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Technology Innovation Strategies Supply Chain Managers Adopt to Improve Product Marketing and Profitability

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MBA, American InterContinental University, 2012

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Information Systems Management

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Abstract

Improperly planned capital investments in new technologies could result in lost productivity for e-procurement and supply chain managers in the e-commerce industries. Grounded in the technology acceptance model, the qualitative multiple case study design was used to explore strategies business managers use to adopt technology innovations to improve product marketing and profitability. Participants were five supply chain business managers and owners from five separate organizations in the southwestern region of the United States. Data were collected via responses submitted through Google Forms and emails, written logs, telephone calls, and recorded audio. Thematic analysis resulted in two key themes: perceived ease of use and perceived usefulness. A key recommendation is implementing strategies that involve agile and lean thinking processes, artificial intelligence, and automation. Implications for positive social change include the potential to improve the customer experience while contributing to a sustainable environment.

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Dedication

I want to dedicate this doctoral study to my wife Lucy and my daughter Alejandra. They continued to push me forward throughout one of the most challenging efforts I have ever overcome. I love you both very much. I also want to dedicate this to my mother and father, who can now say that they have a son who is a doctor. I love you both. I also want to recognize my brothers Peter and Wesley, who I have always looked up to and who have been an inspiration to me throughout life.

Acknowledgments

I want to acknowledge several individuals who were exponential in ensuring the completion of my doctorate. First and foremost, my wife and daughter and my entire family: Dr. Gregory Uche, who has been like a second father to me; Dr. Sylnovia Merchant, who has been an integral part of my successful completion of this study; Dr. Judith Blando, who made me a better writer, Dr. Irene Williams, who took on a tremendous amount of tasks to see me through to the end of my study, and Dr. Donald Buresh who co-authored with me, and has taught me so much about publishing, as well as every one of my course instructors who put me to task and made me a better educator. As a wounded veteran of the U.S. Marine Corps, this doctoral study has been one of the most challenging and rewarding efforts I have ever taken on, and I will never forget where I came from and where I am now. Please believe me when I say I am grateful to all of you.

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Section 1: Foundation of the Study

The objective of this qualitative exploratory multiple case study was to explore the external variables that influence information technology adoption and implementation in supply chain management organizations, as well as subjective norms associated with decisions made by leadership within these organizations. The research results associated with this study identified potential risks and provides a methodology for supply chain management leaders to make appropriate information technology implementation decisions based on increasing productivity and addressing potential behavioral gaps that the technology may cause based on the independent variables of the study which are perceived usefulness and perceived ease of use. The outcomes of this study will allow leaders and managers within supply chain management organizations to make more in-depth technology adoption and implementation decisions to improve product marketing and increase profitability. This study was conducted through use of the Technology Acceptance Model (TAM) and the variables perceived ease of use (PEOU) and perceived usefulness (PU).

Background of the Problem

Human resistance to change compiled with the implementation of new technology can lead to an organization failing in its endeavors, causing substantial monetary and human capital losses (Althuizen, 2018). The technology acceptance model (TAM) has been the subject of numerous studies, some of which resulted in extending the TAM (Bauer et al., 2005). Acceptance and adoption of technology within technology research are used in the same context, but they are inherently different, and extended TAM models

are still being developed under the classical TAM methodology and incorporation of other variables into the TAM can exponentially enhance the TAM (Brandon-Jones & Kauppi, 2018; Li, Qi, & Shu, 2008). The TAM identifies the use and implementation of technology into an organization, as well as user satisfaction associated with the newly implemented technology (Bayraktaroglu et al., 2019). The objective of this study is to expand upon supply chain management and how the TAM can be used to identify information technology use effectiveness within global supply chain organizations that specialize in e-commerce. The TAM is most proposed as a cognitive framework, in which one perceives the use of a particular technology about both ease of use and usefulness of the technology may have a direct impact on an individual's intended use of that technology (Brandon-Jones & Kauppi, 2018).

Three propositions were identified during Althuizen's research. Segmented data showed numerous differences in attitudes, intentions, and behavior compared to non-segment data related to an average individual (Althuizen, 2018). The second proposition identified that the related importance of technology acceptance and its associated segments differed exponentially from the models' known parameters and helped to identify the items from the segments that will effectively leverage a change in attitude, intentions, and behavior with the TAM (Althuizen, 2018). Lastly, in the empirical illustration, the created segments did not differ much from people related variables, except in the case of the Big Five personality traits comparison (Althuizen, 2018; Laumer, Maier, Eckhardt, & Weitzel, 2016).

Problem Statement

Improperly planned capital investments in new technologies could result in lost productivity for e-procurement and supply chain managers in the e-commerce industries (Brandon-Jones & Kauppi, 2018, pp.22-23). Impulse-related e-commerce transactions within the United States average $5,400 per year per American consumer and are directly related to online technologies that implement innovation which provides the consumer with an ease of use of the technology to complete their transaction (Farah & Ramadan, 2020, p.1). The general business problem is that business organizations and their managers have failed to align business operations' processes with the strategic choice to effectively implement new technology transfers. The specific business problem is that some supply chain business managers lack strategies for adopting information technology to improve product marketing and profitability.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies business managers use to adopt technology innovations to improve product marketing and profitability. The population of this study consisted of 5 supply chain business managers located within the Southwestern region of the United States who have been successful and have significant operational and business experience in supply chain management processes implementing technology and processes in addressing business problems within large scale organizations. The implications for positive social change include better selection of technology, which could reduce internal costs and further contribute to a sustainable environment. This may create additional employment

opportunities within the organization, and expansions throughout the region, which could result in additional employment opportunities at newly established businesses.

Nature of the Study

Qualitative, quantitative, and mixed-methods approaches are the three methods researchers use as a proper means of conducting research (Kansteiner & König, 2020). The qualitative methodology was used for this study. Qualitative research takes a humanistic or idealistic approach to exploring a phenomenon and can lead to an empathetic relationship between the researcher and the participants (Gomes & Duarte, 2020). Quantitative research requires hypothesis testing of variables to identify the relationship between the variables and research questions (Yin, 2018). The quantitative method was not appropriate for this study because the objective of the study is not to examine relationships of variables, or group differences. A mixed method researcher uses a combination of qualitative and quantitative data collection and analysis to enrich the general findings of a study (Bester, Moll, & Simons, 2017). The mixed methods approach was not appropriate for this study since the objective of this study is not to collect and analyze empirical data for examining variables' characteristics or relationships. The qualitative method was appropriate for my study because the objective is to explore innovative technology strategies supply chain management leaders use to increase their marketing and profitability capabilities.

Qualitative researchers typically use the following designs: Phenomenological, ethnographic, narrative, and case study. Researchers use the phenomenological design to conduct empirical studies understand the lived personal experiences of individuals, and

the phenomenological design was not suitable for this study. Ethnographic researchers investigate cultural beliefs, values and evaluate their interactions with their research subject groups (Ryan, 2017). The ethnographic design was not appropriate for this study because the objective of this study is not to understand the cultural beliefs of one or more groups of people.

The narrative design is used when researchers want to focus on individuals telling their life stories to draw a conclusion based upon the individuals' visual aspects, history, biographical information, as well their personal human experiences in a manner that lays out their own personal story (Ford, 2020). Because I did not intend to obtain information related to a participants' personal histories, I did not select the narrative design. Researchers use the case study design to conduct social sciences research (Chandra & Shang, 2017; Dixon-Woods et al., 2020; Montes-Rodríguez et al., 2019). The multiple case study design is appropriate to explore and compare the technology innovation strategies that supply chain managers use to improve product marketing and increase profitability. Using the multiple case study design, I explored the experiences of several supply chain business managers to understand what IT strategies helped them to improve product marketing and increase profitability. The ability to produce more realistic data related results based on multiple participants in the study, is expected to lead to stronger research outcomes (Yin, 2018, p. 60).

Research Question

What technology innovation strategies do supply chain managers use to adopt information technology to improve product marketing and profitability?

Interview Questions

1. What technology innovation strategies do you use as a supply chain manager to improve product marketing?
2. What fundamental challenges have you encountered using technology to market products?
3. How did you overcome challenges when marketing products using technology innovation strategies?
4. What innovative technology strategies do you use as a supply chain manager to increase profitability?
5. What challenges have you encountered when using technology innovation strategies to increase profitability?
6. How did you overcome challenges when increasing profitability using technology innovation strategies?
7. What information technology strategies have you integrated into your supply chain management processes to increase profitability?
8. What additional information can you provide about the technology strategies you use to improve product marketing and productivity?

Conceptual Framework

TAM was the composite conceptual framework for the proposed study. Davis (1986) developed the TAM, which was derived from the theory of reasoned action (TRA). The TAM is primarily based upon the user experience, with the constructs of perceived ease of use and perceived usefulness (Sagnier et al., 2020). Tenets of the

technology acceptance model are perceived ease of use (PEOU) and perceived usefulness (PU). Davis et al., (1989) identified that information technology researchers are better suited to achieve results when using intentions models to understand user acceptance or rejection of technology better. Researchers identified the need to measure behavioral users' intentions, perceived usefulness, and perceived ease of use when implementing technology (Ajzen & Fishbein, 1980; Sarver, 1983). Numerous researchers further reinforced the viability of the TAM in accurately identifying users' acceptance and use of technology (Lah et al., 2020). Leaders can integrate technology in a manner that is in line with their business model using the TAM and extending the TAM to further enhance business capabilities. This may enhance the development and implementation of technology innovation strategies that can improve product marketing and profitability within supply chain management organizations.

Operational Definitions

Agile: Businesses and incorporate organizational structures, relative technology, logistical processes, and share like-minded ideas, while simultaneously being flexible (Christopher, 2000).

Blockchain: A digitally distributed and non-centralized shared database that contains records that work on a shared network (Nawaz & Thowfeek, 2020).

E-commerce: The sale or purchase of a product or service that benefits a person, private entity, government organization, or business, and the transaction is processed via an electronic method on a computerized system that is connected to the internet (Dahbi & Benmoussa, 2019).

Grey modeling forecasting: A method for studying datasets that are uncertain and small in size to predict a return quantity (Ene, & Öztürk, 2017).

Innovation Strategies: Strategic methods of exploiting an organizations internal capability while exploring external capabilities to create opportunities that could benefit the organization (Ali, 2021).

Lean thinking: An organizations ability to do more with less while delivering products just on time (Christopher, 2000).

Supply chain management: The ability to manage customer and supplier relationships, as well as collaboration programs while creating a cross-functional environment that is driven by the dependency of managing customer and supplier relationships, and related collaboration programs, with results being improving organizations performance over time while benefiting all members involved (Benseddik, 2019).

Technology acceptance: How an individual or organization embraces technology based upon a particular technology PEOU and PU to the end-user (Yang & Shih, 2020).

Technology implementation: The process of adding a specific technology into an organization while considering a pre-implementation and post-implementation framework that successfully sustains newly integrated technology (Bhise & Sunnapwar, 2019).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are believed to be another individual's perceived reality of a particular philosophy related to being in a specific social category and their understanding and knowledge of social reality (AbuRaya & Gomaa, 2020). One assumption of this study is that the responses from the participants will be appropriate and provided in an honest manner and is relative to technology and supply chain management processes. An additional assumption is that the number of participants sampled can articulate their responses in a truly rich manner that accurately addresses the interview question. I assumed that the implementation of multiple case study research design is the most appropriate method to explore technology innovation strategies that supply chain managers use for adopting information technology to improve product marketing and profitability. I assumed that the sample data obtained accurately depicts and presents a truly viable representation of the technology innovation strategies supply chain managers use to improve product marketing profitability based upon their decision to adopt technologies that enhance their organizations.

Limitations

The limitations of a study may be derived from a misinterpretation of the theory being applied in an incorrect manner that conflicts with the framework being used (Harari & Lee, 2021). This study has five limitations. The first limitation is that only five supply chain managers will be selected for this study, which could hinder the findings as they will not accurately represent the larger United States supply chain manager population.

Second, the participants may not truly articulate their real-life experiences not being at ease and comfortable with the questions being presented because of a potential impact on the organization they support. The educational background and experience may not be a true representation of the United States supply chain manager population in areas such as age, gender, level of education, years of experience in supply chain management and technology, as well as business acumen. Supply chain managers may not truly understand the impact of the study and may provide generic responses to the interview questions. The last limitation is that the supply chain managers understand that the study could significantly impact their organization and may not be willing to provide truly rich responses based upon internal policies and procedures that could jeopardize their positions within their respective organizations.

Delimitations

When researching a particular phenomenon, the researcher must be willing to identify delimitations to establish a framework that provides quality research findings and provides the audience with the appropriate data and conclusions to justify why a particular method was not implemented over another (Theofanidis & Fountouki, 2018). Delimitations are the boundaries the author imposes upon themselves willingly, and which explains the author's reasoning behind not producing a product in a particular manner (Theofanidis & Fountouki, 2018). The first delimitation of this study is that no specific technology generic to the organizations that the supply chain managers support is being evaluated that could improve product marketing and profitability within the United States. Another delimitation of this study is that all participants of the study are from the

United States, and the results of the study may not be relative to other supply chain managers outside of the United States.

Significance of the Study

Contribution to Business Practice

Technology innovation strategies supply chain managers adopt to improve product marketing and profitability are not entirely dependent just technology, but also on the individuals within the organization who use the technology to further grow and sustains their businesses. Leaders within organizations should seek to increase technology adoption and acceptance in a strategic and responsible manner when implementing new technologies to further increase profitability and reduce employer turnover within their organizations (Sharma, 2019). This study is potentially significant to improving organizations' business practices by improving means to properly implement technology into an organization business processes for ensuring a positive impact to employee work performance by mitigating the potential rejection of the technology. The case study findings can help guide and provide leaders of organizations with means to prevent employee turnover because of adoption and implementation of new technology that is being considered by decision-makers. Appropriate strategic technology selection and implementation into the organization by considering how digitization can affect employee adoption of the technology, could increase employee productivity, reduce employee turnover, and provide enhancements to the organizations' business processes (Matzler et al., 2018).

Implications for Social Change

The implication for positive social change from this study include ensuring the technology implemented by decision-makers in the supply chain management business lines are also taking into account human behavior. The results of this study could contribute to positive social change by helping supply chain business managers to reduce employee turnover, increase workforce, a reduction in unemployment claims, and decrease in homelessness. Expansion of the organization because of increased profits could further enhance employment opportunities, create new jobs, and assist in providing social amenities to communities.

A Review of the Professional and Academic Literature

The objective of this qualitative exploratory multiple case study was to explore the external variables that influence information technology adoption and implementation in supply chain management organizations and subjective norms associated with decisions made by leadership within these organizations. The existence of human resistance to change topped with the implementation of new technology can lead to an organization failing in its endeavors, causing substantial monetary and human capital losses (Althuizen, 2018). Many scholars have used the technology acceptance model (TAM) to measure conduct goals and social influences to identify supply chain organizations and the trust levels of technologies implemented (Nawaz & Thowfeek, 2020). Transparency measurements based upon behavioral intent while implementing the TAM were initiated, with behavioral intent showing a significant influence and

correlation about whether or not the adoption of certain technologies within supply chain management (SCM) should be adopted (Nawaz & Thowfeek, 2020).

The literature review for this study consists of an in-depth review of both professional and academic resources that supports the ability to answer the research question: What technology innovation strategies do supply chain managers use to adopt information technology to improve product marketing and profitability? I explored numerous professional and academic articles, peer-reviewed journals, scholarly publications related to the technology acceptance model, supply chain management, innovation, and e-commerce, which are the primary themes for this study. I initiated the literature review with a critical analysis of the conceptual framework, the technology acceptance model, followed by a review of related theories to the conceptual framework. Other theories and methods identified how the technology acceptance model's enhancement can further improve an organization's acceptance or rejection of technology, using the TAM to determine the appropriate technologies before implementing a particular technology. The literature review concludes with extensive analysis and explanations of how the technology acceptance model can enhance supply chain management organizations' successful technology implementation.

Search Strategy

For this literature review, I have implemented academic and professional sources such as Walden University Library and electronic dissertation database, Business Source Premier, ProQuest, ABI/INFORM, EBSCOhost, Science Direct, Open Access Pub, Google Scholar, and Sage Publication. My search keywords include *technology,*

technology acceptance, model, behavior, perceived ease, perceived usefulness, supply chain, planned behavior, global supply chain management, policy deployment, agile, and lean thinking.

Table 1 *Summary of Literature Review Sources*

Reference Type	<5 Years	>5 Years	Total
Peer-reviewed Journals	106	16	122
Dissertations	2	1	3
Non-peer reviewed Journals	0	0	0
Books	2	1	3
Government or Corporate Sites	1	0	1
Total	111	18	128

The sources for the literature review resources are comprised of 128 references, which consist of 120 peer-reviewed journals, 3 dissertations, no non-peer-reviewed journals, 3 books, 1 government and no corporate sites. 87% of the sources used for this literature review are within 5 years of my doctoral research study's expected approval dates.

The literature review begins with a discussion of the theoretical framework. I presented a review of related and contrasting literature, including the following themes: (a) critical analysis of the conceptual framework- technology acceptance model) for the study, (b) critical analysis of related and contrasting theories to the conceptual framework of the study- unified theory of acceptance and use of technology, innovation, adoption theory, theory of augmentation, social choice theory, diffusion of innovation, virus theory, strategic contingency theory, contingency theory, structural contingency theory, strategic choice theory, uncertainty theory, rough set theory, institutional theory, prospect

theory, supply chain management theory, lean thinking, agile supply chain management, theory of constraints, research training environment theory, resource-based theory, systems theory, diffusion theory, grounded theory, and stakeholder theory., (c) analysis of various business leadership strategies, and (d) analysis of business sustainability in the context of supply chain management organizations and technologies relationships to the organizations. I used the technology acceptance model as the conceptual framework for this study to analyze and explain in detail various researchers' perspectives on leadership strategies for supply chain management organizations to make strategic decisions to ensure sustainability.

Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Davis in 1986 and has been a subject of extensive research for over 40 years (Brandon-Jones & Kauppi, 2018; Dziak, 2017). The TAM implements the variables perceived ease of use (PEOU) and perceived usefulness (PU) and identifies users of technology attitude toward using (AT) and behavioral intent (BI) responses based upon the technology being used (Hong & Yu, 2018). Davis et al., (1989) further enhanced the Technology Acceptance Model based on Davis's original research. Taylor (2018) identified that potential effects on the use of technology could influence an organization existing culture and may cause the organizations structure to change significantly based upon how the technology drives the organizations goals.

The Technology Acceptance Model is a theory that is used to justify the implementation of new technology into an organization in a successful fashion, without

interrupting organizations' profits or disrupting human production (Dziak, 2017). The TAM has been expanded continuously over the decades because of ever-growing and rapidly changing technologies implemented into organizations and individuals' lives (Bayraktaroglu, et al., 2019). As human beings become more dependent on technology, rejection or acceptance of the technology is detrimental to an organization's ongoing success in providing products to the population it markets to (Sonia & Eric, 2013). Having a better understanding of technology and its relation to the human factor is what the TAM supports. Quantitative and qualitative research has shown that when TAM is implemented within organizations, the human factor and its acceptance or rejection of technology seems to be the most common finding (Wirtz et al., 2006).

The TAM can be used to determine the use and implementation of technology into an organization, as well as user satisfaction associated with the newly implemented technology (Bayraktaroglu et al., 2019). The objective of this study is to explore the strategies business managers use to adopt technology innovations to improve product marketing and profitability. The TAM is most proposed as a cognitive framework, in which one perceives the use of a particular technology about both ease of use and usefulness of the technology may have a direct influence on an individual's intended use of that technology (Brandon-Jones & Kauppi, 2018).

