cross-sectional study to avoid introducing any form of personal bias into the study. During the past few years, my interest grew in this subject as I visited other organizations and engaged in random discussions with employees that I have met about their work tasks and activities within a multigenerational workforce. I was interested in how workers managed to keep up with using the latest technology to accomplish their work tasks and activities.

As I progressed through my doctoral studies and performing my literature review, I found myself seeking a greater understanding of what could be done to improve and increase employee efficiency and organizational productivity – two key areas that causes a business to grow in talent, skills, and to increase profits. The workforces in the healthcare industry, the military, and law enforcement gathered my attention, given several parallels with my own personal experiences in the engineering field. I further explored other areas, such as educational environments and community organizations through database searches and use of the Internet. I found myself becoming more interested and wanting to understand more about the impact of the type of current technology and its impact on employee efficiency and organizational productivity for this undermentioned area of research.

I worked diligently to organize my thoughts and insights suited to the personal and professional nature of my interest. Throughout the process, I was also mindful not to let my personal thoughts and assumptions cloud my manner of creating survey questions that would answer my research questions and hypotheses, or in any manner prejudice the results. Given my awareness of this risk at the beginning of my research study, I was determined to not allow bias of any sort to affect my data analysis.

Conclusions

In this dissertation, I set out to learn about the impact type of current technology, gender, work experience, and the voluntariness of use had on employee efficiency and organizational productivity among a multigenerational workforce. Based on the findings, I concluded that the type of current technology, that is, informational or noninformational, and if the type of current technology was voluntary or mandatory, had an impact on employee efficiency and organizational productivity among a mutigenerational workforce consisting of both genders across various years of work experience.

In my dissertation, it became apparent that type of current technology was vital to just about every field. It was clear from the findings that type of current technology, informational and noninformational, improved the manner employees performed their work tasks and activities. It is likely that type of current technology when used mandatorily simplified many work tasks and activities. Performance can be strengthened among the multigenerational cohorts in various degrees. By having type of current technology readily available at the workplace, it could help to improve the accuracy of

performing work task and activities by employees and reduce the time it would take if the type of current technology was not available and not used mandatorily.

Also, it is likely that type of current technology could assist in training for employees for organizational productivity. It was vital for managers to adapt to the latest type of current technology. Managers could demonstrate to employees they were deeply engaged in providing them with the opportunities to perform at an optimal level (Sumbal, Tsui, & Lee, 2015), It could be deduced that businesses that did not decide to use type of current technology at the workplace, likely impacted the efficiency of employees and the productivity of the organization in a negative manner that could leave employees struggling to perform their work tasks and activities and reducing productivity at organizations.

In the stepwise regression model for employee efficiency, type of current technology and voluntariness of use were significant independent variables. In the stepwise regression model for organizational productivity, type of current technology and voluntariness of use were also significant independent variables.

In answering the first research question, I found that informational type of current technology leads to higher employee efficiency. Similarly, mandatory use of current technology results in higher employee efficiency. In answering the second research question, I found that informational type of current technology leads to higher organizational productivity. Similarly, mandatory type of current technology results in higher organizational productivity.

References

Abri, A. G., & Mahmoudzadeh, M. (2015). Impact of information technology on productivity and efficiency in Iranian manufacturing industries. *Journal of Industrial Engineering International, 11,* 143-157. doi:10.1007/s40092-014-0095-1

Aczel, B., Kekecs, Z., Bago, B., Szollosi, A., & Foldes, A. (2015). An empirical analysis of the methodology of automatic imitation research in a strategic context. *Journal of Experimental Psychology: Human Perception and Performance, 41*(4), 1049-1062. doi:10.1037/xhp0000081

Anantatnula, V., & Shtivastav, B. (2012). Evolution of project teams for generation Y workforce. *International Journal of Managing Projects in Business, 5*(1), 9-26. doi:10.1108/17538371211192874

Bailey, L. F. (2014). The origin and success of qualitative research. *International Journal of Market Research, 56*(2), 167-184. doi:10.2501/IJMR-2014-013

Barry, M.-E. (2014, January/February). Creating a practice environment that supports multigenerational workforce collaboration. *American Nurse, 46*(1), 13. Retrieved from http://www.TheAmericanNurse.org

Bellocchi, A. (2015, April). Methods for sociological inquiry on emotion in educational settings. *Emotion Review, 7*(2), 151-156. doi:10.1177/1754073914554775

Bennett, J., Pitt, M., & Price, S. (2012). Understanding the impact of generational issues in the workplace. *Facilities, 30*(7/8), 278-288. doi:10.1108/02632771211220086

Bergum, T. (2015). Automation on the loading dock: Safety, efficiency and worker comfort. *EHS Today , 8* (10), 27-28. http://ehstoday.com/safety/automation-loading-dock-safety-efficiency-and-worker-comfort

Bhatnagar, R., Kim, J., & Many, J. E. (2014, August 12). Candidate surveys on program evaluation: examining instrument reliability, validity and program effectiveness. *American Journal of Educational Research, 2*(8), 683-690. doi:10.12691/education-2-8-18

Blackhart, G. C., Brown, K. E., Clark, T., Pierce, D. L., & Shell, K. (2012). Assessing the adequacy of postexperimental inquiries in deception research and the factors that promote participant honesty. *Behavior Research Methods, 44*, 24-40. doi:10.3758/s13428-011-0132-6