Three propositions were identified during Althuizen's research on the technology acceptance model (Althuizen, 2018). Segmented data showed numerous differences in attitudes, intentions, and behavior compared to non-segment data related to an average individual (Althuizen, 2018). The second proposition identified that the related

importance of technology acceptance and its associated segments differed exponentially from the model known parameters and helped identify the items from the segments that will effectively leverage a change in attitude, intentions, and behavior TAM (Althuizen, 2018). The third proposition identified that in the empirical illustration, the created segments did not differ much at all from people-related variables, except in the case of the Big Five personality traits comparison (Althuizen, 2018; Laumer, Maier, Eckhardt, & Weitzel, 2016).

A known issue is that human resistance to change topped with the implementation of new technology can lead to an organization failing in its endeavors, causing substantial monetary and human capital losses (Althuizen, 2018). The intent is to use the TAM framework to further strengthen my research findings on TAM. The ability to determine how AT (Attitude Toward) and BI (Behavioral Intention) can assist in enhancing the TAM and global supply chain management for proper implementation of technology is believed to be relevant. I will explore the experiences of several supply chain business managers to understand what IT strategies helped them to improve product marketing and increase profitability.

Related and Contrasting Theories to TAM

The Technology Acceptance Model (TAM) is the conceptual framework for this study. I will be discussing the unified theory of acceptance and use of technology, technology acceptance model, policy deployment theory, theory of reasoned action, and theory of planned behavior as related and contrasting theories to the technology

acceptance model. An understanding of the TAM and how it relates to human behavior and acceptance, or rejection of technology is the foundation of the TAM.

Theory of Planned Behavior

Icek Ajzen (2011) who created the theory of planned behavior (TPB) believes that since TPB inception in 1986, TPB has become a widely studied and effective methods for predicting human behavior. TPB is very similar to TRA. TPB is a method to predict behavior given a situation, whereas TRA focuses on the behavior to develop methods for predictive measures and controls. The TAM was also created from TRA and is a relating and contrasting theory to both TRA and TPB in that the TAM, like TRA and TPB, measures human behavior.

TRA is used by researchers to develop strategies to prevent specific behavior, and TPB predicts behavior based on an individuals beliefs (Ajzen, 2011). These beliefs are not based on a particular religion or ideology. They are an over encompassing group of particular behaviors that individuals display. It could be a religious or ideological means for a behavior, but it could also be an individuals lifestyle, such as drinking alcohol, smoking cigarettes, or using illicit drugs, or sexual lifestyle. The behavior is predicted based on assumptions of an individuals intent to perform a particular behavior and known behavioral controls. Crook et al., (2016) study on the internet and technology explained that those who do have access to the internet and technology were more likely to participate in online health learning and would most likely have a higher health understanding of healthcare and how it could benefit them individually. Additional research was suggested on what influences an individual to share their intricate healthcare

information, which could further identify their behavioral intentions toward technology and information sharing to enhance predictions of an individual's intent to share or deny personal medical information (Crook et al., 2016). The study incorporates the theory of planned behavior (TPB) as an extension to research, which is a derivative of the TAM (Crook et al., 2016; Lee & Kim, 2020; Procter et al., 2019).

Unified Theory of Acceptance and Use of Technology

Liao and Chen (2020) research on the Unified Theory of Acceptance and Use of Technology (UTAUT) identified that user's acceptance of mobile smart wearable technology revealed potential strategies that marketing organizations could use to increase their customer base. Liao and Chen's research also identified that the TAM could be extended to incorporate decision-making and trial evaluation laboratory (DEMATEL) applications to enhance the TAM further to determine the effects of external variables to advance Information Technology (IT) further decision-making processes. Liao and Chen extension of the TAM using the UTAUT model identified two new variables: social influence and facilitating conditions. It should be noted that the study had a limited sample size and could cause reliability issues with the data and that the DEMATEL incorporates more subject matter experts into future studies (Liao & Chen, 2020).

Research conduct on the Internet of Things (IoT) which incorporated the TAM, TRA, and UTAUT, showed that industries' implementation of IoT has become the most prevalent form of research to determine how organizations conduct construction operations (Chen et al., 2020). The study was conducted quantitatively and extended the

technology acceptance model, as well as the theory of reasoned action, but further extended the TAM by incorporating the theory of planned behavior. The TAM was birthed from the theory of reasoned action (TRA), and the theory of planned behavior (TPB) was also created from TRA (Hahn & Popan, 2018). The study incorporates numerous factors based upon behavior. The conclusion of the study identified that users' acceptance of technology is based upon the influence of the user's willingness to accept technology based upon the variables expectancy, effort expectancy, and social impact (Chen et al., 2020).

Özsungur (2020) study focused on the effects between aging and mobile internet use and how its acceptance influencess human behavior using the unified theory of acceptance and use of technology (UTAUT) identified how that technology could influence one's behavior. The study was focused on job satisfaction, organizational commitment, improvements in health status, deterioration of finances, and situation according to current conditions, which could influence an elder's decision to continue to work at a specific employer vice retiring or leaving the workplace (Özsungur, 2020). The study results identified that successful aging influenced mobile internet acceptance in the workplace, but behavioral intent and use behavior presented no significant effects (Özsungur, 2020).

Doan (2020) research discussed the factors that influence individuals within the country of Vietnam to purchase online products. Doan used the Unified Theory of Acceptance and Use of Technology (UTAUT) and was the first of its kind according to the author, which was used to measure the factors that determine the intent to purchase

online within the country of Vietnam (Doan, 2020). Adoption of UTAUT identified that additional research is suggested on users' behavioral intentions regarding adoption of online purchases, which could affect an organization profit margins in a positive manner (Doan, 2020).

Darsono's (2005) research findings indicates that TAM is a methodology used to measure users' behavior when determining acceptance or rejection of technology. The TAM provides a method to determine how technology's external factors will directly influence an organization's business goals. Darsono (2005) states that implementing the theory of planned behavior in conjunction with the TAM can be disadvantageous. TPB is like the TAM but takes away from the focus of technology. TPB focuses on behavior only, whereas the TAM focuses on acceptance or rejection of technology. The TAM can be geared toward a specific technology based on an organization's primary industry.

Healthcare industries use the TAM while also extending the TAM toward the healthcare industry requirements to determine how older patients planned behavior toward technology could be identified based upon newly implemented technology under the patients' control. Middlemass et al., (2017) research demonstrated how the health information technology acceptance model (HITAM), which is an extension of the TAM benefits the healthcare industry to determine user acceptance or rejection of home-based monitoring systems, while also identifying planned behavior toward technology. They incorporated the HITAM into a pilot study to further build upon their qualitative case study, and their findings determined that older people did not readily accept the new home-based medical monitoring systems. The data prevented the healthcare industry

from conducting mass spending on a technology that was primarily used by older adults, which could have resulted in a severe business cost and extensive loss of revenue. The TAM can be modified to the organization's goals, and accounting for the human behavioral factor is imperative in ensuring the organization's ongoing success.

Theory of Reasoned Action

The theory of reasoned action (TRA) was created by Martin Fishbein and Icek Ajzen in 1975, but formally defined in 1980 (Goldenberg D & Laschinger H, 1991). TRA measures whether the intention to engage in a particular behavior is the most accurate predictor based upon an individual's attitude and the associated subjective norms and will that individual engage in that behavior (Gellman and Turner, 2013). TRA has also been used extensively in e-commerce related studies (Susanty et al., 2020).

Several empirical research articles on the theory of reasoned action were very extensive and focused on developing a model that could measure consumer confidence (Bauer et al., 2005; He & King, 2006). The empirical research focused on TRA and developing a model that could measure consumer confidence took place using (TRA). Upon reading the research further, the TAM findings were based on the technology portion of the abstract, even though the TAM was based around TRA. Again, the structural equation model's topic came up, which resonates with my incorporating that model into my prospectus. Bauer et al., (2005) conducted an empirical test of the consumer acceptance of the mobile marketing model, which was based upon TRA. The end results proved the validity of TRA as being the correct approach for the development of consumer acceptance of mobile marketing model and were able to determine risks

associated with the acceptance of the technology (Bauer et al., 2005). It is believed that implementing the TAM to begin with would have alleviated much of the extra work that the researchers put into the study, as it would have simplified the variables in question.

The Hedges and Olkin technique is a commonly used method for meta-analysis in management, applied psychology, and related fields (Aguinis et al., 2008). He and King (2006) conducted a meta-analysis implementing the Hedges and Olkin technique in their attempt to analyze the Technology Acceptance Model and its use in various industries and fields. Meta-analysis is a means of gathering research from other quantitative research studies' empirical data in order to view the nature of the research's general properties (He & King, 2006). He and King study also discussed behavioral intention (BI), which relates to the Theory of Reasoned Action. The study consisted of a correlation analysis comparing the variables of perceived ease of use, perceived usefulness, behavioral intention, and attitude from previous research. The researchers took the findings and measured perceived ease of use against the behavioral intention, perceived usefulness against the behavioral intention, and perceived ease of use against perceived usefulness.

He and King (2006) results were significant but dictated that there were some correlations between one of the variables that were in question. Based on the findings, the predictor variable was identified as being perceived usefulness in their study, with the behavioral intention being most influenced by perceived usefulness (He & King, 2006). The end results further reinforce that the TAM is still a compelling and beneficial

methodology regarding identification of perceived ease of use, perceived usefulness, and behavioral intention findings within studies.

Policy Deployment

The extension of the TAM has provided researchers with the opportunity to identify additional results by improving the TAM (Sagnier et al., 2020). Policy deployment is a model for facilitating the strategies' adoption and acceptance through specific economic incentives for catalyzing the strategies successful adoption (Nuñez-Jimenez et al., 2020). Policy deployment or "Hoshin Kanri" in Japanese terms is a blending version of Joseph Duran's and Edward Deming's total quality management systems (Lee & Dale, 1998). Policy deployment is related to the TAM, in that technology is evaluated but also quality management processes are taken into consideration. The extended TAM augmented with policy deployment composite conceptual framework because both can increase the perceived and actual usefulness of the technology being implemented (Amoako-Gyampah, 2007; Nuñez-Jimenez et al., 2020).

Global Supply Chain Management and the TAM

Rapciewicz and Buresh (2021) stated that the use of technology could reduce American's dependency on foreign suppliers. The technology acceptance model could enhance supply chain organizations' abilities to remove the dependency upon foreign-made products (Rapciewicz et al., 2021). Appropriate technology to be implemented into supply chain organizations should first be reviewed for acceptance by organizational leadership and the end-users as well. The technology acceptance model can be extended to enhance an organization's capabilities to achieve the appropriate supply chain

management strategies (Rapciewicz et al., 2021). Williams et al., (2017) research on customer relationship management and e-commerce technology acceptance (CRM) opined that business-two-business (B2B) were influenced exponentially based upon CRM, which influenced partnership relationships (Williams et al., 2017).

The literature review revealed that the factors of customer selection, customer relationship orientation, type of technology, and channel governance (contracts and relationships), concluded how CRM effectively influenced the organization. The study provides a conceptual framework, which consists of the five variables to be used as additional theory development that may be implemented into organizations that have outside resources to sustain the organization's innovative capabilities using technology. Those variables are channel governance, transaction costs, customer selection, channel power, and dynamic abilities, which can be used to extend the contingency theory to enhance an organization's CRM (Williams et al., 2017).The potential to incorporate the TAM by extending the TAM using contingency theory and using the variables customer selection, customer relationship orientation, type of technology, and channel governance (contracts and relationships) is prevalent, and could enhance an organizations CRM.

McNamara and Sepasgozar (2017) conducted a qualitative study conducted into the relationship of the construction industry and supply chain management using the technology acceptance model (TAM) which identified the need to evaluate intelligent contracts (iContracts) related to the construction industry, with findings resulting in an extended TAM being created. The extended TAM model was referred to as iCAM (iContract Acceptance Model) and allowing digital forecasting prediction improvements

to enhance construction projects-related processes. In the research, a discussion of building information modeling (BIM) determined that BIM is known in the construction industry as what is referred to in the information technology realm as "digital innovation" (McNamara & Sepasgozar, 2020). The variables perceived ease of use and perceived usefulness from the TAM were extended to include the variables intention to use and use behavior.

Sayilar (2016) research on structural contingency theory (SCT) identified SCT as a proposal to define an organization as being a rationale transparent object, as well as a social phenomenon. SCT was created in the early 1960s and is focused on practitioners and academic organizations specializing in business-oriented processes (Ellis et al., 2002). SCT is still viewed by many within the supply chain management organization as a viable managerial tool and is derived from the contingency theory (Ellis et al., 2002). SCT identified that organizations are defined by identified factors and are still limited to scientific rules (Sayilar, 2016). SCT's goal is based upon the reasoning that an organization's structure is built upon the premise of sociological terms which is commonplace within supply chain management organizations. The three variables associated with SCT are environment, uncertainty, and technology.

The potential to incorporate SCT into the TAM via extending the TAM to incorporate associated variables with environment, uncertainty and technology is prevalent. The conclusion of the study determined that SCT was best suited for large organizations and public institutions. This includes academic organizations as well as industrial organizations. This further reinforces incorporating CST into the TAM. SCT is

a positivist, deterministic, prescriptive, and functionalist view and is used to lay out an organization's technical capabilities and define the organization's tangible products, and the TAM can narrow down variables associated with an organizations technical capabilities (Sayilar, 2016). Savilar goes on to discuss Thompsons's, Woodward's, and Perrow's models, which are focused on technology and how they relate to an organizations characteristics and the type of technology usually implemented (Sayilar, 2016). Supply chain collaboration (SCC) can be beneficial for both large and small organizations with the appropriate technology being implemented, in that an organizations structure should not be limited to performance and disruption-based metrics to determine a firms place within their specific business line, and SCC should be considered when implementing contingency theories (Zhu et al., 2017).

Sayilar (2016) determined that SCT significantly influenced both large and small businesses because of its ability to identify assumptions, develop research questions, and create concepts. Structural contingency theory (SCT) can be broken down into the three variables of environment, technology, and uncertainty and are directly related to organizational structure, in which they produce a fundamental structure, and their opposites create a mechanistic environment (Ellis et al., 2002). The TAM focuses on perceived ease of use and perceived usefulness and incorporating the SCT variables into the TAM could enhance the organizations capabilities. Ellis et al., (2002) conducted research via an empirical review of numerous pieces of literature based upon SCT. The findings are geared primarily toward critical thinking and decisions, with the researchers proposing a continuous extension of SCT with other theories to improve its influence

within business organizations vastly. Technology was identified as an important variable within nearly all the literature review items.

Nair et al., (2020) research on economic recession, in which the authors employed the contingency theory, determined that operational processes and strategies interact with uncertainty in direct relation to the variables cost influence, quality, deliverables, and the ability to be flexible during a performance. The TAM measures perceived ease of use and perceived usefulness and could be extended by incorporating the technologies associated with operational processes, existing organizational strategies, and performance flexibility. The research relates to corporate operations and supply chain management processes and is based upon the literature review. Technology was extensively identified in nearly all the literature review and the association of implementation of processing technologies within SCM organizations (Nair et al., 2020) .

The research class for enhanced investment in process capabilities to identify resource requirements should be considered, as well as adequate technologies to support those processes. This leads to an advancement in Total Quality Management (TQM) programs that fits the organization's business model (Nair et al., 2020). Numerous control (Dummy) variables were used to fill gaps in the model used, which has been identified as an extended version of the contingency theory. The variable environmental uncertainty (EU) was considered the most volatile and unstable variable that requires additional research prior to implementing the contingency theory based upon the organization's proposed operational method. Incorporation of the TAM variables PEOU and PU could alleviate some of the volatility associated with uncertainty. Madhani (2016) identified

that competition between firms no longer exists but has risen to the level that competition is between entire supply chain systems, and the importance of quality management and Six Sigma processes, as well as implementation of the appropriate technologies are detrimental to a supply chain management organizations success.

While conducting research of using the diffusion of innovation theory, systems theory, which is related to technology, was also reviewed, with the findings identifying a significant enhancement of diffusion theory (Wang & Sun, 2019). The study focused on heterogeneity, absorption ability, and technology diffusion performance within firms and their ability to overcome absorption capacity related to human capital and technology and decision-making. Systems theory is based on technology and organizational behavior and how the organization reacts, adjusts, and obtains balance again to the changes made from external and internal sources (Touson et al., 2021). Extension of the TAM using systems theory of diffusion of innovation theory could enhance organizations supply chain management capabilities. The results present an opportunity for organizations to implement technologies and policies that can enhance innovation diffusion goals.

Florkowski and Olivas-Luján (2016) examined how decisions revolving around Human Resource (HR) influences while making strategic decisions for an organization can affect uncertainty and centrality and have a significant positive influence on organizations' strategic decision-making processes. Their research was conducted in a mixed-methods manner implementing the strategic contingency theory (SCT) but extending it using the institutional theory (IT). The TAM has been extended numerous times using institutional theory, with the results identifying that institutions do have a

direct influence on the types of technology being implemented, which in many cases result in inadequate and inappropriate technologies being implemented (Kang et al., 2021). Carr (2016) explained that the efficiency and effectiveness of supply chain management organizations are dependent upon their ability to increase the presence of IT (Information Technology) and strategic partnerships. Transaction cost theory (TCT) and resource dependency theory (RDT) determined that outsourcing technology services could free up time for an organizations employee's to enhance their core competencies, but increased costs in the areas of writing, monitoring, and enforcing contractual requirements, and could lead to further uncertainty concerns for future efforts (Mwai et al., 2014).

Concerns regarding resource-based view (RBV) and resource dependency theory (RDT) could potentially enhance an organization's ability to operate in a highly efficient cross-functional environment, this further streamlining numerous processes (Mwai et al., 2014). Understanding supply chain management organizations and their performance outcomes could be determined by implementing appropriate communications methods (Carr, 2016). The technology could fill gaps in ensuring the proper communication methods are implemented. Osorio-Londoño et al., (2019) performed a quantitative study, using both the grounded theory as well as the strategic contingency theory, and produced strategic applications for organizational management practices that could enhance an organizations capability using technology specific solutions.

Zhang et al., (2018) research using the stakeholder theory, as well as the contingency theory, explained how the theories can be used to gauge how resources were

viewed within an organization's business model to determine environmentally friendly innovation and further organizational sustainment feasibility. Surveys were used to collect data, and the study concluded that these practices could enhance an organization's ability to sustain green-based innovative operations (Zhang et al., 2018). Extension of the TAM using stakeholder theory and contingency theory is not uncommon (Venkatesh & Davis, 2000). The research was conducted in China, with the research concluding that this presents a limitation to their research findings but does identify that research conducted in other countries about green innovation should incorporate the enterprise factors into their research to determine the appropriate model necessary to ensure data integrity in the findings (Zhang et al., 2018). Based on the new model, the researchers suggested incorporating other countries' specific enterprise factors into the model seemed feasible to capture appropriate data metrics and technology factors (Zhang et al., 2018). Freudenreich et al., (2020) opined those stakeholders are not just individuals sitting on the side waiting for outsiders to create process that lead to products of value, but the stakeholders themselves are creators, co-creators, and recipients of the value creation processes.

Technology Innovation Strategies

Continuous improvement (CI) allows organizations to expand on current processes to improve them, ensuring an organization's ability to reduce costs and wasteful spending (Jurburg et al., 2017). Implementation of technologies related to innovation designing products could prevent fraud, waste, and abuse. Jurburg et al., (2017) discussed a phenomenon that demonstrates the gaps between the exponential benefits of CI, and the

resistance presented by individuals within the organization trying to implement CI. Human behavior is the primary topic of study, with the technology acceptance model (TAM) being a research topic. Extension of the TAM using innovation theory has enhanced organizations capabilities because of the social influences association with innovation (Venkatesh & Davis, 2000). Gunasekaran et al., (2017) examined literature review on information technology (IT) and supply chain management (SCM), which reinforced that the variables adaption, agility, and alignment were exponential in ensuring an organization's competitive advantage based upon the organization's implementation and use of IT. Adaption in this case is referred to as an SCM organization's ability to adjust to current and potential future market changes and an organization's current IT capabilities that could influence strategic decision making to either enhance or sustain an existing competitive advantage (Gunasekaran, et al., 2017; Wang & Sun, 2019; Liébana-Cabanillas et al., 2018). Gunasekaran et al., (2017) determined that IT posed a significant influence on SCM organization's abilities related to strategy, alignment, decision-making, and sustainment of an organization's competitive advantage.

Cao et al., (2016) suggests that embracing a specific systems outlook, in that an organization's relationship to information systems (IT) is relevant to how valuable IT could be to a particular organizations perception of how IT adds value to business operations which could also influence innovation within the organization. Systems concepts are referred to as a methodology to empower organizations managers further to address fundamental problems that can hinder an organization's success. Systematic capabilities can, regarding IT systems, directly influence an organization's ability to

created business value as it relates to an organization's performance (Cao et al., 2016). Resource-based view (RBV) can take away from the focus of IT competitive advantage and take away from an organization's ability to accurately leverage IT business value and hinder sustainment efforts of competitive advantage. Abdelkader and Abed (2016) identified that use of the RBV (Resource-Based View) when comparing IT and an organization's competitive advantage that IT had no significant relationship to an organization's competitive advantage. Ashrafi and Mueller (2015) stated that a significant relationship during their quantitative study between the variables IT human resources, IT knowledge resources, and IT relationship resources, with a positive relationship with strategic planning and innovation. The significant relationship positively influenced the implementation of IT-related projects. Ashrafi and Mueller's (2015) research using the valuable, rare, inimitable, and organization (VRIO) framework presents organizations' opportunities to identify if their IT resources are providing a sustainable competitive advantage given the organizations current capabilities.

According to Abdelkader and Abed (2016), the results of their survey on technology and skills determined that only 18% of the respondents believed that technology-related skills were most important. Most of the respondents thought that soft skills such as forward-thinking and change-oriented mindsets were more important (Kiron et al., 2016). Incorporating variables such as innovativeness, IT capability, and business performance based upon the RBV using measurement scales determined that business performance could be based upon information technology implementation but stresses the need to review additional external variables models as well (Turulja &

Bajgorić, 2016). Overlooking other variables could have devastating effects on an organization if new IT were to be incorporated into the organization.

Zardini et al., (2016) indicated that using the RBV, a bottom-up approach for IT-related products and services, may not be the best approach when sustaining IT-related resources and encouraging innovation within the organization. Processes related to IT innovation have been shown to cause gaps and bottlenecks within the managerial sectors, in that IT can be persuasive in both our work and lives and can create improper perceptions of technology (Zhang et al., 2016). Bilgihan and Wang (2016) identified that the allocation of resources should not be based primarily on human resources, but knowledge and capital investments as well. Iazzolino and Laise (2016) explained the need to incorporate knowledge-based strategies to sustain the organization's business model and that knowledge management is the variable in ensuring sustainable strategies within an organization. Research conducted on the dynamic capabilities view (DCV) determines that DCV is an extension of RBV, in that DCV provides a method for managers to have a better understanding of the areas necessary for IT deployments and IT-related enablers that will effectively sustain the organization's competitive advantage (Mikalef, & Pateli, 2017).

Supply chain management and logistics-related tasks are at a point where they are nearly entirely dependent upon information technology (IT) based on both urban and rural demand supply and customer requirements (Gunasekaran, et al., 2017). An organization must be agile to obtain a competitive advantage over other organizations and sustain that advantage. The variables adaption, alignment, and agility ensure the

organizations continue their competitive advantage and meet both the customer's and stakeholders' needs (Gunasekaran et al., 2017). Additional research recommendation based upon Gunasekaran, Subramanian, and Papadopoulos suggests focusing on subject matter experts within the purchasing field to enhance the abilities of supply chain management and information technology-related solutions. Bourbonnais et al., (2020) stated that intelligent video monitoring and mobile applications and their associated application to older individuals using the diffusion of innovation theory (DOI) could allow future technologies to improve the care of older individuals' lives who suffer from cognitive impairments.

Bourbonnais et al., (2020) opined that few studies had been conducted on nursing homes (NH), but determined that managers, family, and formal caregivers in NHs are convergent, in that they are not fully informed on how innovation adoption could further enhance their loved ones who reside in NHs lives. This could lead to an extensive interest by both the family of the patient(s), as well as the patient being treated, of a technology-based application that would be easily accessible to both the family and the patient because of an adequate supply of the technology. Bourbonnais et al., (2018) concluded that future technologies in the health care industry could allow all participants to create a customized care plan that would also actively engage the healthcare provider and associated professionals that were treating the patients and create innovative ideas based upon patients' responses. Greco et al., (2016) research discussed the topic of open innovation paradigm and how organizations' interactions with other organizations can affect the organizations success. The perceptions associated with and the understanding

and acceptance of technology, could advance supply chain organizations capabilities (Son, et al., 2018) .

Since 1992, organizations have consistently been engaged in further implementing innovation (Greco, et al., 2016). Greco et al., (2016) qualitative research was based upon results from the Eurostat Community Innovation Survey (CIS). The conclusion of the study was very brief yet did not accurately determine what the model was made for, other than the assumption that open innovation strategies can diminish marginal returns on profits, and industrial and economic innovation performance can be impacted in a negative manner (Greco et al., 2016). Fixson and Marion (2016) presented a unique case study in which crowdsourcing fails because of an organization's production of extensive ideas, but none of which reached a milestone that could be defined as comprehensive and innovative, with the result being nothing of significance being produced. This results in the organization developing competitive products vice innovative products. The researchers discussed the importance of quality control and how it can completely undermine innovation. An important item discussed during the research was that open innovation could hinder growth. Too much innovation without focus on a particular product line can prevent consumers from understanding exactly what the organization's product lines and goals are and can deter achieving a balance between economy of scale and an appropriate marketing line (Fixson & Marion, 2016). Technology could fill the gaps between innovation and productivity (Rapciewicz et al., 2021).

Lages (2016) targeted the adaption process within supply chain organizations for the organization to thrive during his research efforts. Implementation of the value creation wheel (VCW) helps to determine, analyze, and present potential solutions to problems by creating processes that will influence both in a social change manner and an incorporating stakeholder requirement. VCW is a combination of agility and structure, while incorporating being able to negotiate and alleviate while simultaneously allowing growth and considering uncertainty (Lages, 2016). VCW is a focus tool that can be used to mold innovation to the point of identifying internal and external constraints that could affect operations (Lages, 2016). Lages (2016) research determined that VCW can influence decision making and problem-solving, but more in the fashion of focusing on appropriate decision making to further propel an organization into success by defining the real problem and method to resolve it. Bourke and Crowley (2016) stated that for an organization to remain highly competitive, the management within the organization must successfully implement and sustain change. In addition, Bourke and Crowley (2016), opined that an organizations economic growth will not advance if innovation is not maximized within the evolving environment. Victer (2020) suggests that highly structured organizations benefited from appropriate knowledge management processes than organizations that did not take a contingency-based approach based upon the variables of current organizational efficiencies, unidentified expenses, and undefined risks.

Victer (2020) identified the contingency theory was best suited to define an organizations ability to accurately implement an accurate management strategy to

determine the organization's appropriate value-added positions. Victer made the argument regarding an organizations existing capabilities theory model and how it should be substituted to meet current economic environments and further influence innovation within an organization. Victer (2020) study established that competition played a significant role in ensuring an organization's strategic management performance and identified the need to evaluate an organization's capabilities further in delivering products to its customers and consumers accurately. Søgaard et al., (2019) examined literature review implementing strategic contingency theory to identify how disruptive technology can hinder purchasing maturity and purchasing strategic alignment. Dozens of areas such as technology, product lines, supply chain, and external dependencies were reviewed in the study. Interestingly, during the literature review, the findings determined that 67% of the literature did not offer a theoretical interpretation of how the researchers came to their conclusions (Søgaard et al., 2019). Søgaard et al., (2019) identified that the literature on purchasing maturity was not reliable and could put an organization on a disastrous path should the organization choose to use that literature as a basis for advancement. Organizations leaders should not just limit their focus on individual innovation and creativity when developing strategies and contingencies for success, but innovation and creativity that takes place within working groups and team environments (Hon & Lui, 2016).

Supply Chain Methodologies

An organization's systemic supply chain capabilities should not be based upon one system within an organization but all business information systems (BIS) that support

the organization (Cao et al., 2016). Organizations should not solely depend upon its Information Technology (IT) to enhance as well as sustain its systemic capabilities, but also consider the human factor associated with numerous organizational factors such as IT business value and resource-based view (RBV) (Cao et al., 2016). Deployment of disruptive technology within supply chain management systems is suggested into order to continue to support supply and demand requirements that may require a human resource be actively present (Govindan et al., 2020) From a systematic capability view, IT systems should work in conjunction with each supply chain system to provide measurable business value (Cao et al., 2016). Additional research determined that for IT to add business value, systemic supply chain capabilities must be enhanced by ensuring that existing and proposed future IT implementations integrate in a streamlined manner that does not conflict with an organization's current system elements.

Business intelligence systems (BIS) are a suite of software applications that empower organizations to make appropriate business-related decisions to enhance their capabilities. The technology acceptance model (TAM) and its variables perceived ease of use and perceived usefulness can be extended using variables identified related to an organization's current BIS applications, to determine the level of influence of user acceptance of newly implemented technology (Bach et al., 2016). Taking into consideration the bullwhip effect, in which the potential for excessive production, unnecessary shipping, and an improper decision to increase resources, should be a contributing factor in deciding what BIS software or technology would be best suited for the organization prior to implementation of the application or related technology

(Ignaciuk & Dziomdziora, 2020). Bach et al., (2016) explained that using the TAM and BIS within the USA identified the viability of the TAM and how it can enhance IT project management organizational members abilities, as well as how it can influence management decisions relative to the implementation of additional BIS and user perceptions of the application(s). Strategy and the quality of the information provided to support the implementation of BIS were identified as critical factors in ensuring whether an organization should or should not proceed with new technology implementation. Yang et al., (2021) stated that operations management within supply chain organizations from a behavioral view should also be taken into consideration, as technology and BIS applications could streamline operations management and prevent the bullwhip effect commonplace in logistics and supply chain management.

An increase in legal changes, socio-technical accidents, or natural disasters can have both short-term and long-term effects on an organization's performance, and directly influence supply chain processes, and warrant additional risk mitigation plans such as those identified as twin-objective strategies (Zhu et al., 2017). Twin objective strategies are defined as being opportunities to reduce both risks and increase performance (Zhu et al., 2017). Zhu et al., (2017) stated that both disruptions and performance-based upon the empirical review of the literature, as well as a cross-sectional survey, present both a positive and significant relationship that can directly influence an organization's supply chain collaboration (SCC) processes. The main variables identified in the study are local disruptions, IT failures, and yield uncertainty regarding organizational infrastructure risks. With the globalization of manufacturing, supply chain management processes have

become increasingly complex, with the ability to identify demand to create the supply creating extensive uncertainty that could hinder production (Zhou et al., 2020).There were numerous observations from the study, but the primary business-oriented results determined that extensive attention should be focused on infrastructure and catastrophic risks (Hon & Lui, 2016; Zhu et al., 2017; Søgaard et al., 2019).

Expected utility, mean-variance, and value-at-risk are the three traditional research variables associated with risk aversion (Zhang et al., 2019). Zhang et al.,(2019) research explained why demand uncertainty is directly influenced by risk aversion and discussed the newsvendor model. The researchers argue that these three traditional variables may not be accurately able to determine specific risk characteristics associated with decision-makers because of the potential to make an excessive conservative decision (Zhang et al., 2019). Wang et al., (2021) opined that although organizations may be willing to invest in manufacturing and distributing certain technology-based products that can meet customer demands, the technology itself may not be favorable to the organizations customers because of increased product costs and presents a significant to risk to the organization product lines. Zang et al., (2019) proposed using the tail value-at-risk method because of the ability to measure uncertainty appropriately and is derived from uncertainty theory. The results of the study showed both a positive and negative correlation between the variables risk confidence, risk aversion, expected profit, and can affect ordering quantities, with either an increase or decrease in ordering costs, or can significantly affect the ordering decision for products (Zhang et al., 2019). Additional research is proposed to expand the framework of uncertainty theory and further research

in supply chain coordination related to contracts such as buyback and revenue sharing contracts which could reduce the negative correlations between risk confidence, risk aversion, and expected profit .

Kirsner (2016) research on the lean startup methodology found that organizations fail to understand Lean processes. Kirsner (2016) defined the Lean startup process as incorporating appropriate decision-making, rapid development of ideas, accurate customer and stakeholder feedback, face-to-face interactions with customers and stakeholders, and an Agile approach from concept design to product finish. Value stream is a significant part of lean methodologies, and with the advancement of technology, value stream future state is unknown, and could influence traditional lean practices from being deployed properly (Tortorella et al., 2020). The incorporation of agile methodologies into lean process could significantly enhance an organizations capability to overcome potentially risks associated with technology and lean processes (Kirsner, 2016; Ciric et al., 2018) According to Kirsner (2016), 50% of large organizations presented the fact that they were afraid to present their products to consumers before implementation. 33% of organizations identified that they do not have the adequate resources to adopt a Lean methodology. The research concludes that skilled labor produces results, and innovation is good, but being able to implement innovation into an organization saturated with standard operating procedures and policies can be challenging (Kirsner, 2016).

Ghaffari and Lagzian (2018) examined cloud adoption and user experience, specifically Personal Could Storage Service (PCSS). The researchers took an interpretive

phenomenology approach to determine users' acceptance and implementation of PCSS, identifying that users were heavily influenced by the variables demand-side factors, supply-side factors, and institutional factors. Cloud computing is provided based upon the accessibility of the internet and depended upon the availability of data centers and associated equipment such as servers and enables both internal and external organizations to provide services to other organizations and is a trusted means of information sharing and processing (Ghaffari & Lagzian, 2018; Turan & Verbauwhede, 2020). This study was intriguing because of its qualitative nature, whereas most studies on PCSS were interpreted in a quantitative manner (Ghaffari & Lagzian, 2018). Semi-structured interviews were conducted using experienced personnel in the field of PCSS. Previous studies were cited on Yang and Lin regarding technology acceptance using the variables perceived usefulness, service support, self-efficiency, social influence, and unstructured task (Ghaffari & Lagzian, 2018; Yang & Lin, 2015).

Although the technology acceptance model (TAM) was not explicitly identified in Ghaffari & Lagzian's study, the variables of user perception and user experience were directly referenced on several occasions. Phenomenology has been extensively used in information systems, focusing on adoption, and continues to flourish in this realm because of perceptual causation and the environment the technology supports (Ghaffari & Lagzian, 2018; Albertazzi, 2021; Gunderson, 2020). In this study, purposeful sampling was employed to identify other potential participants. Based on the research, the qualitative approach was more appropriate than the quantitative approach based upon the multifaceted phenomena because of the extensive review of PCSS. The study's results

concluded that additional research should be implemented and that the findings associated with this research could be further built upon based on the assumption that more extensive sample sizes could yield more effective results (Ghaffari & Lagzian, 2018).

Sang (2017) explained how prospect theory (PT) was used to evaluate numerous manufactures and compares a revenue-sharing contract that is commonly used in the movie industry as it applies to one manufacturer and one retailer and compares the linear relationship between optimism increase and reduction in order quantities and implementation by retailers. A revenue-sharing contract is defined as a primary form of supply chain coordination, which provides a cross-functional means of multiple supply chain organizations and their vendors to share costing and profits based upon market demand (Sang, 2017; Luo et al., 2021). This model is also based upon uncertainty, which is also the basis for the prospect theory, hence the correlation between the theory and a revenue-sharing contract, which based upon the variable's optimism, quantities, and use, can have a negative effect upon the contract. Sang (2017) research focused on behavior but is geared toward human behavior and supply and demand behavior related to leaders associated with the contract and the decisions made to increase or decrease a particular variable. In the case of revenue sharing contracts, ethics involving limited information sharing with strategic partners participating in the revenue sharing contracts to increase profits could also affect the organization and the entire supply chain market and is a direct reflection of the necessity for corporate social responsibility to be maintained (Raza, 2018).

The theory of constraints (TOC) has been identified as a proven theory widely used in supply chain management that produces beneficial results and improves processes (Modi et al., 2019). Modi et al., (2019) examined TOC and current reality tree (CRT) based upon the literature review as only supporting the identification of a few root causes associated with supply chain deficiencies, even though the CRT is exceptionally involved in nature. The TOC implementation was successful in identifying potentially flawed policies that could affect an organization's production because of the systems being outdated and no longer applicable to industry standards and production methods (Modi et al., 2019). Dasgupta et al., (2019) indicated that because of capacity bottlenecks and increased overhead costs, when organizations face a positive demand shock, they increase production and retain larger inventory in order to increase profits by selling to geographical locations that are negatively affected by demand shock as a means of overcoming uncertainty. The TOC takes a holistic approach to extensive and complex processes, and an open-ended managerial approach to simplify internal and external stakeholders' goals, and further builds upon commonality among methods (Modi et al., 2019; McCleskey, 2020).

Puche et al., (2016) examined supply chain management (SCM), and its identified main challenge of improving customer service without incurring additional overhead costs. The researchers determined that taking either a holistic or systemic approach to SCM benefits the organization more than working with complex processes and simplifying them, which is referred to as the traditional reductionist alternative (Puche et al., 2016). Human behavior is a continuously lacking variable which should be

implemented into the chosen framework used to improve the supply chain management (SCM) processes associated with a particular organization because of lead time factors dependent upon human beings (Puche et al., 2016; Haeussler et al., 2021). When defining the framework, the five factors of information sharing, collaborative performance system, decision synchronization, incentive alignment, and integrated processes must be considered (Puche et al., 2016). The incorporation of TOC (Theory of constraints) with the focus on process improvements and retaining product quality, could lead to increased profits immediately, as well as sustainment of those profits continuously during the SCM life cycle (Puche et al., 2016; Chuang & Wu, 2019).

Product Marketing

Enterprise BlockChain (EBC) has become the more preferred method for investing in the service industries focused on electronic-based services in the country of Indian that support supply chain management (SCM) organizations (Karamchandani et al., 2020). Karamchandani et al., (2020) examined EBC success rates implementing a structural equation model (SEM) to extend the TAM (Technology Acceptance Model). Perceived EBC benefits, perceived incremental profitability, and perceived usefulness were the prevalent factors associated with the study. Supply chain integration intensity (SCII) was also integrated into the SEM, as well as information technology integration (ITI). Karamchandani et al., (2020) research demonstrated that practitioners in the SCM industry could increase the six key areas which are information quality, mass customization, service quality, delivery reliability, and customer relationship. Alkahtani et al., (2021) opined that in order to obtain consumer buy in on marketed supply chain

products, supply chain organizations must take into account technology that can be perceived as being user friendly to the consumer.