Box, G. E., & Tidwell, P. W. (1962). Transformation of the independent variables. *Technometrics, 4*, 531-550. http://www.jstor.org/stable/1266288

Brown, M., Pitt-Catsouphes, M., McHamara, T., & Besen, E. (2014). Returnng to the workforce after retiring: A job demands, job control, social support perspective on job satisfaction. *The International Journal of Human Resource Management, 25*(22), 3113-3133. doi:10.1080/09585192.2014.919951

Bursch, D., & Kelly, K. (2014). Managing the multigenerational workplace. *UNC Executive Development , 1* (1), 1-19. Retrieved from http://www.kenan-flagler.unc.edu/~/media/Files/documents/executive-development/managing-the-multigenerational-workplace-white-paper.pdf

Canary, H. E., & McPhee, R. D. (2011). *Communication and organizational knowledge: Contemporary issues for theory and practice.* New York, NY, USA: Routledge. doi:10.1111/j.1460-2466.2010.01517.x

Cassata, C. (2014). Generational melting pot. *OfficePro, 74* (4), 8-11. http://connection.ebscohost.com/c/articles/109312611/generational-melting-pot

Cekada, T. L. (2012, March). Training a Multigenerational Workforce. *Professional Safety, 57*(3), 40-44. Retrieved from http://www.asse.org/professional-safety/

Chandler, J., Mueller, P., & Paolacci, G. (2014). Nonnaïveté among Amazon mechanical Turk workers: Consequences and solutions for behavioral researchers. *Behavior Research Methods, 46,* 112-130. doi: 10.3758/s13428-013-0365-7

Chaudhuri, S., & Ghosh, R. (2012, August). Reverse mentoring: A social exchange tool for keeping the boomers engaged and millennials committed. *Human Resource Development Review, 11*(1), 55-76. doi:10.1177/1534484311417562

Chesley, N. (2014a, August). Information and communication technology use, work intensification and employee strain and distress. *Work Employment & Society, 28*(4), 589-610. doi:10.1177/0950017013500112

Chesley, N. (2014b, July 10). Workplace technology use may increase both employees' distress and productivity. Retrieved January 10, 2016, from United States Politics and Policy: http://bit.ly/lromvMR

Cloutier, O., Felusiak, L., Hill, C., & Pemberton-Jones, E. J. (2015, June). The importance of developing strategies for employee retention. *Journal of*

Leadership, Accountability and Ethics, 12(2), 119-129. doi: 10.22161/ijebm.2.3.1

Comte, A., & Bridges, J. H. (1865). *A general view of positivism.* London, England: Trübner and Company. Retrieved from https://archive.org/details/generalviewofpos00comt

Coulter, J. S., & Faulkner, D. C. (2014). The multigenerational workforce. *Professional Case Management, 19*(1), 46-50. doi:10.1097/NCM.0000000000000008

Crawford, S., & Stucki, L. (1990). Peer review and the changing research record. *Journal of the Amerrica Society for Information Science, 41*, 223-228. doi:10.1002/(SICI)1097-4571(199004)41:3<223::AID-ASI14>3.0.CO;2-3

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA, USA: Sage Publications, Inc. Retrieved from https://us.sagepub.com/en-us/nam/qualitative-inquiry-and-research-design/book235677

Davis, F. D. (1989, September). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340. doi:10.2307/249008

Deyoe, R. H., & Fox, T. L. (2012). Identifying strategies to minimize workplace conflict due to generational differences. *Journal of Behavioral Studies in Business, 5*(1), 1-27. Retrieved from http://www.aabri.com/SA12Manuscripts/SA12102.pdf

Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. (T. B.

Society, Ed.) *British Journal of Psychology, 105*(3), 399 - 412. doi:10.1111/bjop.12046

Edlund, J. E., Hartnett, J. H., Heider, J. H., Perez, E. J., & Lusk, J. (2014). Experimenter characteristics and word choice: Best practices when administering an informed consent. *Ethics & Behavior, 24*, 397-407. doi:10.1080/10508422.2013.854171

Edlund, J. E., Nichols, A. L., Okdie, B. M., Guadagno, R. E., Eno, C. A., Heider, J. D., . . . Wilcox, K. T. (2014). The prevalence and prevention of crosstalk: A multi-institutional study. *The Journal of Social Psychology, 154*, 181-185. doi:10.1080/00224545.2013.872596

Eversole, B. A., Venneberg, D. L., & Crowder, C. L. (2012, November). Creating a flexible organizational culture to attract and retain talented workers across generations. *Advances in Developing Human Resources, 14*(4), 607-625. doi:10.1177/1523422312455612

Fan, C.-W. (2014, November). Applied the technology acceptance model to survey the mobile-learning adoption behavior in science museum. *International Journal of Innovation and Scientific Research, 12*(1), 22-29. http://www.ijisr.issr-journals.org/abstract.php?article=IJISR-14-272-01

Fenzel, J. L. (2013). *Examining generational differences in the workplace: Work centrality, narcissism, and their relation to employee work engagement.* University of Wisconsin Milwaukee, UWM Digital Commons. Milwaukee, WI: e-Publications. Retrieved from http://dc.uwm.edu/etd

Ferguson, C. J., & Heene, M. (2012). A vast graveyard of funded theories publication bias and psychological science's aversion to the null. *Perspectives on Psychological Science, 7*, 555-561. doi:10.1177/1745691612459059

Ferri-Reed, J. (2014, October). Building innovative multi-generational teams. *The Journal for Quality and Participation, 37*(3), 20-22. Retrieved from http://search.proquest.com.ezp.waldenulibrary.org.docview/1627999379?accountid=14872

Finkelstein, L., King, E., & Voyles, E. (2015). Age Meta-stereotyping and Cross-age Workplace Interactions: A Meta View of Age Stereotypes at Work. *Work, Aging and Retirement, 1*(1), 26-40. doi:10.1093/workar/wau002. .

Frankfort-Nachmias, C., & Nachmias, D. (2008). *Research methods in the social sciences* (7th ed.). New York, NY, USA: Worth Publishers http://www.macmillanlearning.com/catalog/Product/researchmethodsinthesocialsciences-eighthedition-frankfort-nachmias

Gal, Y. (2015, December 17). *Cambridge Machine Learning Group*. Retrieved from The Science of Deep Learning: http://mlg.eng.cam.ac.uk/yarin/blog_5058.html

Gasparotti, C. (2014). Application of the earned value method in monitoring of the project cost. *Review of Management and Economic Engineering, 13*(3), 574-588. http://rmee.sveatoslav.com/volume-13/number-3-v13/methodology-3-v13/780-application-of-the-earned-value-method-in-monitoring-of-the-project-cost.html

Giner- Sorolla, R. (2012). Science or art? How aesthetic standards grease the way through the publication bottleneck but undermine science. *Perspectives on Psychological Science, 7,* 562-571. doi:10.1177/1745691612457576

Harms, R., Luck, F., Kraus, S., & Walsh, S. (2014, November). On the motivational drivers of gray entrepreneurship: An exploratory study. *Technological Forecasting & Social Change, 89,* 358-365. doi:http://dx.doi.org/10.1016/j.techfore.2014.08.001

Harvey, J. (2012). Managing organizational memory with intergenerational knowledge. *Journal*

of Knowledge Management, 16(3), 400-417. doi:10.1108/13673271211238733

Heng, C. Y., & Yazdanifard, R. (2013, October). Generation gap; Is there any solid solution? From human relation point of view. *International Journal of Economy, Management and Social Sciences, 2*(10), 837-840. https://www.researchgate.net/publication/260219890_Generation_Gap_Is_There_any_Solid_Solution_From_Human_Relation_Point_of_View

Henkin, N. Z., & Butts, D. M. (2012). Intergenerational practice in the United States: Past, present and future. *Quality in Ageing and Older Adults, 13*(4), 249-256. doi:10.1108/14717791211286913

Hernaus, T., & Poloski, V. N. (2014). Work design for different generational cohorts: Determining common and idiosyncratic job characteristics. *Journal of Organizational Change Management, 27*(4), 615-641. Retrieved from

http://search.proquest.com.ezp.waldenulibrary.org/docview/1660768284?accountid=14872

Holian, R. (2015, December). Work, career, age and life-stage; assumption and preferences of a multigenerational workforce. *Labour & Industry, 25*(4), 278-292. doi:10.1080/10301763.2015.1083366

Holian, R., Hutton, B., & Bellamy, S. (2013). How older workers are defining new terms of retirement. *The International Journal of Aging and Society, 2*(4), 77-88. Retrieved from http://ijj.cgpublisher.com/product/pub.212/prod.74

Horton. J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics, 14*, 399-425. doi:10.1007/s10683-011-9273-9

Johnson, M. (2015, September/October). Engaging a multigenerational and multicultural workforce: One style does not suit all. *Plans & Trusts, 33*(5), 10-15. http://connection.ebscohost.com/c/articles/109118447/engaging-multigenerational-multicultural-workforce-one-style-does-not-suit-all

Johnson, T. P. (2015). Cross-cultural issues in survey methodology. *Public Opinion Quarterly, 79*(Special Issue), 211-213. doi:10.1093/poq/nfv010Klein, O., Doyen, S., Leys, C., Magalhães de Saldanha da Gama, P. A., Miller, S., Questienne, L., & Cleeremans, A. (2012). Low hopes, high expectations: Expectancy effects and the replicability of behavioral experiments. *Perspectives on Psychological Science, 7*, 572-584. doi:10.1177/1745691612463704

Johnson, L., & Anderson, A. (2016, February). Perspective - Taking skills for a multigenerational workforce. *Talent Development,* 70-73.