Wong et al., (2020) examined blockchain adoption in supply chain management (SCM) operations within small businesses in Malaysia. The variables relative advantage, complexity, upper management support, cost, market dynamics, competitive pressure, and regulatory support being analyzed were identified to evaluate numerous supply chain technology benefits. Wong et al., (2020) stated that digital supply chain technologies and methods are not fully used to their potential based upon organizations not willing to implement change. Wang et al., (2021) also explained that although blockchain technologies are becoming more prevalent within supply chain management, organizations still struggle to fully implement blockchain technologies within their business model. Blockchain technologies and practices have been extensively examined using the technology acceptance model (TAM) and unified theory of acceptance model (UTAUT) as it relates to SCM (Wong et al., 2020). Technology, the organization, and the environment were combined to create a predictive model to analyze the variables associated with the study (Wong et al., 2020). A correlation and regression analysis were not conducted between the variables, with post-hoc discriminant data analysis implementing certain criterion, as well as verification of cross loading, which is implemented to verify that the variables associated with the model are of sound structure (Wong et al., 2020). With the continued expansion of globalization and the rapid advancement of technology, consumer demand will continue to mold supply chain

networks strategic and operational requirements in a diversified manner (Tozanlı et al., 2020).

Wong et al., (2020) explained their reasoning behind not conducting the correlation and regression analysis was that because of the complexity associated with measuring human decision-making patterns, they can only determine negative relationships, and the intent to analyze the effectiveness of the model's positive effects on human behavior was the primary focus (Wong et al., 2020). Wong et al., (2020) overarching intent is to demonstrate that innovation adoption theory relates to the proposed framework, and is relevant to SCM and operations, and can determine the adoption of technology and factors and challenges in both risk management and risk assessment manner. Liébana-Cabanillas et al., (2018) opined that consumer interest in products could be lost based upon a lack of satisfaction, service quality, effort expectancy, and perceived risk associated with a particular technology. Wong et al., (2020) explicitly intended to measure the three proposed frameworks of TAM, UTAUT, and determine if they could identify enhancements in blockchain technologies and methods using their predictive model.

Branstad and Solem (2020) examined how market innovation revealed how consumers may have a new view on products, and recommends organizations incorporate new methods of adoption and diffusion of marketing practices. Consumer culture, although vastly overlooked, has recently been identified as a means to produce more effective marketing techniques (Branstad & Solem, 2020). The literature tells us in both a qualitative and quantitative manner that social influence variables such as legitimacy,

ideologies, narratives, communities, identities, and values can directly influence market changes. Rokka (2021) defined consumer culture theory as a method used to identify consumer behavior and is a major part of marketing strategies necessary to enhance profitability driven by the consumers behavior. Organizations may need to shift their paradigms to meet consumer demands. The study determined two diverse groups of variables that played a part about how the market could be influenced; the consumer activist and the market creator, both of which could influence an organization's ability to exercise diffusion of innovation. It should be noted that both consumer innovation feedback and institutional processes could be blended to further enhance acceptance, rejection, or the creation of additional innovation within marketing practices.

Dahlander and Piezunka (2017) examined crowdsourcing and how engaging outside resources produce innovative ideas. Obtaining ideas from customers allows an organization to exercise innovation in a diversified yet affordable manner. Having the ability to attract crowdsourcing is an art and can have disastrous results for an organization if they do not adequately evaluate their crowdsourcing strategy implementing the appropriate technologies (Dahlander & Piezunka, 2017). It is also important to note that implementing crowdsourcing without proper training being provided to the crowdsourcing audience could provide flawed results, creating misinformation and lacking an ability to provide adequate strategies necessary to properly market a product (Conrad et al., 2020). Dahlander and Piezunka (2017) suggests that organizations should not wait for external individuals to participate in the discussions but to take the first step and present some ideas to the potential crowdsource groups.

Once introduced, constant engagement with the crowdsource group is a necessity to generate innovation further. This allows the outsiders the understanding that the organization understands and cares about their feedback and ideas and can develop additional crowdsources and positive engagement and an increase in positive perception of the organization (Dahlander & Piezunka, 2017).

Agnihotri (2016) researched innovation and blue ocean strategy and determined that disruptive innovation and frugal innovation can create a blue ocean strategy. The blue ocean strategy means to garner the attention of markets that others have not yet realized and create a new market arena (Agnihotri, 2016). The blue ocean strategy considers organizations existing capabilities, assets, resources, and operational activities and uses them to create innovation (Agnihotri, 2016). Leavy (2018) opined that innovation is value driven, in that cost and innovation are not opposites, but should be considered a powerful combination in marketing products and creating a competitive advantage over other organizations. The main flaw identified by Agnihotri was that the blue ocean strategy only targeted existing customers and did not seek to integrate new customers, which is why a lack of innovation could cause the blue ocean strategy to fail (Agnihotri, 2016). Strategy canvas was derived from the blue ocean strategy and does not focus primarily on value innovation but innovation in general (Agnihotri, 2016).

Chien et al., (2016) research findings were based upon quantitative analysis via an empirical study of existing literature and focuses on user preference and visual aesthetics. Chien et al., (2016) proposed the exploitation of technology, more specifically data mining techniques that can be used to develop an assessment system that can enhance

evaluation of product features as a data mining methodology gauging user experience. Rough set theory (RST) has continuously been proposed in product development organizations. RST is primarily focused on the manufacturing, medical, and marketing fields, to name a few, because of RST ability to not depend upon unnecessary variable dependencies and data assumptions (Chien et al., 2016). The empirical study concludes that data-driven innovation should look beyond RST and incorporate user experience factors. This could lead to other innovative designs and potential growth for an organization. With consumer retention being a primary focus of business operations, RST should take into consideration customer relationship management (CRM) risks in order to prevent churn, in which customers switch to other service providers (Vijaya & Sivasankar, 2018).

Technology has been consistently used to benchmark businesses to overcome competitive advantages. Ghemawat (2002) examined how technology drives an organization's ability to perform marketing, increase manufacturing, create a sound distribution process and network, and create service-related products such as labor and materials support. Having a competitive advantage over other manufacturers by implementing the appropriate technology ensures that an organization's strategy can mirror its current competitive environment (Ghemawat 2002). Broekhuis et al., (2019) explained how usability of technologies could influence benchmarking processes because of the complexity of the technology used to gather metrics. An example of this would be a stock day trader who depends upon mobile applications and market analysis software to make sound decisions before buy or selling a particular stock. Competitive thinking is a

risk-based approach to looking at an organization's environment and ensuring it meets its strategic goals. Information technology has introduced variables that created a more complex strategic decision-making process, which required the reliance on the technology in the 1960s (Ghemawat, 2002).

Business Profitability

Martin (2000) identified a supply chain methodology known as Agile Supply Chain Management (ASCM), which is relative to flexibility and improved processes consistently, yet still, meet supply and demand requirements while increasing profits. Zupancic et al., (2017) researched into manufacturing processes such as lean, supply chain management (LSCM) theory, with the intent to improve business performance, stability, and the ability to predict future consumer product requirements which could increase profits. Ghode et al. (2020) opined that an accurate information flow that contained rich and real-time data could improve profitability in supply chain management organizations. A firm's ability to identify innovative processes can be enhanced by information technology tools and its considered investment, which is standard practice in an enterprise environment that could reduce overhead costs, resulting in business profitability (Trantopoulos et al., 2017). There is a direct relationship between innovation and IT that can enhance an organization's capability, based upon knowledge-enhancing methods, which could lead to improved production cost, productivity, and sustained firm performance (Trantopoulos et al., 2017). To incorporate accurately identified corporate knowledge and organizational capabilities, appropriate data access systems with validated data and supporting network connectivity requirements are necessary to properly

understand the external variables from the organization's internal knowledge base to enhance the organization's capabilities (Trantopoulos et al., 2017). Organizations must search outside of their existing capabilities to further understand the knowledge-based view (KBV) to further enhance their knowledge base and advance their process efficiency and determine economic value related to their business line and increase profitability.

A computer-based simulation using Kanban production and DBR methodologies produced results demonstrating Kanban being the most improved production method, followed by DBR. Carvalho et al., (2019) identified that value stream mapping (VSM) combined with Kanban significantly reduced overhead costs and increased profitability within small businesses. Although traditional methods showed more production, it also demonstrated a significantly higher amount of work in progress (WIP) still required to be completed. For example, with traditional methods, an average of 186, 35 items were completed with 217,55 still WIP based on 27 cycles of production. With Kanban, and an average of 172,1 items were complete with a solid 14 a WIP over 7 cycles, and with DBR, an average of 185 items were completed with 15,35 still a WIP at 7,5 cycles. WIP is identified as the cost measuring mechanism associated with production. The results show Kanban and DBR demonstrate the lowest production costs because of higher production and less WIP and indicated that controlling and reducing tasks related to production significantly reduced costs and production times instead of focusing on the resources associated with the output which increased profitability (Zupancic et al., 2017). Thürer et al., (2020) initiated a similar simulation on Production Planning and Control

(PPC) systems to test performance of those systems primarily manufactured using Kanban and similar methodologies, with results determining significant bottlenecks being identified.

Another computer-simulated experiment event conducted by Macdonald, Zobel, Melnyk, and Griffis associated with supply chain management organizations identified potential scenarios that could invoke catastrophic events to identify risks and their potentially expanding threats outside of the organization (Macdonald et al., 2018). Mass customization (MC) implementation within the supply chain industry has significantly reduced costs while improving production and profitability but carries significant risks that could hinder future profits (Choi et al., 2019). The interesting factor that was overarching was behavioral factors associated with the risk framework. Supply chain shock, in which an organization can be affected by both a positive or a negative variable, can significantly disrupt supply chain processes and is referred to as an unplanned or unanticipated event, and directly affects an organizations profitability (Macdonald et al., 2018). Flynn et al., (2016) identify unexpected events as uncertainty and have been identified as the four variables of physical manifestations, behavioral response, perception, and social expectations. As specified in Macdonald et al., (2018) risk framework, human behavior is the dominant variable and directly influences organizations profits.

An additional supply chain shock framework study proposed by Macdonald et al., (2018) contains the variables shocks, ecosystem, investments, performance and is incorporated into their simulation model when determining potential risks. Chilcott

(2020) research determined that an organizations low productivity, combined with increased operating costs and dependency on a small, targeted area of markets, makes the organization vulnerable to significant profit loses which could easily be replaced by overseas markets. Black and Glaser-Segura (2020) proposed extending a strategic contingency model to enhance planning and execution of supply chain network capabilities to prevent supply shock-related bottlenecks and recommended evaluating technologies such as digitization in advance to prepare for those bottlenecks to increase business profitability. Macdonald et al., (2018) research identified the potential for supply chain managers to make more realistic decisions regarding inventory control, communication technology, and supplier relationships, with the potential for other areas to be incorporated into the decision factors. Macdonald et al., (2018) also identified in the study that the framework could be used by other researchers, as well as individuals specializing in risk management, to enhance current supply chain management processes further, as well as identify potential risks associated within an organization's business processes that could affect profits (Macdonald et al., 2018).

Awasume (2016) expansion of the strategic contingency theory (SCT) in the form of a multi-exploratory case study determined that SCT fit well because of SCT relationship with contingency theory (CT). Awasume (2016) focused primarily on leadership effectiveness and related strategies to determine the financial strategy and resources used to sustain a new business beyond its 3-year mark and how to expand its base and increase profits. The results of the study identified that more than one strategy was necessary for the business to make it past the 3-year mark and remain profitable.

Ratcliff (2018) research focused on small businesses and strategies that sustain them beyond 5 years via the qualitative case study methodology. The strategic contingency theory (SCT) was used in the study, demonstrating that an organization's stakeholders are an integral part of ensuring that successful strategies are implemented to increase and sustain a small businesses profitability (Ratcliff, 2018). SCT is based upon the understanding that business leaders within the organization make strategic business decisions that set the organization up for long-term success. The study determined that leadership skills were just as essential if not more important than business skills. Leaders must consider technology and future planning regarding product lines, profits, as well as market insight.

Passley (2021) identified similar study results in that multi-exploratory case studies determine relationships more accurately between the variables when comparing more than one theory. This goes back to how the extension of the TAM could enhance an organizations capabilities and potentially increasing profits. Szymańska (2016) research identified that an organization's culture is a critical factor in ensuring the successful implementation of innovation and increasing profitability. An organization's size drives its culture and can hinder innovation from properly being implemented (Szymańska, 2016). The open innovation model (OI) is a variable to determine the level of innovation an organization possesses for both small and medium-sized organizations and identifies the level of knowledge sharing and development of new solutions within those organizations which could be driven by the needs of the customers, which could affect the businesses profitability (Malm et al., 2020). Szymańska (2016) identified significant

relationships between an organization's culture and open innovation within small and medium businesses, which can be used as a factor to determine the success of an organization. External factors that were also identified as variables are management, and business owners need to consider potential opportunities and exploit them to create positive opportunities within the organization. Organizational culture items such as time and profit orientation could directly impact cost reductions based upon an employee's perception of a particular process or product, which would also impact business profitability (Musanzikwa & Ramchander, 2018).

Bettencourt and Ulwick (2008) opined an eight-step process that introduces the idea of practice, which consists of the variables define, locate, prepare, confirm, execute, monitor, modify, and conclude. Job mapping is an entirely different map than traditional process mapping in that job mapping seeks to identify what customers are trying to accomplish (Bettencourt & Ulwick, 2008) . In contrast, process mapping is focused on what the customer is doing, and in some organizations, is used as the measurement tool for forecasting of profits. Job mapping provides more effective deployment and implementation of existing in-house resources (Georgiou et al., 2018). Gračanin et al., (2019) believes that value stream mapping and job mapping are similar in that product flow and information flow could either increase business profitability or could cause increased costs because of no return of investment produced from the future state results. During mapping a job process, innovative opportunities should be looked for to develop additional added value. Bettencourt and Ulwick (2008) identified innovation by employing the understanding that customers create jobs because they buy the

organizations services and products, which leads to the process of getting the job done, and leaders can exploit those jobs to identify innovation, and further grow their organization while increase profitability.

Transition

Section 1 of this study included the background of the problem, problem statement, purpose statement, nature of the study, the significance of the study, and the conceptual framework. Section 1 also contains an extensive literature review of external variables that influence information technology adoption and implementation in supply chain management organizations and technology innovation strategies supply chain managers may use to improve product marketing and profitability within the United States. In section 2 of the study, I will describe the research method and design, data collection techniques, participants, ethical research issues, population, sampling, and the validity and reliability of the study. In section 3, I will present findings of the doctoral study, relevance to business, social change influence, and recommendations for additional research.

Section 2: The Project

Section 2 includes the purpose of the study, the research methodology and framework, the role of the researcher, population and sample size, ethical research guidelines, data collection methods and instruments, control and organization of the data, data analysis techniques, and the reliability and validity of the study. In Section 2, I will discuss in detail the use of semi structured interviews to collect data, and the step-by-step process of data analysis. Section 2 will conclude with a transition statement.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies business managers use to adopt technology innovations to improve product marketing and profitability. The population of this study consisted of 5 supply chain business managers located within the Southwestern region of the United States who have been successful and have significant operational and business experience in supply chain management processes implementing technology and processes in addressing business problems within large scale organizations. The implications for positive social change include better selection of technology, which could reduce internal costs. This may create additional employment opportunities within the organization, and expansions throughout the region, which could result in additional employment opportunities at the newly established businesses.

Role of the Researcher

The role of the researcher as it pertains to qualitative research methods is to ensure academic theories and methods used are adequately implemented while

simultaneously leaving a positive impression with numerous benefits to the study's participants (Hagues, 2021). The participants provided necessary data on the study's objectives to begin the thematic analysis of the findings and identify the appropriate codes associated with the interviewee's responses. My role as the researcher included designing and implementing interview questions necessary to capture data to create themes, collecting data from participants using semi-structured interviews, and maintaining the reliability and validity of the data.

This study includes supply chain business managers with knowledge of supply chain technologies to answer questions associated with the topic of the study on innovative strategies that technology could help enhance product marketing and profitability. My responsibility includes breaking up the data derived from interview transcripts, observation notes, or other sources into manageable parts, elements, or units to identify types, classes, sequences, and patterns. Such break-up reconstructs data and provides clarity to the study (Jackson & Bazeley, 2019). I paired the available raw data by coding, identify themes that describe the phenomenon under review, and assigning the coded data to the appropriate theme to identify patterns within the repeated themes.

My experience with technology began when I joined the U.S. Marine Corps, in which I was in the telecommunications field. The TAM further intrigued me because of the TAM close relationship to technology and how human behavior plays a significant role in successfully implementing technology within organizations. My role as the researcher requires me to adhere to all appropriate ethical guidelines and properly mitigate any risks associated with ethical issues that may taint the study negatively. I will

conform to all guidelines and standards set forth by the Institutional Review Board (IRB). I will follow the guidelines set forth by the Collaborative Institutional Training Initiative (CITI Program) and the Belmont Report guidelines. The Belmont Report was established in 1978 to provide guidance and define the roles and responsibilities of ethical research and define the line between practice and research (Lantos, 2020).

Researchers must recognize their biases when conducting research and the potential influences it may have upon that research. One of the methods I used to mitigate potential bias was thematic analysis in identifying potential themes within the data received, which was from a third-party vendor known as Google Forms. This prevented me from altering the data as the reliability and validity of the data is retained by the third-party vendor. No in-person interviews occurred, which prevented bias results associated with social desirability biases that could have potentially developed during the interview process and improperly influence interviewees' responses (Leggett et al., 2003). COVID-19 also prevented in person interviews due to participants concerns about infection. The solicitation of the interview questions were created in Google Forms. Google Forms allowed me to create an online link to submit the questions to participants with technology and supply chain management backgrounds.

Participants

I defined requirements and protocols necessary for selecting appropriate participants for the interview questions. Qualitative research methods involve understanding an individual's life experiences, and online interviews can capture these in the same manner as in-person interviews but with reduced costs and timelines (Topping

et al., 2021). The population of this study consisted of 5 supply chain business managers located within the southwestern region of the United States who have been successful and have significant operational and business experience in supply chain management processes implementing technology and processes in addressing business problems within large scale organizations.

I obtained access participants by searching for local supply chain management companies and contacting relevant individuals in supply chain management roles located in the southwestern region of the United States. Consistent engagement with participants of a study provides a solid foundation for the potential retention of these participants for future studies (Ochieng et al., 2021). I also used my network of vendors from my current job role to identify participants who meet the criteria of being a supply chain manager and contacted them either by telephone or email to ask for their participation. I searched professional organizations such as LinkedIn.com to identify potential participants located in the southwestern region of the United States who are in the supply chain management industry. Recruitment of participants for professional studies via online social media methods significantly reduces overhead costs associated with paying for a professional service to identify the appropriate participants for the researcher (Spahrkäs et al., 2021).

In some instances, obtaining informed consent may not necessarily explain that informed consent has been truly established (Staunton et al., 2018). The proposed method of obtaining the participants' trust and confidence and ensuring informed consent is solidified. I introduce myself via email and a follow-up telephone call. I included a copy of the problem statement, purpose statement, nature of the study, and the research

question and interview questions. I also provided a copy of the informed consent form for their review and potential acceptance. Please see Appendix A for the consent form that will be used for recruitment purposes.