Jorge, C. N., & Yazdanifard, R. (2014, November). The impact of social and emotional intelligence on employee motivation in a multigenerational workplace. *International Journal of Information, Business and Management, 6*(4), 163-170. Retrieved fromhttp://search.proquest.com.ezp.waldenulibrary.org/docview/1552838299?accountid=14872

Kapoor, C., & Solomon, N. (2011). Understanding and managing generational differences in the workplace. *Worldwide Hospitality and Tourism Themes,* 3(4), 308-318. doi:10.1108/17554211111162435

Kilber, J., Barclay, A., & Ohmer, D. (2014, September). Seven tips for managing Generation Y. *Journal of Management Policy and Practice, 15*(4), 80-91. Retrieved from http://search.proquest.com.ezp.waldenulibrary.org/docuview/1618137778?accountid=14872

Klein, O., Doyen, S., Leys, C., Magalhães de Saldanha da Gama, P. A., Miller, S., Questienne, L., & Cleeremans, A. (2012). Low hopes, high expectations: Expectancy effects and the replicability of behavioral experiments. *Perspectives on Psychological Science, 7,* 572-584. doi:10.1177/1745691612463704

Klein, R. A., Ratliff, K. A., Vianello, M., Adams, R. B., Bahnik, Š., Bernstein, M. J., . . . Nosek, B. A. (2014). Investigating variation in replicability: A "many labs"

replication project. *Social Psychology, 45,* 142-152. doi:10.1027/1864-9335/a000178

König, C. (2015). HR technologies for the multi-generational workforce. *Workforce Solutions Review , 6* (3), 20-23. http://connection.ebscohost.com/c/articles/111478863/hr-technologies-multi-generational-workforce

Kordbachch, N., Shultz, K. S., & Olson, D. A. (2014). Engaging mid and late career employees: The relationship between age, employment engagement, intrinsic motivation, and meaningfulness. *Journal of Organizational Psychology, 14*(1), 11-25. Retrieved from http://www.na-businesspress.com/JOP/

Kuhn, T. S., (2012). *The structure of scientific revolutions.* (T. S. Kuhn, Ed.) Chicago, IL, USA: Oxford University Press.

Kulesza, C. S., & Smith, D. (2013). Reverse mentoring: Something for everyone! *Strategic Finance , 95* (4), 21-63. http://connection.ebscohost.com/c/articles/86726871/reverse-mentoring-something-everyone

Kulik, C., Ryan, S., Harper, S., & George, G. (2014). From the editors aging populations and management. *Academy of Management Journal, 57*(4), 929-935. doi:10.5465/amj.2014.4004

Lam, L.-c. (2015, December). Optimizing workplace with technology and cultural change. *Computerworld Hong Kong*, 62-64.

http://connection.ebscohost.com/c/articles/112468754/optimizing-workplace-technology-cultural-change

Lamb, E., & Gentry, J. (2013). The denial of aging in american advertising: Empowering or disempowering. *The International Journal of Aging and Society, 2*(4), 35-47. Retrieved from http://www.ijj.cgpublisher.com/product/pub212/prod.68

Lazazzara, A., Karpinska, K., & Henkens, K. (2013). What factors influence training opportunities for older workers? Three factorial surveys exploring the attitudes of HR professionals. *The International Journal of Human Resource Management, 24*(11), 2154-2172. doi:10.1080/09585192.2012.725077

Lennox- Hill, A. (2011, March 9). *Slideshare*. Retrieved from A2 Positivism & Quantitative Research: https://www.slideshare.net/aprichelle/a2-lesson-2

Leong, J. (2012, August). Managing the multi-generational workforce: From the GI generation to the millennials. *Australian Library Journal, 61*(3), 243-244. Retrieved from http://search.proquest.com.ezp.waldenulibrary.org/docview/1069246038?accountid=4872

Lester, S. W., Standifer, R. L., Schultz, N. J., & Windsor, J. M. (2012). Actual versus perceived generational differences at work: An empirical examination. *Journal of Leadership & Organizational Studies, 19*(3), 341-354. doi:10.1177/1548051812442747

Locmele-Lunova, R., & Cirjevskis, A. (2017, May 23). Exploring the multigenerational workforce's personal and work values: The future research agenda. *Journal of Business Management*(13), 7-19.

Ma, Q., & Liu, L. (2004). The technology acceptance model: a meta-analysis of empirical findings. *Journal of Organizational and End User Computing, 16*(1), 59-70. doi:10.4018/978-1-59140-474-3.ch006

Makel, M. C., Plucker, J. A., & Hegarty, B. (2012). Replications in psychology research: How often do they really occur? *Perspectives on Psychological Science, 7*, 537-542. doi:10.1177/1745691612460688

Meilink, J. L., & Grimes, C. (2015). Designs for the ages: Meeting the needs of a multigenerational workforce. (M. Hrickiewicz, Ed.) *Health Facilities Management , 28* (7), 30-33. http://www.hfmmagazine.com/articles/1613?dcrPath=/templatedata/HF_Common/NewsArticle/data/HFM/Magazine/2015/July/hfm-designing-for-a-multigenerational-workforceMendelson, M. (2013, September 5). The millennial generation: Receiving a fair exchange? *Journal of Intergenerational Relationships, 11*(3), 324-328. doi:10.1080/15350770.2013.810056

Mill, J. S. (2013). *Auguste Comte and Positivism.* John Stuart Mill. http://www.gutenberg.org/files/16833/16833-h/16833-h.htm

Molinsky, A. (2013). *Global dexterity: How to adapt your behavior across cultures without losing yourself in the process.* Boston, MA, USA: Harvard Business Press. doi:10.1002/tesj.171

Moses, J., & Knutsen, T. L. (2012). *Ways of knowing: competing methodologies in social and political research* (2nd ed.). New York, NY, USA: Palgrave Macmilln. Retrieved from https://www.amazon.com/Ways-Knowing-Competing-Methodologies-Political/dp/0230360688/ref=cm_cr_arp_d_pdt_img_top?ie=UTF8

Murray, A. (2013, July 8). Mind the gap: Technology, millennial leadership and the cross-generational workforce. *The Australian Library Journal, 60*(1), 54-65. doi:10.1080/00049670.2011.10722556

Neuman, W. L., & Robson, K. (2015). Basics of social research: Qualitative and quantitative approaches. In M. Sartor (Ed.). Toronto, Canada, Toronto, Canada: Pearson.