The individuals participating in the interviews are experienced professionals in the supply chain organization that use technology to enhance their organization's marketing capabilities and increase profitability. Researchers who actively engage with experienced professionals for their studies may not just only produce good results from research findings, but the doctoral student could also potentially create a community of practice that could increase the chances of creating performative theories that can benefit the industries the professionals participating in the study work within (Kelly et al., 2021). The eight semi-structured interview questions which are located on the first page of Appendix B listed in this study, were posted to Google Forms, and then I emailed a link to the participants for their responses. The participants for this study are within the Southwestern region of the United States to obtain the necessary responses from qualified candidates to support the qualitative analysis associated with NVivo 12 software. The participants also work in management, supply chain, and product management job functions. The interview question responses received from the participants via Google Forms were used to perform the thematic analysis using NVivo 12 software.

Research Method and Design

I used the qualitative method for this doctoral study, and the chosen design is multiple case study. I finalized my research and analyzed the results using NVivo 12 software and employing thematic analysis. I took an inductive approach to the findings

based upon my findings using TAM to identify strategies business managers use to adopt technology innovations to improve product marketing and profitability. The use of multiple case study design allowed the appropriate level of data triangulation.

Research Method

There are three methods researchers use to conduct a study which are qualitative, quantitative, and mixed methods (Strijker et al., 2020). Researchers use qualitative methods to define and further explore, identify additional concepts, and create new theories and models (Chandra & Shang, 2017). A mixed-method approach is a combination of both qualitative and quantitative research methods (Saunders et al., 2015; Kansteiner & König, 2020). To further explore innovative strategies that business managers within supply chain management organizations can use to enhance marketing capabilities and increase profitability using technology, I did not use the mixed method approach because of the requirements for testing hypothesis related items which are intricate to quantitative studies, as well as the quantitative requirements of a mixed-methods study. Mixed-methods research combines both qualitative and quantitative research methods into a single study. Mixed-methods research could push the researcher to decide on having the primary focus of the research be on the qualitative portion, or vice versa, and could become very complex (Izquierdo & Anguera, 2021).

Quantitative researchers do not focus on assumptions related to a particular phenomenon's orientation like qualitative researchers tend to do (Cortina, 2020). Quantitative research focuses on the numbers associated with the data findings, and the implementation by the researcher of statistical analysis to identify relationships in the

variables associated with the research (Palanski et al., 2021). Quantitative research methods also require a larger sample size and a targeted group in order to achieve an adequate amount of data required to perform the numerous statical analysis processes associated with quantitative research (Boyle et al., 2017). I did not select the quantitative method for this study because of the requirement for hypothesis testing and gathering of a large sample size.

Qualitative researchers can determine human beings' requirements by identifying the visual and verbal variables intrinsic to qualitative research (Orel & Mayerhoffer, 2021). Qualitative research also allows the researcher to become an intricate part of the participant's personal experiences, allowing the research to sit alongside the participant to gather truly rich data and can highlight additional strengths within the study that could enhance the research findings ((Hagues, 2021; Sutton & Austin, 2015). Qualitative research will allow the researcher to identify how different efforts can be incorporated into each other to enhance the study's findings (Woodall et al., 2021). Qualitative research methods can enhance the researchers' abilities to identify overarching themes within the data findings (Orel & Mayerhoffer, 2021). Qualitative research provides a unique approach to medical studies, whereas researchers and practitioners can identify patient and doctor experiences and perform additional analysis for improvement to the organizations existing healthcare product lines (Ullrich et al., 2020). The qualitative method was not suitable for this study.

Research Design

Some of the research designs qualitative researchers use include case study, phenomenology, ethnography, and narrative design (Strijker et al., 2020). Case study research is a widely used research design across multiple scientific disciplines and is used to explore a phenomenon to depict a clearer picture of the research findings (Nilmanat & Kurniawan, 2021). Case study design can also provide the researcher a solid foundation and further strengthen the argument to support the research findings and provide an accurate depiction of the relationships between the studies variables (Grant et al., 2020). I used the case study design for this study.

Phenomenological design relates to empirical studies, in which the researcher produces an alternative constructive review of the literature (Aagaard, 2017). Phenomenological design also focuses on the similarities between an organization's current and prior experiences to identify the phenomenon's descriptive nature, while retaining innovation and reinforcing the commitment to identify the origin of the phenomenon (Creswell, 2018; (van Manen, 2020). I did not research an organization's current or prior experiences to identify a potential phenomenon, so the phenomenological design was not inappropriate for this study.

Ethnographic researchers derive their findings from hands-on experiences and interactions with their research subjects and how it relates to the participant's cultures and beliefs (Ryan, 2017). Ethnographic researchers directly interact with a 'hands-on" approach during ethnographic related studies. I did not employ ethnographic research design for this study. The narrative design relates more to a particular phenomenon, in

which events are laid out in chronological order to identify the human relationships associated with the events and the actions taken (Liu & Tseng, 2021). Because of time constraints related to the study and no requirement to layout events in a timeline, I did not use the narrative researcher design. A case study design is the most recognized design for conducting social sciences research and may be used in qualitative and quantitative research methods and mixed-methods research (Montes-Rodríguez et al., 2019). I did not research social science issues but rather a business problem. The multiple case study method was most appropriate for this study.

In qualitative research, data saturation is the baseline measurement and end-all rule for discontinuing data collection and analysis of the data findings (Saunders et al., 2018). Data saturation is the systematic methodology of estimating and defining when qualitative sample size is adequate (Guest et al., 2020). Because of the in-depth development of the research questions, and the potential return of rich data responses, the chances of achieving data saturation are significantly enhanced. Data saturation can be achieved via the return of responses relative to the interview questions presented in the online survey, as well as the number of participants who actively engage in the survey because of the use of inductive thematic analysis and the results of the data analysis (Guest et al., 2020). In qualitative research, constant comparison is implemented until no additional themes during the coding process can be identified, further reinforcing the reliability and validity of the data findings (Johansson, 2019). This means that all data collection and analysis methods have been exhausted, and no additional themes can be identified

Population and Sampling

Population

Exploring strategies business managers use to adopt technology innovations to improve product marketing and profitability provides the foundation to obtain qualified candidates who can provide reliable data during this doctoral research multiple case study. Selecting a population for a study must be guided by an intentional selection process. The population of this study consisted of five supply chain business managers with backgrounds and expertise in supply chain management and technology who were presented with eight interview questions. Selection of business managers within the supply chain management industry was conducted purposefully for this multiple case study to obtain relevant and rich data.

Sampling

Purposeful sampling does not require a strategic method of obtaining probabilistic results relative to quantitative studies (Hon & Liu, 2016). The implementation of purposeful sampling allows the researcher to identify variations in the data to identify relevant codes and themes rich and valuable in the context to answer the research question (Hjertstrand et al., 2021)

The use of the purposeful sampling techniques purposeful sampling, random sampling, and snowballing sampling are best suited when the researcher needs to manage the amount of data gathered, which, if not correctly managed, could lead to the researcher's inability to perform appropriate analysis of the findings (Ames et al., 2019). I used purposeful sampling for this study. Selection of participants for this study were

based on the following factors: A manager within the supply chain industry, experience in information technology, a background in new business development, and a thorough understanding of corporate business operations within their respective organizations. These are the attributes associated with this study. These are relative to criterion sampling, which is comparable to purposeful sampling and can provide the researcher a foundation for selecting the appropriate participants while also allowing the researcher the flexibility as the study progresses to obtain the proper level of data needed to support the doctoral study (Moser & Korstjens, 2018). This process was imperative to my study, as it ensures that all selected participants for this study meet the above pre-defined requirements.

The following considerations for implementing the appropriate sample size include but are not limited to the research design, the methodology employed, a limited budget and the data acquired relative to the study (Benoot et al., 2016; Ko & Lim, 2021). This study was based upon five cases and was performed using the qualitative method. The five cases were supply chain management companies located within the southwestern region of the United States and are small, medium, and large companies.

The participant's backgrounds and experiences must relate to the topic of the study. Some of the relationships to this study must be a few years within the information technology field, extensive experiences within the supply chain management industry and associated business strategies, a desire to participate in the study, and a specific role in management within the supply chain management industry. Five participants from five different organizations were presented with the individual questionnaires relative to this

multiple case study. Three telephonic interviews took place due to participants schedules. Two follow-on telephonic interviews took place during this study related to the three additional questions identified from the initial participant respones. One Zoom video call took place and was related to the follow-on questions. No in-person interviews took place due to COVID-19 restrictions. An initial "meet and greet" via telephonic methods was conducted with the participants before presenting the questions relative to the study to obtain the participant's trust and confidence and to ensure them that I would be protecting their identities and to obtained verbal informed consent from them via an email response. The meet and greet was established after they responded to my initial email invitation and wanted to know more about the study.

All participant's responses were reviewed for accuracy, and the follow-up questions to ensure the reliability and validity of the answers to the research questions were maintained. All questions were maintained after I copied and pasted the Google Forms response to a Word file, then placed on an external hard drive for data retention. No changes were made to the eight interview questions and each participants response. The same process was followed for the three additional follow-on questions. All notes from the telephonic interviews were initially handwritten, then transcribed to a Word file and retained on the hard drive as well.

The incorporation of the TAM as my theory relative to the research question allowed me to focus on the responses provided to the eight interview questions by the five participants in this multiple case study and to accurately compare the variables perceived ease of use and perceived usefulness to identified codes and themes relative to

the interview questions accurately. The use of Google Forms to obtain the participant's response for qualitative purposes allowed NVivo 12 software to identify the codes and associated themes relative to the TAM and the research question that was required to be answered in this multiple case study. Every participant responded to the initial and follow-on questionaries via Google Forms. However, three of the five participants that were able to be reached, clarification and discussion of the responses was conducted via telephonic methods relative to the initial eight interview questions. Two of the five participants for the three follow-on questions were able to conduct a telephonic interview. One of the five participants was able to discuss their responses via a Zoom call for the three follow-on questions

Ethical Research

To ensure that the researcher will enforce ethical research during a study and participants are protected, the researcher must conform to the Belmont report of 1979 and adhere to the institutional review board ethical considerations before implementing any research study (Abramson et al., 2018). Research organizations in developing countries commonly do not include institutional review boards (IRB) when conducting educational and non-medical related fields using human subjects as the basis for their research (Huang et al., 2021). Walden University is located in the United States, not a developing country, and the United States is a leading world power. Walden University has exceptionally high standards for ethical research requirements. The Belmont report of 1979 describes ethical research requirements with human subjects as intervention being used only to provide a diagnosis of the issue at hand, identify the appropriate treatment or

therapy necessary to help the patient improve, and that there is a reasonable chance that the treatment or therapy will be successful if implemented (Lantos, 2020). As this study was about a business problem, there was no human subjects in my research related to scientific experiments. The only human subject participants were those who answered eight interview questions and three follow-on questions related to technology and strategies used in supply chain management to adopt technology innovations to improve product marketing and profitability. After receiving Walden University IRB approval, observation of the ethical principles outlined in the Belmont Report were maintained.

Researchers use the informed consent form to educate potential research participants of the relevant items associated with the study so that the participants may make the appropriate decision whether to participate or not in the study (De Sutter et al., 2021). Receipt of the informed consent form is a necessary ethical requirement before actively engaging participants in the research study (Kraft et al., 2020). Researchers must have a reasonable and competent means of implementing an informed consent process to ensure ethical standards are adhered to, can readily and appropriately answer participant questions, articulate risks associated with the study, and identify potential outcomes of the study prior to obtaining informed consent (Alomar, 2021). The researcher should provide the informed consent form before actively engaging with the participant in the study.). The informed consent form was sent through email to the participants to sign the PDF via an e-signature or print and hand signed and scanned back to me via email before the start of collecting data, or an email response with the words “I consent” was provided by the participants. The informed consent form contained information on the study's

purpose, the study's voluntary nature, the withdrawal process, the disclosure on incentives, and the confidentiality and how participant's names will be protected from being included in the study, as well as prevent others from identifying them.

Participation in this multiple case study was voluntary, and participants have the right to accept or decline the letter of invitation I sent to them. Participants were free to withdraw from the research process at any time by reaching out to me via telephone, text message, verbal or sign language expression, or email to notify me of their intent to discontinue participation in the study. Participants are not subject to any penalties for withdrawing from the research project. Submission of the interview questions to the participants was via Google Forms by email with a link to the Google forms questions when it is a convenient date and time for the participants and under strict compliance with the stipulations in the interview protocol (see Appendix C).

Some researchers have used incentives to draw a much larger pool of participants. Although incentives are considered ethical, they are subjective and can lead to coercion (Grady, 2019). No incentives were for my study. The informed consent form explained the decision not to give incentives to the participants, which participants read and acknowledged via email before starting the data collection process.

The researcher is responsible for ensuring that the participant's names will be protected by creating strategies that ensure the researcher successfully keeps their promise and provides sensitive data to be presented that does not identify the participants (Turcotte-Tremblay & Sween-Cadieux, 2018). Four variables could influence outside stakeholders' abilities to identify participants; 1) hierarchical structure, 2) small milieu, 3)

immersion in a few sites and 4) vested interests of decision-makers (Turcotte-Tremblay & Sween-Cadieux, 2018). Before collecting data, permission must be obtained from the Walden University IRB to begin data collection, and I provided proof I have received the CITI certification (see Appendix D). The Walden University IRB approval number for this study is 01-10-22-1003723. Implementation of the Belmont Report guidelines on the protection of human subjects were adhered to during this research project.

Researchers extensively use the implementation of codes instead of names to protect the participants of the researcher's study from being identified while promoting a sense of security, maintaining participant confidentiality, and sustaining anonymity (Yin, 2018). Usage of letters and numbers P1, P2, P3, P4, and P5 to describe study participants on transcripts and research logs were incorporated to protect participants identifies. The P stands for the participant, and a number was assigned to that participant. As there is no researcher being conducted on specific company but business managers within supply chain management organizations, no coding of companies was necessary. At no time were the participant's organizations identified within the study. Participants in the letter of invitation and the informed consent form were ensured of their confidentiality and protection of their data for the study. Confidentially was also be protected by limiting access to the data and securely storing, encrypting, and protecting data in electronic folders with a password on an external drive and stored in a personal safe. Deletion of the study data will take place 5 years after the publication of the study.

Data Collection Instruments

I was the primary data collection instrument for this multiple case study project. The use of Google Forms was implemented to submit my questionnaire to the participants. The questionnaire was sent via a hyperlink to the participant's email account via my email account, which is a Walden University email account. The use of Zoom video conferencing for follow-up questions or an approved video media platform that accommodates the participants was also implemented. The six data collection methods were Google Forms questionnaire, email, telephone, NVivo 12 software, Microsoft Excel, and video conferencing. Because of COVID-19 restrictions, no in-person interviews were conducted.

Implementation of cognitive interview protocols for my follow-up questions were included in this study. Cognitive interviews (CI) empower participants to reflect upon a previous task they completed, define what it means to them, and then have the participant describe how they completed that task (Wolcott & Lobczowski, 2021). A combination of an online questionnaire, and telephonic follow-on interviews was the method of data collection. A notable advantage of using surveys, questionnaires, telephone responses, and on-site visits is that each data collection instrument produces unique results that differentiate from one another (Goe & Roth, 2019).

Usage of NVivo 12 software to perform thematic analysis of the responses to the eight interview questions and transcribe any audio recorded was the method for analyzing the data findings. Microsoft Excel was used to track all data collected to ensure the validity of the findings. Combining NVivo 12 and Microsoft Excel allows qualitative

research to be adequately coded and data collection to be tracked and documented (Goe & Roth, 2019).

Semi-structured interview techniques were incorporated into this study. The use of semi-structured interviews enables the researcher to present a few pre-determined questions while allowing for follow-up questions to be developed and presented later to the participants and ensuring ethical standards are adhered to by the researcher (Husband, 2020). Semi-structured interviews allow the researcher to create additional questions upon discovering different themes identified during the coding process (Saunders et al., 2015).

The reliability and validity of the research findings were verified and determined to be sound by reviewing the transcripts associated with the participant's responses to the interview questions and associated transcripts, as well as data triangulation. The review of the transcripts and implementation of data triangulation is adequate to use as measurements for ensuring the researcher's reliability and validity of the research findings and ensuring rigor is met (Cypress, 2017). Establishing rigor post hoc can produce more severity and ensure reliability and validity of the study is obtained. (Cypress, 2017). Care of and control of all research findings during this study and maintaining consistency in my research methods and analysis of the results, logically articulating these items so that the audience can understand and later duplicate them will were adhered to. As my study is a multiple case study, data triangulation was a requirement to achieve the reliability and validity of the data.

Data Collection Technique

Data collection and analysis of the findings create a dialogue among researchers and participants and promote inclusion and diversity (Reid & Koglbauer, 2018). The data collection items for this multiple case study were based on the research question, "What technology innovation strategies do supply chain managers use to adopt information technology to improve product marketing and profitability?" The data was collected via responses submitted through Google Forms and emails, and telephone calls in which written logs from the responses were transcribed to Word files. Each participant was provided a separate Google Forms questionnaire, all of which contained the same questions. Three of the four participants were known to me through previous interactions within my professional employment. These three participants also referred me to several other participants. However, I contacted nearly 300 potential participants I identified via LinkedIn as being relative to supply chain management. Out of those, roughly twenty responded. Out of the twenty, ten backed out. Out of the ten remaining, only five met the requirements for this study. The initial contact was in the form of an email sent using the text listed in Appendix C of this study or sent via LinkedIn's messaging service using the text from Appendix C.

The data collection process for this study was Google Forms, emails, Zoom, and telephonic interviews for the semi-structured interview portion, as well as implementation of CI to draw out additional answers from the participants. Google Forms is an online software provided by Google that allows the administration of surveys and questionnaires and offers qualitative and quantitative data from the respondents of the

surveys or questionnaires. Google Forms in qualitative studies is a cost effective and user-friendly means of capturing significantly rich data when using a limited number of questions (Lisinskiene et al., 2019). The ability to print the finalized responses to a PDF file then convert to a Word file allowed me to easily upload the participants responses as a Word file into NVivo 12 and begin the coding process. Member checking was conducted by reviewing the questionnaire responses, and following up via telephone, Zoom, and emails with each participant to ensure their responses were accurate. This was done to ensure data triangulation was achieved. None of the participants were willing to share corporate documents and referred me to their company's website for additional information .

Appendix C was for the introductory phone/email script when first interacting with the participants. Ten participants that specialize in the supply chain management industry and who are either owners or managers were identified. They were identified via online methods such as LinkedIn and ResearchGate. Only five of those 10 were provided the interview questions via the online questionnaire once IRB approval was granted to proceed forward with my Section 3. This was due to five of the 10 participants not having the necessary experience required for this study. The five remaining participants has extensive backgrounds as wither business owners or managers who not only managed supply chain processes and operations, but also were in positions to implement new processes and have previous implemented new processes within their respective organizations that enhanced the organizations capabilities.

I reviewed each participants LinkedIn profile to ensure they possessed the necessary background to participate in this study. The three individuals I know who participated in this study already had the necessary background to be good candidates for this study due to my nearly ten years of business-related activities with them. Data triangulation was achieved via the following three methods: questionnaire, company website, and follow-on interview questions. Telephonic and Zoom responses were documented via handwritten notes. Those notes were then transcribed into a Word file. NVivo 12 software transcription was then used to analyze the responses. Each participant's company website provided a mission statement, list of corporate members, business lines, contact information, federal and state certifications relative to small businesses, as well as Data Universal Numbering System (DUNS) number and North American Industry Classification System (NAICS) codes.