Nichols, A. L., & Edlund, J. E. (2015). Practicing what we preach (and sometimes study): Methodological issues in experimental laboratory research. *Review of General Psychology, 19*(2), 191-202. doi:10.1037/gpr0000027

Nitschke, S. (2014). Advanced exoskeleton technology increases shipyard worker efficiency. *Naval Forces, 35*(5), 96-97. http://connection.ebscohost.com/c/product-reviews/99364842/advanced-exoskeleton-technology-increases-shipyard-worker-efficiency

Pearce, T. (2015, July). "Science Organized": Positivism and the metaphysical club, 1865-1875. *Journal of the History of Ideas, 76*(3), 441-465. doi: 10.1353/jhi.2015.0025

Perreira, T., & Berta, W. (2016, Winter). Using focus groups to modify the workplace affective commitment multidimensional questionnaire (WACMQ) for use in health care. *Journal of Health and Human Services Administration*, 407-424.

Peters, G.-J. Y. (2014, April). The alpha and the omega of scale reliability and validity. *The European Health Psychologist, 16*(2), 56 - 69. doi:10.17605/OSF.IO/TNRXV | ARK c7605/osf.io/tnrxv

Petrakis, P. E., & Kostis, P. C. (2015). The role of knowledge and trust in SMEs. (N. Philipson, Ed.) *Journal of the Knowledge Economy, 6*, 105-124. doi:10.1007/s13132-012-0115-6

Pietrusewicz, K., & Waszczuk, P. (2013). Five ways to enable the next generation workforce. *Control Engineering , 60* (1), 44. http://www.controleng.com/single-article/five-ways-to-enable-the-next-generation-workforce/4294461edee5552a8044d99c9d0de05d.html

Purcell, K., & Rainie, L. (2014, December). *Technology's impact on workers.* Pew Research Center, Internet, Science, and Technology Research. Washington, DC: Pew Research Center. Retrieved from http://www.pewInternet.org/2014/12/30/technologys-impact-on-workers/

Rajput, N., Marwah, P., Bali, R., & Gupta, M. (2013, February). Managing multigenerational workforce: Challenge for millennium managers. *International Journal of Marketing and Technology, 3*(2), 132-149. Retrieved from http://www.ijmra.us/2013ijmt_february.php

Roediger, H. L. (2012, February). Psychology's woes and a partial cure: The value of replication. *Observer, 25*(2), 27-29. http://www.psychologicalscience.org/index.php/publications/observer/2012/february-12/psychologys-woes-and-a-partial-cure-the-value-of-replication.html

Romo, A. (2012). *Managing multigenerational workforce: How to bridge the generational gaps?* Thesis, Jyväskylän ammattikorkeakoulu, JAMK University of Applied Sciences, Jyväskylä,FI. https://www.theseus.fi/bitstream/handle/10024/46928/Romo_Annastiina.pdf?sequence=1

Rose, D. M., & Gordon, R. (2015). Age-related cognitive changes and distributed leadership. *Journal of Management Development, 34*(3), 330-339. doi:10.1108/JMD-07-2013-0094

Samadi, B., Wei, C. C., Seyfee, S., & Yusoff, W. F. (2015). Conceptual model of organizational trust and knowledge sharing behavior among multigenerational employees. *Asian Social Science, 11*(9), 32-42. doi:10.5539/ass.v11n9p32

Sargent, L., Lee, M. D., Martin, B., & Zikic, J. (2013). Reinventing retirement: New pathways, new arrangements, new meanings. *Human Relations, 66*(1), 3-21. doi:10.1177/0018726712465658

Simeonova, B., Bogolyubov, P., Blagov, E., & Kharabsheh, R. (2014). Cross-cultural validation of UTAUT: The case of university VLEs in Jordan, Russia and the UK. *The Electronic Journal of Knowledge Management, 12*(1), 25-34. http://eprints.lancs.ac.uk/id/eprint/69681

Simon, J. A. (2013, September 5). Let's meet in the middle. *Journal of Intergenerational Relationships, 11*(3), 334-336. doi:10.1080/15350770.2013.810062

Smyrl, B. J. (2011). *Leading a multi-generational workforce: Understanding generational differences for effective communication.* Marquette University, College of Professional Studies Professional Projects. Milwaukee, WI: e-Publications. Retrieved from http://epublications.marquette.edu/cps_professional

Soemarno, P. (2011). *Quantitative research methods in environmental studies*. Retrieved from www.slideplayer.com: https://www.google.com/amp/slideplayer.com/amp/4078092/

Sumbal, M. S., Tsui, E., & Lee, W. B. (2015). Baby boomers retirement in oil and gas: Challenges of knowledge transfer for organizational competitive advantage. *Proceedings of the 7th International Joint Conference on Knowledge Discovery, KnowledgeEngineering and Knowledge Management (IC3K 2015), 3*, 168-173. doi:10.5539/ass.v11n9p32

The Stanford Encyclopedia of Philosophy. (2013, March 31). Rationalism vs. Empiricism. In D. Davidson, & E. N. Zalta (Ed.). Stanford, CA, USA: The Metaphysics Research Lab Center for the Study of Language and Information. http://plato.stanford.edu/entries/rationalism-empiricism/

Thompson, C., & Gregory, J. B. (2012, November 9). Managing millennials: A framework for improving attraction, motivation and retention. *The Psychologist-Manager Journal, 15*(4), 237–246. doi:10.1080/10887156.2012.730444.