No incentives were offered for this study to prevent any conflicts of interest with the participants and their respective organizations. There were no in-person meetings due to COVID-19 restrictions. For follow on questions, the use of video conferencing software Zoom, as well as telephonic methods was implemented. Handwritten notes were taken and tracked via an Excel file matrix containing participant ID numbers, with a time and date associated with the note and a detailed description of the notes. These notes were used to conduct further thematic analysis within NVivo 12 by transcribing the notes to a Word file. These notes were necessary as some of the participants wanted to clarify their initial online questionnaire responses, as well as add additional information.

The data collected was stored online in my Google account, copied to a Word file, and placed on an external hard drive that is encrypted and password protected. The hard drive is stored within a personal safe and will be retained for 5 years. All emails, written logs, telephone calls, and recorded audio were transferred to the external hard drive discussed previously. Cognitive interview techniques allow the participant to accurately depict the psychological and physical aspects of a previous experience (Lokanan, 2018). Cognitive interview protocols were used for follow-up questions.

I was able to capture the variables PEOU and PU associated with the TAM and the relationship to interview question responses obtained from the interview questions. These protocols are located in Appendix C. Cognitive interview techniques involve the four basic principles of mental recollection, report all findings, change configuration, and change perception (Lokanan, 2018). Only change perception seemed relative during the follow-on questions, as some of the participants clarified their initial responses. Cognitive interviews enhance communication between the researcher and participant, encouraging additional thoughts between the researcher and participant, and improving socially related dynamics during the study (Fisher & Reardon, 2020). Several of the participants added additional information to their initial responses, as well as provided extensively more information to the follow-on questions.

Data Organization Technique

For research data to sustain its reliability and validity, researchers must properly retain their accumulated data by creating a plan for data management that includes how the data will be collected, appraised, stored, preserved, access control to the data, and re-

use and transformation the data for later use (Drysdale, 2020). For this study, usage of an online questionnaire consisting of eight interview questions is an intrinsic part of this study. CI was used as a follow-on interview technique for the additional questions developed from the thematic analysis of the original questions posed. Usage of the letters and numbers P1, P2, P3, P4, and P5 to describe study participants on transcripts and research logs was implemented to manage and protect data and participants identifies.

The data received was manually inputted and tracked in an Excel file with the following headings: Participant ID, type of data received (video, audio, email, document, survey, etc.), date and time data received, destruction date (5 years from received date, priority level (value of the data) with 1, 2, and 3 with 1 being the highest level of priority and 3 being the lowest level of importance. The data is securely stored on an external hard drive and encrypted, and password protected. The external hard drive is stored in a secure safe located within the domicile. Any hard copy files have been scanned and converted to an Adobe PDF file, then added to the external hard drive, and the original hard copy was destroyed. All data related to this study will be destroyed within 5 years of the original date of creation.

Data Analysis

Qualitative data analysis software (QDAS) can be used in numerous ways to come to a conclusion-based decision relative to the data found during the qualitative study (Le Blanc, 2017). Many software programs assist data coding, thematic analysis, and classification (Looney, 2018). NVivo version 12 was used for the qualitative analysis. Coding and retrieval programs help the researcher retrieve text segments from

the data set and code them, and theory-generating programs identify relationships between coded categories theoretical explanations (Looney, 2018). The process of coding, identifying themes, and classification is subjective, and success depends on the researcher's skill and experience (Looney, 2018).

NVivo 12 software was used to perform a thematic analysis of the interview questions and the responses provided by the participants. I chose NVivo 12 software because I have been using it in my workplace for several years, and I consider myself an expert with this software. Additionally, NVivo 12 was $89 for a two-year student license, whereas ATLAS ti was $99 for a two-year student license. I have never worked with ATLAS ti and having to learn another software could take a significant amount of time away from my study. My background in cyber security also raised concerns with Atlas TI being download to my personal computer. The United States Department of Veterans Affairs has continuously flagged Atlas ti as a significant security risk to the organization's information systems network (U.S Department of Veterans Affairs, 2021). Only specific versions have been approved but with limited usage of the application.

Classification of coded data or assigning the coded data to an appropriate theme is like working on a complex puzzle (Jackson & Bazeley, 2019). Just as one starts by sorting the different pieces of a puzzle based on the objects represented in the puzzle, classifying the coded data based on their similarities is just as important (Jackson & Bazeley, 2019). Two standard classification systems are typology or straightforward classification into groups and taxonomy, or multiple level taxonomies with super-ordinate and subordinate categories (Jackson & Bazeley, 2019). Some sets of data

classify easily, while other sets of data remain difficult to classify. During the thematic analysis, organization of the codes was based on the TAM variables PEOU and PU and the newly identified themes.

Codes are surrogates for textual data, summarizing and synthesizing observations in a raw data set (Jackson & Bazeley, 2019). Researchers use codes to emulate distributional analysis and hypothesis testing and to group or categorize otherwise discrete events, statements, and observations into distinct classes (Jackson & Bazeley, 2019). The coding method extends to assigning numbers, symbols or objects, or any other form of representation. Researchers use thematic analysis or identification of themes to categorize the coded data resembles sorting a box of buttons, which people group according to size, number of holes, color, or type. Researchers then find the themes that are relevant and categorize data to such themes similarly. When creating categories, include actual label or theme, define the theme, describe how to recognize a theme, describe any qualifications or exclusions to identifying themes, and provide examples that lend clarity and eliminate possible confusion (Jackson & Bazeley, 2019). Following this coding method allowed for the proper implementation of thematic analysis of the research data.

The conceptual framework that is utilized within this study pertains to the TAM framework. This framework used the PEOU and PU to determine the validity of innovative strategies utilized for implementing technology within SCMs improve product marketing and profitability. The TAM framework is the method used to identified whether the themes created from the thematic analysis of the obtained data is relative to

the research question. The TAM framework is based upon human behavior and acceptance of newly implemented technology. This framework provided the foundation for development of those themes relative to my study through the development of interview questions pertinent to the TAMS variables.

Reliability and Validity

Nowell et al., (2017) research defines reliability and validity within qualitative studies as incorporating the additional factors of credibility, transferability, dependability, and confirmability to emulate the traditional quantitative assessment values necessary to achieve intrinsic reliability and validity of quantitative studies. Researchers must adhere to the use of the instruments and defined measurements within their research to ensure the reliability and validity of the research findings (Mendonça-Alves et al., 2019). To ensure reliability in this study, documenting the research process and using the interview protocol CI to ensure consistency during the interview process for follow-up questions separate from the online questionnaire should additional follow-on questions become necessary is required for this study. To ensure rigor and validity in qualitative research, researchers use data triangulation to achieve data saturation by better understanding stakeholders' requirements that the study could potentially produce and use to improve and allow additional researchers to build upon (Whitmore et al., 2019).

Reliability

Reliability within qualitative studies relates to the subject(s) and object(s) that are being studied and how they relate to the truth of the findings (Huttunen & Kakkori, 2020). To ensure the reliability of research findings and the analysis provided,

researchers must present the data in a manner that demonstrates clarity, coherence, and relevance (Caycho-Rodríguez et al., 2021). I established reliability, and ensured clarity, coherence, and relevance in this study were presented by documenting the research processes, implement data triangulation, and implement member checking for any CI-related follow-up questions.

Dependability. The dependability of research findings in qualitative research can allow the researcher to accurately depict a model dependent on the research results (Aizpurua et al., 2020). Dependability within qualitative research addresses whether or not the data is consistent in using prolonged engagement, persistent observation, data triangulation, and member checking (Korstjens, & Moser, 2018). Researchers use prolonged engagement to narrow down risks associated with the study to mitigate those risks to ensure dependability (Chemweno et al., 2018). Persistent observation is the least commonly used method of securing the truthfulness of research findings, as data triangulation is the most preferred method (Liao & Hitchcock, 2018). Member checking involves allowing the participants to validate the results of transcribed data or research findings for accuracy, and if necessary, provide corrections to the researcher to achieve accurate information (Brear, 2019). Data triangulation consists of multiple theories and methods being used to obtain numerous data sources to produce a clear and concise understanding of a phenomenon and validate the findings' integrity (Odiri, 2019). All case study processes was documented and the usage of methodological triangulation such as member checking to ensure the study's dependability was achieved.

Validity

Qualitative research validity depends on the context and purpose of the research study and its findings concerning the methods used to conclude the results (FitzPatrick, 2019). Validity within qualitative research provides that the data presented is appropriate and genuinely expresses an assessment of participants' experiences in a trustworthy manner and can be duplicated within the study and in future studies (Spiers et al., 2018). Validity of qualitative data is further achieved by ensuring the research questions(s) are adhered to so that bias data is not being presented in the study (Moon, 2019).

Credibility. The credibility of qualitative research should strive to answer the research question(s) while researching a particular phenomenon and having the ability for that research to be reproduced similarly by others in the future (Haven & Van Grootel, 2019). Ensuring the researcher's study's credibility is maintained by implementing methodological reporting standards established within their research and following those standards should always be adhered to (Ospina et al., 2018). Usage of triangulation by comparing participants' responses to member checking methods should additional themes arise during the thematic analysis portion of the study that requires follow-on questions using the CI method was incorporated into the study.

Transferability. Transferability within qualitative research are the experiences and perceptions associated with the data findings and results that are relevant to the conclusion of the study and should be able to be duplicated in a systemic review by other researchers and include applicability, generalizability, transportability, directness, extrapolation, internal/external validity, and relevance (Munthe-Kaas et al., 2019).

Establishing transferability by describing the research design, the data collection processes, and the relation of the study to allow the audience a simplified method to compare this study to similar studies is necessary for this study and was included. Some ways to obtain transferability are adopting previously used practices from other previously published research so that the results can be duplicated (Hintz et al., 2018). Another method is blended data. The analytic processes associated with big and thick data are combined to develop strategic approaches necessary to create sound research. (Bornakke & Due, 2018). This could enhance research processes and new concepts being identified for future research efforts, reinforcing the researchers' ability to obtain transferability (Bornakke & Due, 2018).

Confirmability. Confirmability enhances data triangulation by ensuring the data obtained and analyzed can be confirmed for accuracy by others (Abdalla et al., 2018). Confirmability is an additional means of establishing validity within a study. Enhancement of confirmability can also be obtained by including in-text citations and quotes and supporting references in the researcher's study while justifying the new findings within the discussion and conclusion of the researcher's study (Stenfors et al., 2020). Several reliable measurement tools implemented during thematic data analysis are thick rich data, blended data, data investigator triangulation, member checking, and audit trails (Wicaksono et al., 2021).

Data Saturation. The achievement of data saturation within a doctoral study ensures the reliability and validity of the study. Data saturation is achieved when the researcher has continuously sampled and analyzed all data associated with the study, and

no new findings can be identified, and the theory relative to the study is sound (Aldiabat & Le Navenec, 2018). Data saturation does not define an adequate sample size when conducting formal research, but a sample size specification and justification are necessary before implementing any study (Guest et al., 2020). Previous research performed by Guest et al., (2006) on the qualitative research method determined that the most affluent data was obtained during the first five to six interviews and that little to no additional new information was identified when the researchers neared their twentieth interview. Guest et al. (2020) also identified that 80% to 92% of all themes were found during the first ten interviews of the four datasets analyzed throughout their research.

It is commonly agreed upon amongst researchers that when there is an inability to obtain any additional data, identify any new codes or themes, and the research can be duplicated, data saturation has been achieved (Fusch & Nuss, 2015; Guest et al., 2006). The number of participants identified and the eight interview questions and their design were the two methods of measurement used to ensure data saturation has been obtained in this doctoral study. When no additional themes within the participant's response to the eight open-ended questions are identified, and a minimum of five participants provide adequate responses to the interview questions, data saturation was been achieved. A sample size of five participants for this doctoral study was sufficient to support the research findings and achieve data saturation.

Transition and Summary

In Section 2, I restated the purpose of the study, discussed my role as the researcher and participants of the study, presented the research method and design, and

described the population and sampling strategies. Section 2 also includes the data collection instruments and technique, data organization and data analysis techniques, ethical consideration in research, and the validity and reliability in research. In section 3, I will provide a summary of the findings and present data from the study findings, which would include data from interviews, analysis of the interviews, and archival company documents. I will also discuss the application of the findings to professional practice and the implications for social change. Finally, I will make recommendations for action and future research and present my reflection.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative multiple case study was to explore the strategies business managers use to adopt technology innovations to improve product marketing and profitability. The data came from business owners and managers obtained via an online questionnaire, telephone interviews, and email responses. The findings show strategies business managers and owners within the supply chain industry adopt technologies to enhance innovative strategies to improve marketing of products and increase profitability. This study includes five business owners and managers from five separate organizations (see Table 2). These organizations reside in the southwestern region of the United States. Table 2 represents the breakdown of the participants and where they reside in each organization. For privacy and protection of participant's identification, the naming conventions of P1 through P5 were used to replace names and organizations. P1 represents participant 1, and P5 means participant 5.

This study's findings begin with the overarching research question: What technology innovation strategies do supply chain managers use to adopt information technology to improve product marketing and profitability? I focused on five business managers and owners of supply chain management firms located within the southwestern region of the United States. A review of transcripts, online questionnaire responses, telephone interviews, email responses, and three additional follow-up questions were conducted for all five participants to ensure reliability and validity of the study. During

the interview process, three further questions were derived from the initial responses from the eight initial interview questions:

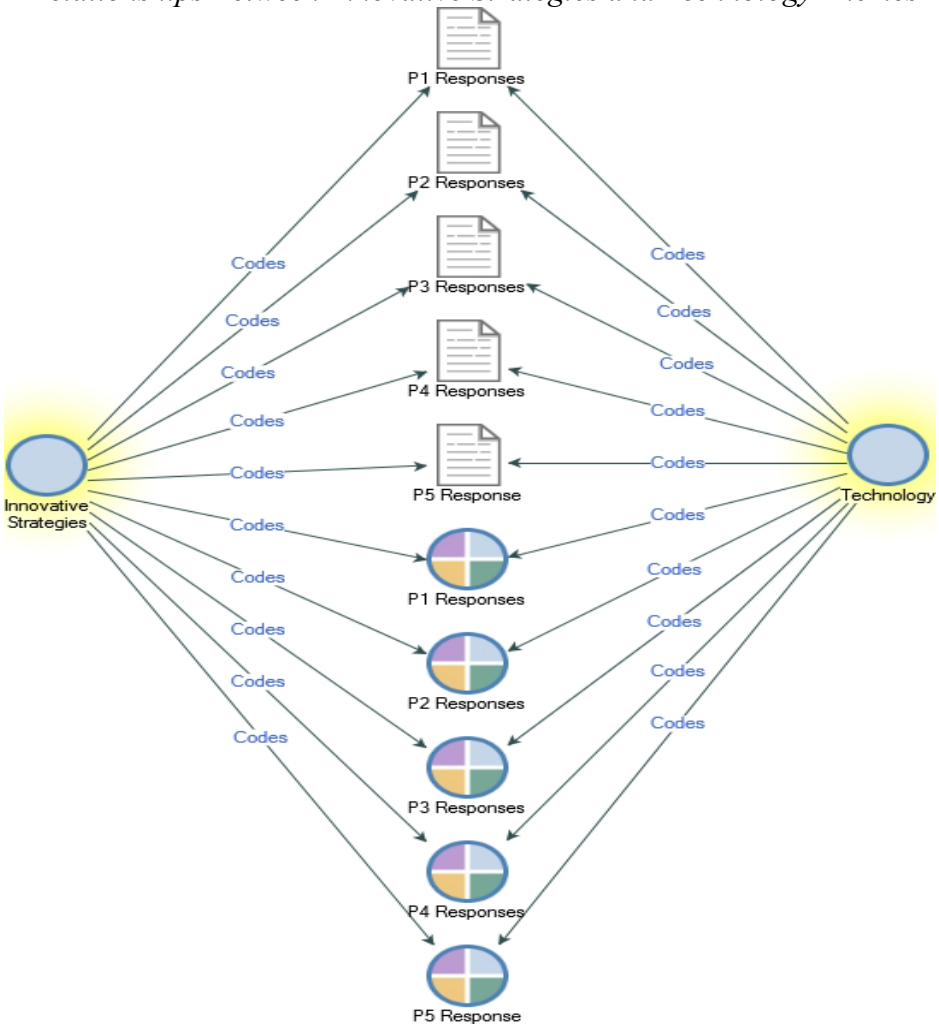
1. Do you believe the technologies you listed in your responses are easy to use and why?
2. Do you believe the technologies you listed in your responses are secure enough to prevent cyber security threats and why?
3. Are there any applicable regulations that hinder productivity and profitability?

Primary themes that were identified during the thematic analysis using NVivo 12 qualitative coding software were challenges, innovative strategies, and technology. Challenges have three sub-themes, innovative strategies have nine sub-themes, and technology has two sub-themes based on the TAM variables perceived ease of use (PEOU) and perceived usefulness (PU). The challenges' theme was derived from the three additional follow-on questions identified from the initial interview question responses. Innovative strategy's sub-themes include inventory management, automation, metrics, data management, marketing strategies, profitability, customer service, resources, and management decisions. The technology theme consists of the variables associated with the TAM and are perceived ease of use and perceived usefulness. The challenges' theme was identified based on the results of the three interview questions created from the participants' responses, consisting of cyber-security, applicable regulations, and uncertainty.

Theme One: Innovative Strategies

The primary themes involved exploring strategies business managers use to adopt technology innovations to improve product marketing and profitability. Theme one provided the primary construct for developing the additional NVivo 12 nodes. Figure 1 shows the relationships between the innovative strategies and technology themes identified during the NVivo 12 analysis. Every participant has a relationship to technological products based upon their responses to the themes associated with technology and innovative strategies that impacted their organizations profitability and productivity.

Figure 1 *Relationships Between Innovative Strategies and Technology Themes*



These innovative strategies were successful due to participants abilities to overcome uncertainty in such a volatile market given the current COVID-19 pandemic and sustain organizational goals. However, dependency upon external resources and strategic partnerships has ensured the sustainment of these five organizations participating in this study. An organization's decision to export globally is influenced by the global market, current knowledge of technology and associated production costs, and the decision to move forward with the global export-based upon risks and resources

available, as well as established relationships that could impact timely exports (Hessels & Terjesen, 2010). Christopher (2000) identified that complexity in delivering products increases when organizations grow. Implementing agile practices can further streamline supply chain management practices (Christopher, 2000).

As managers begin developing implementation strategies for existing internal and external resources, careful consideration of potential rapid growth should be observed. The business problem became more apparent during this study based upon the literature review and the findings from the participant's responses. Manager's implementation of additional processes became more of a requirement than an optional necessity. The TAM conceptual framework of PEOU and PU in relation to innovative strategies supply chain managers use to improve product marketing and profitability based upon this study determined that implementation of technologies vastly enhances an organization's productivity but was also hindered by training and employee acceptance of the technology.

Sub Theme One: Automation

The prospect of implementing successful strategies to improve product marketing and profitability was driven by the need for automation of supply chain management processes. P1 stated, "inventory controls and min stock quantities to auto-generate vendor PO's is a necessity". P2 stated the need for "warehouse and inventory control operations" and "various data collection and predictive analysis tools." P3 noted that "better customer experience Managed data and analytics are necessary for supply chain management

organizations.” P4 stated the requirements for “streamline processes so users, consumers, and end-users are able to access information easily.”

P5 said, “However, I think with newer AI/ML technologies that are being introduced into database appliances, network appliances and other tools that are designed to learn about an enterprise's environment may result in much more efficient use of your Cybersecurity team's time post discovery of threats in the network and may also lead to the discovery of APT's much faster than before.” Every participant talked about the necessity for artificial intelligence. However, 4 out of 5 of the participants expressed their concerns regarding cyber security and protecting information in a cloud-based and automated environment. This is what led to the additional three follow-up questions.

Sub-Theme Two: Customer Service

Within this sub-theme, automation was highly prevalent. P1 stated, “This ensures our stocking levels are maintained for our customers for the products we have on contract with them. We market this as a value add with automation to ensure we have product availability for the customer’s needs.” P3 stated, “Technology is not always readily available and, in some areas, where technology lags create vacuums and ignores customers residing in those area. Missed opportunities!” Automation is not always readily available, and in some cases, is not a feasible technology unless the technology being deployed within the organization supports the organization and relative customers adequately (Mahlamäki et al., 2020). The organization's success is based upon the organization's ability to translate a customer's need into a tangible specification that is within the limitations of the product or service provided (Mahlamäki et al., 2020). P4

stated, “In a government sector we are limited my acceptable manpower and by a budget. In the commercial and contracting sector, we are not limited. I do feel that if the “right pitch” is made to the appropriate audience, things would change.” Every participant stressed their requirements for a positive customer engagement, leaving a lasting experience that results in repeat business.

Sub-Theme Three: Data Management

Predictive analysis, inventory management, and forecasting demand within this sub-theme were prevalent. P1 stated “communication with the customer to forecast demand” is necessary. Additional tools could further streamline forecasting demand while allowing customers engagement in a streamlined manner. Within this theme, every participant talked about the need for artificial intelligence. Artificial intelligence is defined as the methodology a machine uses to mimic human behavior to come to a rational decision while simultaneously measuring those decisions to ensure those decisions are reasonable and in line with the necessary relative task at hand (Pournader et al., 2021). P1 through P5 all mentioned the necessity for predictive analysis to meet customer requirements and forecasting efforts. P2 stated, “Regardless of whether using predictive analysis tools or BD/marketing software, it all comes down to where and how data is stored, and just because it’s in a ‘secure’ cloud environment does not mean it’s NIST compliant.” Organizations should always consider security but note that storing both internal and external data within a cloud environment provides significant risks.

Sub-Theme Four: Inventory Management

Every participant talked about inventory management as one of the top priorities in ensuring their organization's success. Inventory management is dependent upon the efficiency of procurement and supply planning practices. Both centralized and decentralized operations align with the demand for resources and associated product lines sold as goods (Semenchuk & Shutenko, 2021). P1 stated the necessity for "adjust minimum stock quantities and reorder values to try and maintain acceptable stocking levels." The data showed the need for a robust inventory management system to enhance the organization's profitability. P1 also stated that "Software applications can save a tremendous amount of time on the loading aspect, can automate packing and save space in shipping that all maximize profits." Data collection, predictive analysis tools, and artificial intelligence capabilities were among the top items discussed by all the participants. P3 believes that "Supply chain intelligence - Increased agility and mitigate disruption Supply chain management - design, planning and execution Inventory management is key to the organization's ongoing abilities to streamline products to customers while simultaneously building a coalition of vendors to enhance customers' experiences." The TAM provides a means to measure PEOU and PU not just on the internal user level but the external user as well and could also be used to measure vendors experiences with software applications.

Sub-Theme Five: Management Decisions

Management decisions were not a significant finding during this study. Only P3 and P4 provided any response relative to management decisions and impacting supply

chain management processes. P3 and P4 have been automating production and supply chain management processes for quite some time. However, this is not to discount management decisions within supply chain management. The potential for decisions being made by management not based upon technical or economic requirements but based upon what is right and wrong within the industry that increase the organization's footprint with the results being increased common structures (Hessels & Terjesen, 2010). Management decisions not based solely on technology and economics has the potential to enhance an organization's ability to reduce overhead costs while increasing profitability.

Sub-Theme Six: Marketing Strategies

There is a lot of data related to this sub-theme. The most widely used form of marketing is social media. P1 stated, "We market this as a value add with automation to ensure we have product availability for the customer's needs." Even in the organization's social media marketing techniques, automation is prevalent. P1's dependency upon outside larger organizations has made it very successful.

P1 stated, "We are continually engaging with other larger companies in the supply chain industry to seek new strategies and products to help create efficiencies." P2 stated, "Predictive analysis is the primary strategy we employ for operations and logistics services supporting client warehousing requirements; this certainly has a marketing capability as well. Our use of predictive analysis is through an OEM proprietary Logistics Information System that assists with supply chain requirements, warehouse and inventory control operations, and deliveries management." The adoption of technology to further enhance the organization's goals demonstrates the need for further implementation of

blockchain technologies to further advance an organization's capability within supply chain management industries (Queiroz et al., 2021). Implementation of blockchain technologies could enhance the organizations' ability to market to a larger audience, or in some cases, a more targeted audience. The participants heavily use social media platforms such as LinkedIn and Facebook. Additionally, software applications such as dynamic ads and lead generations forms were also mentioned. Another marketing strategy is allowing external vendors and customers to access internal databases to view current inventory to streamline purchasing requirements.

Sub-Theme Seven: Metrics

The primary strategy used by nearly every participant is predictive analytics to obtain metrics. Resilience is when an organization can recover from a disaster related to the product lines provided in an efficient, effective, and rapid manner and is an effective methodology within the supply chain industry (Behzadi et al., 2020). Predictive metrics provide a means for organizations to practice resilience. P2 stated that "Predictive analysis is the primary strategy" in obtaining metrics. P3 stated, "better customer experience Managed data and analytics" for overcoming challenges relative to innovative strategies that utilize technology. P4 believes that "tracking visibility across multiple countries simultaneously" is necessary to increase profitability. However, Hessels and Terjesen (2010) warn us that collecting information on foreign markets and networking with and qualifying local support vendors can become costly and cumbersome and could distract from what metrics are genuinely required to be gathered and analyzed. Organizations should be aware of the costs associated with focusing on foreign markets.

Sub-Theme Eight: Profitability

This sub-theme provided numerous strategies that were very similar to each participant but unique in their deployment method. P1 stated, “We have several strategies that include the above-mentioned communication requirements with customers for accurate product demand forecasts as well as vendors for production timelines. Additionally, we strategize on freight options and consolidation to minimize freight costs while trying to increase deliverable timelines. The transportation and freight costs are as important to maximizing profitability in the supply chain. We continually work with our freight carriers to automate the bill of lading generation from our customers utilizing our pre-negotiated rates while trying to maintain maximum load capacity and maximum units per pallet that minimize per-unit transportation costs.” P1 in their statement regarding transportation noted that:

> The continued regulation and tax on oil and other fuels used for transportation certainly negatively affect profitability from both a time and spend aspect.” P2 stated, “Mostly due to cost and as a small business, we would likely continue to use limited scope Artificial intelligence tools in lieu of a full-scale Artificial intelligence system/strategy.

One of the strategies supply chain managers and business owners could employ is grey modeling-based forecasting to increase profitability. Grey modeling forecasting is derived from grey systems theory and predicts the future values of a time series of recent datasets relative to uncertainty and small sizes (Ene & Öztürk, 2017). Grey systems theory can benefit supply chain managements organizations by allowing a predictive

model for determining the end of life of a product, thus allowing the organization to prepare for either a replacement or an upgrade to the existing product. Grey systems theory could enhance recovering and recycling processes that supply chain management organizations participate in. If organizations do not participate in recovery and recycling programs, metrics obtained from grey systems theory implementation could enable the organization to develop predictive analytics for potential future product lines (Ene & Öztürk, 2017, p.156).

Sub-Theme Nine: Resources

Every participant stressed their concerns regarding resources due to the COVID-19 pandemic and other regulations. P1 stated, "For transportation, warehousing and airlines all involved in the supply chain have continued to have difficulty keeping staffing levels high enough to meet the needs of demand." P2 believes "The FARS and DFARS require a great deal of administrative infrastructure to be compliant and is probably why the defense contractor industry is not appealing to so many commercial businesses." DFARS stands for "Defense Federal Acquisition Regulation Supplement," and FARS stands for "Federal Acquisition Regulation." Both regulations are in place to guide federal agencies in acquiring goods and services (General Services Administration, 2022). Shared information in a cross-functional environment can only be successful if the organizations are willing to leverage the information via process integration with adequate technology to support ongoing supply chain efforts (Christopher, 2000).

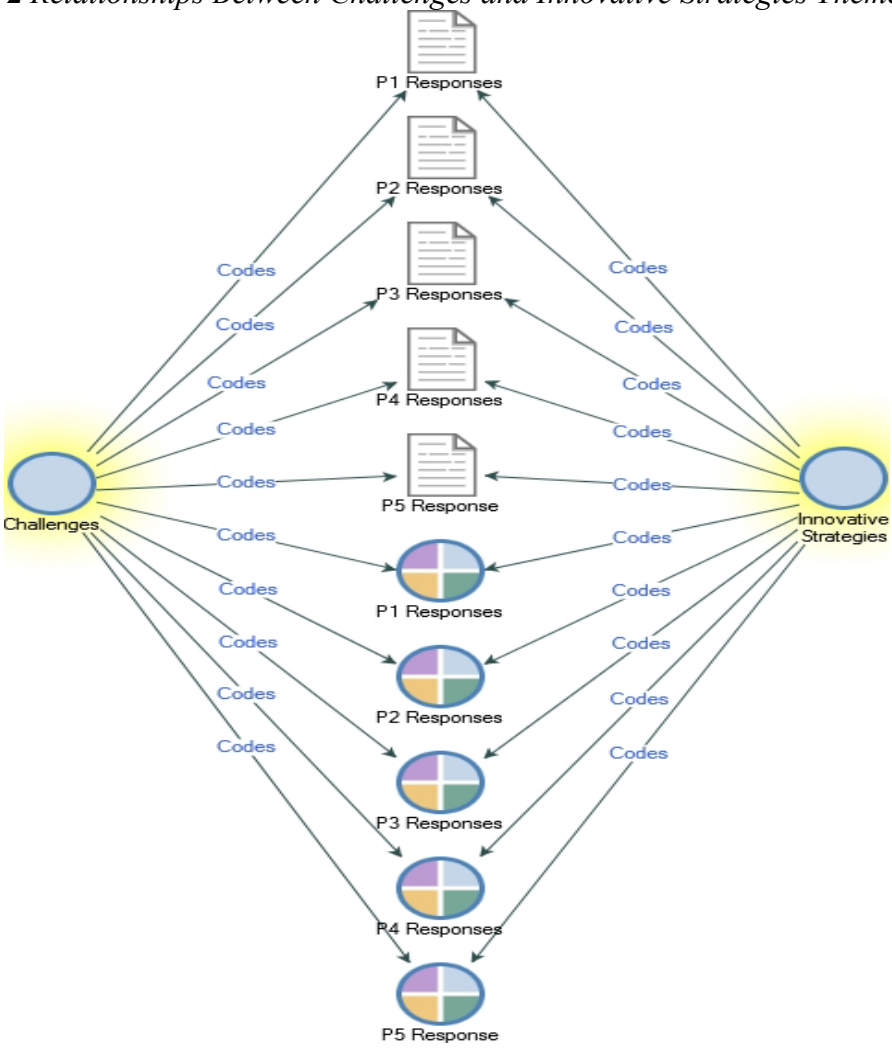
Organizations dependent upon their resources must make decisions based upon their objectives but consider currently available resources (Hessels & Terjesen, 2010). An

organization's ongoing success depends upon adapting to social norms, adhering to environmental factors, and keeping current with the accuracy of economic measures (Shibin et al., 2020). Uncertainty is a crucial variable among every participant. Institutional Theory (IT) and Resource-Based Theory (RBV) are relative potential solutions for all participants' responses as an extension to the TAM. RBV focuses primarily on resources and how they impact an organization's business model (Shibin et al., 2020). IT is geared towards environmentally friendly supply chain management programs and incorporates quality management processes and technology applications that enhance an organization's capability (Shibin et al., 2020).

Theme Two: Challenges

The challenges' theme derived from initial innovative strategies responses to the interview questions, which later identified three additional interview questions, which expanded into three sub-themes. Figure 2 shows the relationships between the challenges and innovative strategies themes identified during the NVivo 12 analysis. Cyber security was a concern with all the participants based on their responses. Existing regulations impacted every participant's business line in either a positive or negative manner. Uncertainty was prevalent with every participant's response. COVID-19 has imposed significant challenges within supply chain management organizations. As with risks and uncertainty, supply chain management organizations must implement agile strategies to ensure proper planning and an integrated execution solution to overcome risks and uncertainty (Medina-Serrano et al., 2021).

Figure 2 *Relationships Between Challenges and Innovative Strategies Themes*



Sub-Theme One: Cyber Security

Information technology and associated cyber security risks put supply chain management organizations that utilize cloud-based applications at risk. The risk greatly increases with human interaction with technology that supports supply chain management processes. Lebek et al's. (2014) research about information security awareness behavior using Theory of Planned Behavior (TPB), General Deterrence Theory (GDT), Protection Motivation Theory (PMT) and Technology Acceptance Model (TAM) identified that

behavioral intention (BI) and actual behavior (AB) significantly increased organizations cyber security risks. P1 stated, “We don’t have the details of the software to make a determination that it will prevent threats but in order to ride our system it must comply with certain standards.”

Leaders are more prone to incorporate technologies based upon the application meeting a requirement that adheres to a particular regulation. NIST-800 is one of those regulations. NIST (National Institute of Standards and Technology) comprises numerous regulations that set standards for federal agencies and support businesses to protect against cyber security threats. P2 stated, “A further challenge are the applicable regulations for handling and storing the information “. P2 provided the NIST 800-171 as an example. Cloud computing can be costly. Internal storage such as hard drives and virtual drives can also increase costs within organizations. However, with advanced manufacturing technologies (AMT) and inter-organizational information technology systems, topped with cloud computing, supply chain management organizations can significantly increase e-commerce and e-business capabilities, thus increasing profits (Manuel Maqueira et al., 2019).

With the NIST requirements for federal contractors and government agencies, there are limitations to specific applications that are being utilized. P2 stated, “We have to limit the way we use some of the technologies because of NIST 800-171 and CMMC 1.0 (soon to be 2.0) requirements for handling CUI and have even avoided some technologies because of compliance.” CUI (Controlled Unclassified Information) consists of not classified information but is sensitive in nature (i.e., social security numbers,

names and associated addresses, salary, and other personal information). P4 stated, “No, I do not feel that the systems are very secure. The systems were designed in the ’80s and ’90s and are rarely updated. The likelihood of the systems being compromised I feel is high, especially if the system is “live” and on-line. There has not been enough steps taken to prevent a cyber-attack, and there have been numerous compromises to far more complex systems. Based off of my own research, cyber security for a large company is one of the biggest underestimated/ undermanned areas within the company across the US.” Organizations may implement the appropriate level of cyber security due to the increased costs or the complexity of cyber security frameworks.

Prevention of all cyber security attacks may not be possible when P5 noted:

> No, based on the way applications and networking systems are built, it is impossible to prevent threats. However, I think with newer AI/ML technologies that are being introduced into database appliances, network appliances and other tools that are designed to learn about an enterprise's environment may result in much more efficient use of your Cybersecurity team's time post discovery of threats in the network and may also lead to the discovery of APT's much faster than before.

With organizations migrating to a cloud-based solution and with AMT and inter-organizational information technology systems becoming more prevalent, organizations will be forced to enhance cyber security threat deterrence-based controls. Cyber-security measures could increase costs to the consumer to cover these additional costs.

Furthermore, as cyber-attacks increase, consumers may want additional reassurance from organizations that their personal information is adequately protected.

Sub-Theme Two: Applicable Regulations

As with the NIST 800 requirements, the taxes on goods and the increased oil costs due to tax regulations are impacting supply chain management organizations. P1 stated, " The continued regulation and tax on oil and other fuels used for transportation certainly negatively affect profitability from both a time and spend aspect." With inflation rising and taxes increasing on oil, consumers will burden increased costs associated with supply chain management organizations' products. 27 nations participate in a carbon tax which has been implemented as a method to reduce global warming (Lai, 2021). Large supply chain organizations such as Wal-Mart, Tesco, and Unilever participate in carbon tax related programs due to their global reach but use a two-echelon total expected cost (TEC) model to control both costs and emissions relative to the transportation of goods to their distribution and retail locations (Ghosh et al., 2018).

Some states have significantly higher regulations than others. P2 states, "California is highly a regulated state for businesses, with high taxes. The FARS and DFARS require a great deal of administrative infrastructure to be compliant and is probably why the defense contractor industry is not appealing to so many commercial businesses." The costs of goods in other states will most likely be significantly cheaper due to more relaxed regulations and fewer taxes. The California Air Resource Board (CARB) has very strict requirements for large diesel trucks. Diesel trucks exceeding certain weight limits must have upgraded engines and carbon emissions reduction devices

installed if the owners of these vehicles wish to operate within California. California emissions requirements poses a significant challenge for supply chain management organizations that depend upon the above types of vehicles to transport goods within California and from outside of California into the state. This will most likely impact profitability and productivity within supply chain organizations that operate within the state of California.

Sub-Theme Three: Uncertainty

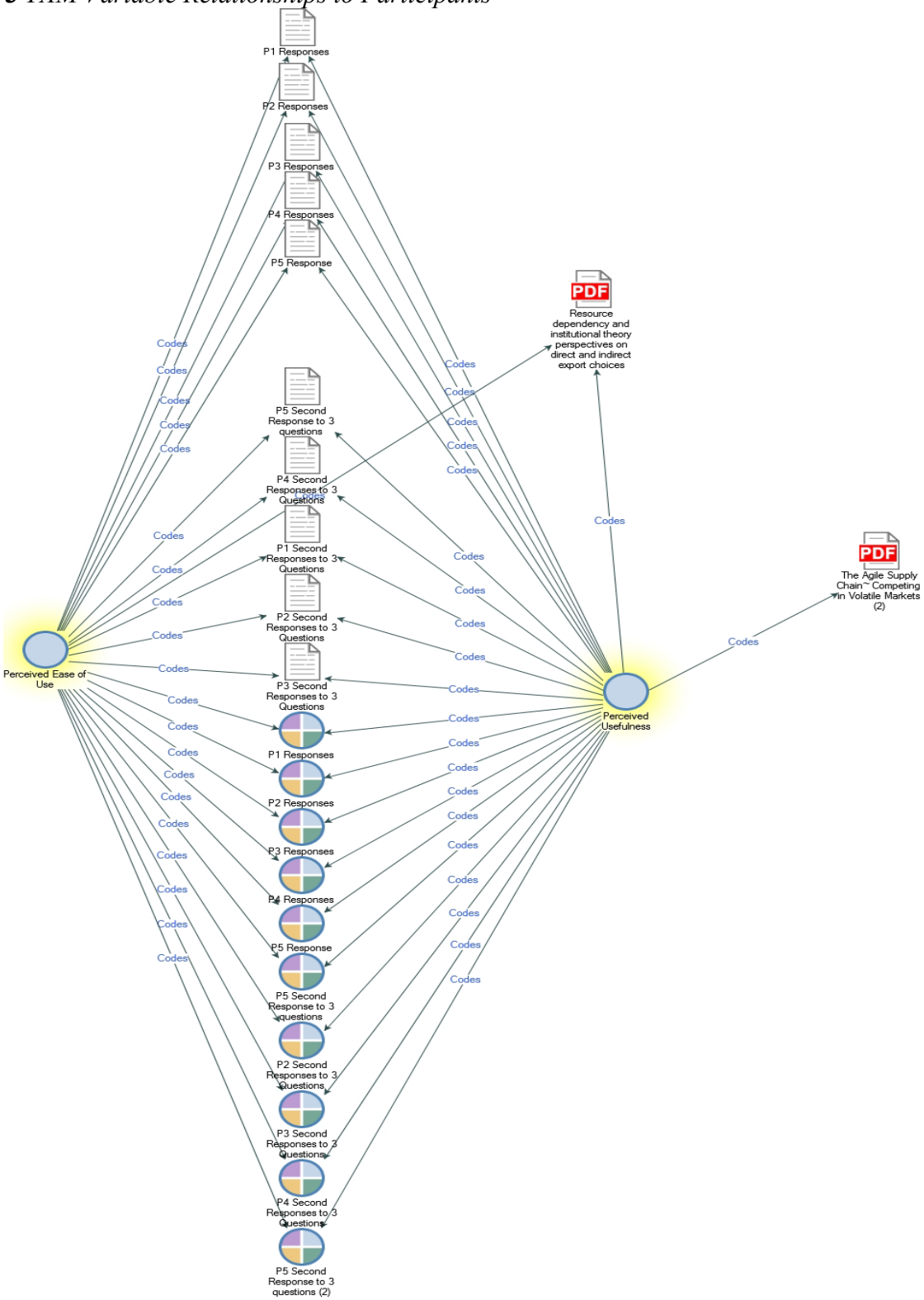
As with all supply chain management organizations, man-made and natural disasters are known risks (Fattahi, 2020). COVID-19 has created a supply chain management nightmare for worldwide supply chain management organizations. COVID-19 has forced supply chain management organizations to look at supply chain practices at a micro-level instead of the traditionally high level. Supply chain networks (SCN) must ensure that the appropriate stakeholders are identified and marketed adequately in a manner that implements agile methodologies (Dotoli & Epicoco, 2020). Agile processes could alleviate a significant amount of uncertainty by ensuring the targeted stakeholders support the SCN and associated supply chain management organizations. P4 response further reinforces Dotoli and Epicoco research when they stated “In a government sector we are limited my acceptable manpower and by a budget. In the commercial and contracting sector we are not limited. I do feel that if the “right pitch” is made to the appropriate audience, things would change.” Understanding what the targeted audience wants is just as important as who the targeted audience is.