Vasconcelos, L. A. (2013, July). Exploring macrocontingencies and metacontingencies: Experimental and non-experimental contributions. *Suma Psicológica, 20*(1), 31-43. https://www.researchgate.net/publication/274376160_Exploring_macrocontingencies_and_Metacontingencies_experimental_and_Non-experimental_contributions

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research, 11*(4), 342-365. http://dx.doi.org/10.1287/isre.11.4.342.11872

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204. doi:10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478. http://www.jstor.org/stable/30036540

Vough, H., Batille, C., Noh, S., & Lee, M. (2015). Going off script: How managers make sense of the ending of their careers. *Journal of Management Studies, 52*(3), 414-440. doi:10.1111/joms.v52.3

Wei, N.-C., Bao, C.-P., Yao, S.-Y., & Wang, P.-S. (2016, April). Earned value management views on improving performance of engineering project management. *International Journal of Organizational Innovation, 8*(4), 93-111. Retrieved from

http://eds.a.ebscohost.com.ezp.waldenulibrary.org/eds/detail/detail?sid=4184f532-aa5d-4310-8f5d5ffdb095b91e%40sessionmgr4002&vid=11&hid=4208&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=114725523&db=bth

Wesolowski, P. (2014). Melding a multi-generational workforce: Communication technology is part of the problem - and the solution. *Human Resource Management International Digest, 22*(2), 33-35. Retrieved from http://search.proquest.com.ezp.waldenulibrary.org/docview/1519212455?accountid=14872

Wiedmer, T. (2015, September). Generations do differ: Best practices in leading traditionalists, boomers, and generations X, Y, and Z. *Delta Kappa Gamma Bulletin, 82*(1), 51-58. http://connection.ebscohost.com/c/articles/110364697/generations-do-differ-best-practices-leading-traditionalists-boomers-generations-x-y-z

Woods, K. (2016). Organizational ambidexterity and the multi-generational workforce. *Journal of Organizational Culture, Communications and Conflict, 20*(1), 95-111. Retrieved from http://search.proquest.com.ezp.waldenulibrary.org/docview/1804899567?accountid=14872

Zopiatis, A., Krambia-Kapardis, M., & Varnavas, A. (2012, April). Y-ers, x-ers and boomers: Investigating the multigenerational (mis)perceptions in the hospitality

workplace. *Tourism and Hospitality Research, 12*(2), 101-121. doi:10.1177/1467358412466668

Appendix A: Construct Definitions

Construct Definitions

Attitude: Individual's positive or negative feeling about performing the target behavior (e.g., using a system).

Behavioral intention: The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior.

Computer self-efficacy: The degree to which an individual believes that he or she has the ability to perform specific task/job using computer.

Effort expectancy: The degree of ease associated with the use of the system.

Facilitating conditions: The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

Perceived behavioral control: The perception of the ease or difficulty of the particular behavior.

Perceived ease of use: See the definition of effort expectancy.

Perceived enjoyment: The extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use.

Perceived usefulness: See the definition of performance expectancy.

Perception of external control: See the definition of facilitating conditions.

Performance expectancy: The degree to which an individual believes that using the system will help him or her to attain gains in job performance.

Social influence: The degree to which an individual perceives that important others believe he or she should use the new system.

Subjective norm: Person's perception that most people who are important to him or her think he or she should or should not perform the behavior in question.

Voluntariness: The extent to which potential adopters perceive the adoption decision to be non-mandatory.

Appendix B: List of Current Technologies in Organizations

List of Current Technologies in Organizations

Informational	Noninformational
Computers	Computer-driven Process Support Tools
Electronic mail	Maintenance equipment
Internet Services	Construction equipment
Information Technology	Power tools/equipment
Instant Messaging	Vehicles (forklift, tractor, crane, etc.)
Software Applications	
Wireless Fidelity (Wi-Fi)	
Universal Printers (Copy, Fax, Scan and send, Print)	
Landline Telephone	
Cell or Smartphone	
Web-based Inspection Process Support Tools	

Appendix C: Survey Instrument Used by the Participant

Title: Impact Using Type of current technology on Employee Efficiency and Organizational Productivity

The information you will provide today will only be used to analyze statistically the relationship of employee efficiency and organizational productivity with the type of current technology at the workplace. **Your participation is strictly voluntary, your name will remain anonymous, and the information you provide will only be identifiable by assigning a number to each participant. For example, you will be identified only as Participant 1.**

- Try to respond to all the items.
- Make sure these fields are filled in.

Figure 15 is an illustration of the survey instrument used for my dissertation.

Please click the circle that best fits your response:

Section I: Demographic Characteristic Information
1. Gender: ○ Male ○ Female
2. Age (on November 1, 2017): ○ 23 – 36 years old (Generation Y) Born from 1981 to 1994 ○ 37 – 52 years old (Generation X) Born from 1965 to 1980 ○ 53 – 71 years old (Baby Boomers) Born from 1946 to 1964 ○ More than 71 years old (Traditionalists) Born before 1946
3. Work Experience: (Write in the number of years of work experience) How many years of experience do you have in service? _____
4. What type of current technology do you mostly use at the job? ○ Informational (1) ○ Noninformational (0)
5. Is the use of current technology on your job voluntary or mandatory? ○ Voluntary (1) ○ Mandatory (0)

Please click the circle in the appropriate box to rate the following items:
Employee Efficiency and Organizational Productivity: 1=Extremely Unlikely 2=Moderately Unlikely 3=Neither Likely nor Unlikely 4=Moderately Likely 5=Extremely Likely

Section II: Employee Efficiency		EU	MU	NLUL	ML	EL
		1	2	3	4	5
6. Employee efficiency is improved when using type of current technology based on the project schedule.		○	○	○	○	○
7. My interaction with the type of current technology available at my job would help me to be more efficient in my work tasks and activities than if I did not use that technology.		○	○	○	○	○
8. Using the type of current technology available at my job helps me to		○	○	○	○	○

complete my work tasks and activities efficiently.						
9. My efficiency is impacted by becoming skillful at using the type of current technology available at my job.		○	○	○	○	○
10. I am more efficient on a work task or activity using the type of current technology available at my job if I have a lot of time to complete the job for which the type of current technology is provided.		○	○	○	○	○
11. Employee efficiency would improve using the type of current technology available at my job than if I did not use that technology.		○	○	○	○	○
12. Employee efficiency is enhanced when using the type of current technology at my job to accomplish critical aspects of my work tasks and activities.		○	○	○	○	○

Section III: Organizational Productivity		EU	MU	NLNU	ML	EL
		1	2	3	4	5
13. The job environment I work in allows me to use type of current technology to be productive in my work and contribute to the productivity of the organization.		○	○	○	○	○
14. The organization has the resources (budget, skilled employees, environment) to use the type of current technology to increase productivity.		○	○	○	○	○
15. To my understanding, management agrees the type of current technology on my job impacts productivity at the organization positively.		○	○	○	○	○
16. My intent to use the type of current technology on my job as needed for my work tasks and activities positively impacts organizational productivity.		○	○	○	○	○
17. Organizational productivity is improved when employees are fully trained on type of current technology.		○	○	○	○	○

18. Organizational productivity is enhanced when using the type of current technology available at my job compared to the previous technology available at my job.		○	○	○	○	○
19. Organizational productivity is improved when the type of current technology available at my job is utilized to improve business practices and decentralize decision-making processes.		○	○	○	○	○
20. Organizational productivity is improved when the type of current technology available at the job is the major reason.		○	○	○	○	○
21. Organizational productivity is increased at my job when the necessary conditions are facilitated (training, applicable work tasks and activities, motivation from management) to use type of current technology.		○	○	○	○	○
22. Organizational productivity can improve using the type of current technology available at my job.		○	○	○	○	○
23. Organizational productivity will improve when I intend to use the type of current technology available at my job on the next project I am assigned.		○	○	○	○	○

Thank you for taking the survey!

Figure 15. Survey instrument

Appendix D: IBM SPSS Output Data

The following linear regression analysis data are the outputs of employee efficiency and organizational productivity generated using IBM SPSS.

Table D1

Descriptive Statistics for Employee Efficiency Using Multiple Regression Analysis

	Mean	Std deviation	N
EE	3.930389610	.9271347454	275
CT	.80	.398	275
EXP	22.987	13.3150	275
UCT	.25	.432	275
GEN	.35	.479	275
TRAD	.01	.120	275
BB	.33	.473	275
GENX	.32	.466	275

Table D2

Model Summary[b] for Employee Efficiency Using Multiple Regression Analysis

					Change statistics					
Model	R	R square	Adjusted R square	Std error of the estimate	R square change	F change	df1	df2	Sig F change	Durbin-Watson
1	.295[a]	.087	.063	.8975519678	.087	3.623	7	267	.001	1.894

a. Predictors: (Constant), GENX, EXP, UCT, TRAD, GEN, CT, BB
b. Dependent Variable: EE

Table D3

Coefficients[a] for Employee Efficiency for Multiple Regression Analysis

						95.0% Confidence Interval for B		Correlations		
Model	Unstandardized B	Coefficients std. error	Standardized coefficients beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part
1 (Constant)	3.799	.154		24.704	.000	3.497	4.102			
CT	.408	.142	.175	2.887	.004	.130	.687	. 189	.174	.169
EXP	-.005	.007	-.073	-.776	.439	-.018	.008	-.003	-.047	-.045
UCT	-.400	.128	-.186	-3.125	.002	-.652	-.148	-.213	-.188	-.183
GEN	-.208	.117	-.106	-1.757	.080	-.436	.025	-.101	-.107	-.103
TRAD	.149	.507	.019	.293	.769	-.849	1.146	.014	.018	.017
BB	.101	.209	.052	.483	.629	-.311	.513	-.014	.030	.028
GENX	.175	.159	.088	1.105	.270	-.137	.487	.039	.067	.065

a. Dependent Variable: EE

Table D4

Descriptive Statistics for Organizational Productivity Using Multiple Regression Analysis

	Mean	Std deviation	N
OP	4.014968967	.8085587766	249
CT	.81	.395	249
EXP	22.339	13.0027	249
UCT	.25	.433	249
GEN	.34	.475	249
TRAD	.02	.126	249
BB	.32	.466	249
GENX	.31	.461	249

Table D5

Model Summary[b] for Organizational Productivity Using Multiple Regression Analysis

					Change Statistics					
Model	R	R square	Adjusted R square	Std error of the estimate	R square change	F change	df1	df2	Sig F change	Durbin-Watson
1	.364[a]	.133	.107	.7638899225	.133	5.265	7	241	.000	2.140

a. Predictors: (Constant), GENX, EXP, UCT, TRAD, GEN, CT, BB
b. Dependent Variable: OP

Table D6

Coefficients[a] for Organizational Productivity for Multiple Regression Analysis

						95.0% Confidence Interval for B		Correlations		
Model	Unstandardized B	Coefficients std. error	Standardized coefficients beta	t	Sig.	Lower bound	Upper bound	Zero-order	Partial	Part
1 (Constant)	3.706	.138		26.937	.000	3.435	3.977			
CT	.463	.127	.226	3.638	.000	.212	.714	. 261	.228	.218
EXP	-.002	.006	-.038	-.389	.698	-.014	.010	.085	-.025	-.023
UCT	-.406	.115	-.218	-3.536	.000	-.633	-.180	-.257	-.222	-.212
GEN	-.138	.106	-.081	-1.303	.194	-.346	.070	-.066	-.084	-.078
TRAD	.114	.438	.018	.259	.796	-.750	.977	.016	.017	.016
BB	.190	.186	.110	1.023	.307	-.176	.556	.056	.066	.061
GENX	.241	.143	.138	1.693	.092	-.040	.522	.065	.108	.102

a. Dependent Variable: OP

Table D7

Model Summary[d] for Employee Efficiency Using Stepwise Regression Analysis

					Change statistics					
Model	R	R square	Adjusted R square	Std error of the Estimate	R square Change	F change	df1	df2	Sig F change	Durbin-Watson
1	.213[a]	.045	.042	.907	.045	13.001	1	273	.000	
2	.267[b]	.071	.064	.897	.026	7.538	1	272	.006	1.912

a. Predictors: (Constant), UCT
b. Predictors: (Constant), UCT, CT
c. Dependent Variable: EE

Table D8

Model Summary[d] for Organizational Productivity Using Stepwise Regression Analysis

					Change Statistics					
Model	R	R square	Adjusted R square	Std error of the estimate	R square change	F change	df1	df2	Sig F change	Durbin-Watson
1	.261[a]	.068	.065	.7820243546	.068	18.115	1	247	.000	
2	.343[b]	.117	.110	.7626819716	.049	13.687	1	246	.000	2.114

a. Predictors: (Constant), CT
b. Predictors: (Constant), CT, UCT
c. Dependent Variable: OP

Table D9

Residual Statistics[a] for Employee Efficiency

	Minimum	Maximum	Mean	Std deviation	N
Predicted value	3.319633245	4.105490208	3.930389610	.2473859559	275
Std. predicted value	-2.469	.708	.000	1.000	275
Standard error of predicted value	.066	.146	.089	.030	275
Adjusted predicted value	3.289539099	4.122555733	3.930368204	.2475371232	275
Residual	-3.10549021	1.302823424	.0000000000	.8935205790	275
Std. residual	-3.463	1.453	.000	.996	275
Stud. residual	-3.472	1.465	.000	1.002	275
Deleted residual	-3.12255573	1.325003505	.0000214066	.9028152514	275
Stud. deleted residual	-3.545	1.468	-.002	1.008	275
Mahal distance	.501	6.243	1.993	2.041	275
Cook's distance	.000	.062	.003	.006	275
Centered leverage value	.002	.023	.007	.007	275

a. Dependent Variable: EE

Table D10

Residual Statistics[a] for Organizational Productivity

	Minimum	Maximum	Mean	Std Deviation	N
Predicted value	3.322230339	4.209496975	4.014968967	.2770821246	249
Std. predicted value	-2.500	.702	.000	1.000	249
Standard error of predicted value	.059	.131	.079	.027	249
Adjusted predicted value	3.287936211	4.228402138	4.014926974	.2771146164	249
Residual	-3.11858797	1.260004878	.0000000000	.7596004157	249
Std. residual	-4.089	1.652	.000	.996	249
Stud. residual	-4.101	1.672	.000	1.002	249
Deleted residual	-3.13749337	1.290877461	.0000419927	.7690600123	249
Stud. deleted residual	-4.241	1.678	.002	1.011	249
Mahal distance	.498	6.294	1.992	2.058	249
Cook's distance	.000	.085	.004	.008	249
Centered leverage value	.002	.025	.008	.008	249

a. Dependent Variable: OP

Table D11

Reliability Statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of items
.952	.953	18