Theme Three: Technology

The original TAM construct includes five key variables of perceived usefulness, perceived ease of use, attitude towards using, behavioral intent to use, and actual use to identify relationships between users and technology (Racero et al., 2020). This study only incorporated PEOU and PU. Based upon data obtained from the five participants, behavioral intention and attitude towards using were also identified due to cyber security and associated technology and regulations, which pose a risk to supply chain management organizations. Behavioral intention and attitude towards using were not explored in-depth for this study, focusing only on PEOU and PU. Figure 3 shows the relationships between resource dependency theory, institutional theory, and agile methodologies and how those theories correlate to PEOU and PU.

The PDF images in Figure 3 are presented this way due to NVIVO 12 capabilities. These PDF file images are based upon codes that were derived from literature review on resource dependency theory, institutional theory, and Agile supply chain management processes and were derived from research conduct by Jolanda Hessels, Siri Terjesen, and Martin Christopher (Christopher, 2000; Hessels & Terjesen, 2010). The relationships between these two theories and agile processes were identified throughout this study based upon the participants responses to the interview questions and three additional follow-on questions.

Figure 3 *TAM Variable Relationships to Participants*



The technologies employed by the numerous participant's organizations are primarily based upon the requirements for automation. Automation software, SAP / ERP, artificial intelligence software, inventory control software, Proship, predictive analysis software, Application Performance Monitoring (APM) tools, shared Originally Equipment Manufacturer (OEM) Logistics Information Systems (LIS), and iCodes, in-transit visibility, TCPT, LogAIS, Load Planning tools, and other service request systems were identified as primary forms of business management and planning tools used by the participants of this study. Supply chain management is an innovative methodology employed by managers due to the integrated critical thinking necessary for successful operations of the organization; artificial intelligence can further enhance that capability (Sharma et al., 2022). However, training associated with artificial intelligence software programs can be a significant challenge to the organization's internal and external resources. P1 states, “When introducing new technologies there is always a learning curve for the personnel when introduced to new systems or procedures. Ensuring proper training and efficient use of the technology is the most challenging aspect of introducing new technology to the supply chain.” P2 had very similar responses, where they stated, “We are still overcoming the challenges of implementing our data collection tools”.

P4 stated that “train and cross train other personnel to pick up the workload. Having to work across numerous systems this has been the only way to keep up if you are not working OT.” This was not due to employee turnover but due to the implementation of new technology necessary to sustain the organization's business lines. During this study, marketing tools such as LinkedIn and Facebook were identified as helpful tools.

Additional marketing tools identified as being successful were relative content management, hosted live and webinar events, as well as sponsored InMail and Text Ads, and QR Codes. Dynamic ads and lead generation forms were also used successfully by the study participants.

Sub-Theme One: Perceived Ease of Use

PEOU is commonly defined as an individual's perception of either a product or service and how easy it is to use and implement with the least amount of difficulty (Wilson et al., 2021). Implementing new technology within organizations will always pose a learning curve, but with experience, the learning curve can be overcome (Sarpong et al., 2020). In a global market dependent upon technology and information sharing, supply chain management and organizational failures can affect other organizations, eventually impacting the consumer (Rapciewicz & Buresh, 2021). The appropriate level of training before full implementation of new technology is necessary to prevent organizational failures that can impact the organization and consumers. P1 stated, "When introducing new technologies there is always a learning curve for the personnel when introduced to new systems or procedures." PEOU could be impacted depending upon the complexity of the technology and associated training.

Some of these learning curves could take ample time, resulting in reduced productivity. For example, P2 stated, " There's certainly a learning curve (sometimes it's several months) in the beginning with new software dashboards and using new databases, but we have never had any difficulties learning and using the technologies." Although there were no difficulties in learning the new technology, several months of reduced

productivity could impact an organization's profit and reduce the number of loyal consumers due to increased delivery timelines. P3 reinforced the above statement when they stated, “Technology is not always readily available and, in some areas, where technology lags create vacuums and ignores customers residing in those areas.” PEOU would most likely be negatively impacted based upon increased training timelines, reduced productivity, and improved delivery timelines. The fallout could be reduced profits, loss of consumer confidence, and decreased employee retention.

Sub-Theme Two: Perceived Usefulness

PU is the perception a product or service gives to an individual that positively affects that individual and makes daily activities more productive for them (Wilson et al., 2021). The participants in this study demonstrated that the technologies employed that support their supply chain management organizations positively impacted their productivity and profitability. P1 stated, “software applications can save a tremendous amount of time on the loading aspect, can automate packing and save space in shipping that all maximize profits.” PU is not used to measure individual job performance but the interaction between the individual and the technology being utilized (Mathieson, 1991). P2 states, “data and the predictive analysis tool we are still learning, and the human involvement is still quite considerable but forecasted to decrease overtime.”

The human factor is still prevalent regardless of the technology employed, and management decisions are still necessary. P2 also stated that “However, it’s important to point out that no technology or software we adopted has ever been a 100% solution, not even close. There are certainly customization features and usually an ability for

additional features by purchasing add-on modules ($$), but even with add-ons there usually seems to be some significant and unique requirements that can't be supported." The reliance on human resources is still necessary to sustain operations. P4 also described their dependency upon human resources, where they stated, "Error codes, system crashing, updates, system not performing as designed. The systems were designed to create efficiencies, but more often than not created an in-efficiency and we worked a lot of overtime. In a perfect world, operating from a static environment the system would suffice, but it is not ideal. P5 stated that when using APM or Observability tools, " It depends on the tools that you purchased. Many of them are difficult to tune for your landscape so you really need to understand all of the assets in the landscape." This required a human resource to understand the landscape.

Digitization has significant management enhancement properties that could increase an SCM organization's marketing capabilities to reach a larger audience while reducing users' negative experiences with associated digital marketing applications (Mahlamäki et al., 2020). P1 believes the implementation of artificial intelligence would enhance their capabilities. P2 states, "A limited scope Artificial intelligence tools in lieu of a full-scale Artificial intelligence system/strategy." would be beneficial to their organization. P3 believes that Artificial intelligence will "Make inventory monitoring more accurate and reduce material waste.". All participants spoke of the need for automation to sustain their business model. The positive effects of PU based upon the technology employed were prevalent in this study.

Table 2 is a representation of the participants and the organizations that they either own or manage. As you can see, all participants work for separate organizations. It is not known whether the participants organizations have any cross functional association, as this information was not asked of the participants to protect the organizations privacy while performing this study. Each participant organization specialized in supply chain management, so it could be possible that the conduct business together in some manner, but that is not known from this study.

Table 2 *Representation of Participant Identifiers of Interviews for the Five participating Organizations*

Study Participants	Organization A	Organization B	Organization C	Organization D	Organization E
Participant 1	P1				
Participant 2		P2			
Participant 3			P3		
Participant 4				P4	
Participant 5					P5

Applications to Professional Practice

The themes from the thematic analysis framed three main themes which include technology, challenges, and innovative strategies. The sub-themes that were identified during the thematic analysis were derived from the initial responses to the interview questions, with the challenge's theme being derived from the three additional follow-on questions created from the findings of the initial interview questions. Applying these themes to improve innovative strategies to increase product marketing and profitability became more transparent as the interviews progressed and additional follow-on questions were identified. Information technology (IT) is ever evolving, and supply chain management is a critical thinking industry. Technology is paramount within SCM, and the ongoing usage of technology and ever evolving changes with new and emerging technologies is shaping the foundation for successful sustainment of supply chain management organizations, which allows internal and external users and management of the technology to successfully deliver products to consumers.

This study’s findings provide the clarity necessary for supply chain managers and owners to identify risks associated with technology implementation, identify necessary

training requirements on the technology, and reinforce the need for incorporation of technologies such as artificial intelligence and automation-based applications to increase marketing capabilities and profitability. Incorporating agile and lean thinking processes can further enhance the TAM within supply chain management organizations. Increased cross-platform collaboration between organizations with a common goal can be enhanced using technology to streamline supply chain management processes further. These findings and suggested strategies demonstrate the TAM's relevance in improving IT practices and innovative strategies relative to supply chain management practices. Still, they can also be employed within other industries as well.

Implications for Social Change

Technology is prevalent in the 21st century. Social media, marketing campaigns, online advertising, and gaming are daily mechanisms for many worldwide. TAM provides SCMs the ability to make informed decisions about implementing the appropriate technologies to enhance market capabilities and increase profitability. SCMs need to embrace technology to streamline other logistics associated with delivering products to consumers. COVID-19 demonstrated how a pandemic could impact the supply chain system. Worldwide lockdowns during COVID-19 have caused carbon emissions to drop significantly (Adhikari et al., 2021). In China, the CO2 emissions dropped nearly 30% during 2020 and estimated 22-46% in the United States, and almost 60% in India (Adhikari et al., 2021). The lockdowns created a significant reduction in road and airway traffic. Further enhanced technologies that produce little to no emissions could reduce CO2 emissions even further. The potential to deliver products to end-users

while reducing our carbon footprint is significant, and technology can help pave the road to successfully reducing carbon emissions.

With reduced dependency on oil comes decreasing taxes. However, it should be noted that a reduction in taxes due to less of a dependence on oil could create taxation in other areas. The potential for other industries to continue to flourish with new and emerging industries could become more commonplace. These new and emerging technologies could create additional opportunities for people to advance their careers. Clean energy that is feasible to support SCMs and logistics could create additional employment opportunities that could create new tradecrafts within existing solar and wind power industries, as well as hydrogen and fracking-based technologies. SCMs could capitalize on technology to streamline green initiatives while meeting logistical requirements to sustain their organization. Positive social change through the appropriate implementation of technology within SCM could enhance the customer experience while contributing to a sustainable environment.

Recommendations for Action

The methodology used to analyze participants' responses and associated literature reviews demonstrated the usefulness of technology with SCMs. The analysis identifies relationships between technology and innovative strategies that suggest incorporating agile and lean thinking processes, artificial intelligence, as well as automation to enhance SCMs. There is synergy between agile and lean thinking processes that can significantly enhance an organization's marketing capability and increase profits and productivity. SCMs must also consider necessary training requirements associated with potentially

planned new IT implementations, as this could initially create bottlenecks in existing processes. The strategies that were shown to be most effective in SCMs are the usage of artificial intelligence, automation, and inventory management software. Additionally, marketing tools such as social media presence within both LinkedIn and Facebook are suggested, blockchain technologies, digitization, and cross-functional cloud-based solutions in a shared environment with both consumers and partnering organizations.

Managers and owners of SCMs should also incorporate agile and lean methods into current business operations, which can enhance technology implementation decisions. This should also include cyber-security policies to protect information on IT-related systems and associated customer and partner organizations. Training programs internal to SCMs should address potential future technology implementations and capture the manhours necessary to achieve training that prevents bottlenecks in existing processes. Agile and lean thinking methodologies could also be used to streamline new processes once users are appropriately trained on the latest technology being implemented.

Recommendations for Further Research

The suggested recommendations for additional study are innovative strategies supply chain managers and owners use to enhance technology adoption, how the newly implemented technology can be enhanced to positively influence SCMs , partnering organizations, and related consumers, and additional strategies that could increase profitability and marketing capabilities. The limitations of this study included a narrow set of participants. Obtaining access to qualified participants was not difficult. Time

constraints and scheduling conflicts were prevalent due to the daily workload and personal items each participant already participated in. More than 300 potential participants were contacted. Out of those, roughly twenty responded. Out of the twenty, ten backed out. Out of the ten remaining, only five met the requirements for this study.

Future researchers should take the above factors into account when performing their research. Ensuring that SCMs are willing to participate in advance will help streamline data capturing methods. Based on the data obtained from the highly qualified participants, additional research is suggested on artificial intelligence, automation, and cyber-security within SCMs with the TAM as the primary construct and being extended using Grey Systems Theory, Institutional Theory, and Resource-Based Theory. Additional research is also suggested using agile and lean thinking as an extension of the TAM. These additional research suggestions are not limited to SCMs and could be applied to all businesses.

Reflections

Completing my doctoral program has been by far one of the most challenging experiences of my life. Completing the required coursework just to work solely on my capstone was a significant challenge. Navigating the prospectus and proposal stages was where I grew the most. The IRB process via an ethical review took a little longer than I thought due to my potential relationships with some candidates who might have been involved in this study. However, it clearly showed that Walden University took ethical research very seriously. COVID-19 provided a significant challenge in that I was not able

to meet participants in person. However, email, online questionnaires, and telephone calls were successfully utilized to obtain the truly rich data for this study to be successful.

I wish to acknowledge that my personal biases are well within sight due to my involvement in technology and cyber-security. However, I have no experience with supply chain management methodologies, so as the research findings were laid out after the thematic analysis, I was highly intrigued that cyber-security become relevant to this study even though I did not expect it to be. I did not even consider discussing cyber-security during this study until after the responses from the participants. Section 3 of this study was the most enjoyable and intriguing part of my doctoral journey and has enlightened me on what formal research can produce.

Conclusion

In closing, the most significant finding from this study was that the TAM is a powerful tool managers and business owners can use to determine the appropriate technology to be implemented and the necessary requirements to effectively implement the technology and sustain the organization's internal and external resources and consumers. Implementation strategies must include the appropriate level of training, sustainment plans, artificial intelligence, and automation-based applications. A cross-collaborative cloud-based solution with adequate cyber-security controls in place within a partnered environment will significantly enhance an organization's marketing and profitability capabilities.

Leaders must ensure that the scope of technology implementation is clearly defined and incorporates the above-suggested strategies. Recognizing existing regulations

and ensuring those regulations are incorporated into the scope is a necessity. Simply implementing a technology blindly could be disastrous for SCMs or businesses in general. A shared commonality and understanding of PEOU and PU will obtain stakeholder buy-in when partnering with other organizations. Organizations and associated partners must operate in an agile and lean-thinking manner. This will enhance an organization's consumer base and streamline internal and external processes, regardless of the type of technology being implemented.

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Appendix A: Consent Form

You are invited to participate in a research study on technology innovation strategies supply chain owners or managers adopt to improve product marketing and profitability. The purpose of this study is to explore the innovative strategies that business owners or managers within supply chain management organizations can use to enhance marketing capabilities and increase profitability using technology. The researcher is inviting owners and managers of supply chain management (SCM) organizations working within the United States as participants. This form is part of the consent to help you understand the study before deciding whether or not to participate. The research sample will include 5 owners or managers of SCMs currently in operation. The participants must have five years' work experience in SCM as an owner or manager. The person conducting the study is George Rapciewicz Jr. who is a doctoral student at Walden University.

Procedures

This study will involve you completing the following steps:

- Responding to questions either in a written questionnaire. This step will take about 15-60 minutes, depending on how in depth you choose to be in your responses.
- If necessary, responding to follow-up questions either via email or through an audio recorded interview done via telephone or videoconferencing. This step will take about 5-15 minutes.

- Reviewing a summary of my interpretation of your responses to ensure I am accurately representing what you meant to say. This step will take about 15 minutes.
- Providing non-confidential documentation relating to the subject of innovative strategies by email.

Voluntary Nature of the Study

Your participation in this study is strictly voluntary. Please note that the study is voluntary and your decision to participate (or not) will be respected. Agreeing to participate in the study does not preclude your ability to withdraw at a future date if you so desire.

Study Risks and Benefits

As a participant in this study, you will be encouraged to recall and describe experiences, some of which might present minor discomfort with memories evoked and the passage of time. The study will not present any risk to the safety or wellbeing of the participants. Owners and managers of SCMs will learn about innovative strategies that business managers within supply chain management organizations can use to enhance marketing capabilities and increase profitability using technology.

Payment

Participation in this study will not entail or elicit payment of any kind.

Privacy

Any information provided by a participant will be accorded the highest confidentially. The researcher will not use your personal information for any purpose

other than that which is required for this research project. Further, the researcher will not include your name or any other personal or identifiable information in the study reports. All information including the recordings, transcripts and other computer related data files would be kept securely in a safe to which only the researcher has access. The data collected during the data collection process will be kept secured by the following measures, such as password protecting the data, using codes in place of the names of the participants and their organizations. The research data will be kept for a period of at least 5 years, as required by Walden University, at which time all records will be destroyed.

Contacts and Questions:

Should you have any questions you are welcome to contact George Rapciewicz Jr. at 760-809-2694 or by way of email: george.rapciewicz@waldenu.edu. If you wish to speak privately about your rights as a participant, you may call the Walden University on 1-800-925-3368 EXT 3121210 (USA) and 001-612-312-1210 for those outside the USA or by email at irb@mail.waldenu.edu. Walden University's approval number for this study is 01-10-22-1003723 and it expires on January 9, 2023. Please retain a copy of this form for your records.

Obtaining Your Consent

If you understand the study well enough to participate, you can reply to my email with the words 'I consent.'

Appendix B: Semi-Structured Interview Questions

1. What technology innovation strategies do you use as a supply chain manager to improve product marketing?
2. What fundamental challenges have you encountered using technology to market products?
3. How did you overcome challenges when marketing products using technology innovation strategies?
4. What innovative technology strategies do you use as a supply chain manager to increase profitability?
5. What challenges have you encountered when using technology innovation strategies to increase profitability?
6. How did you overcome challenges when increasing profitability using technology innovation strategies?
7. What information technology strategies have you integrated into your supply chain management processes to increase profitability?
8. What additional information can you provide about the technology strategies you use to improve product marketing and productivity?

Appendix C: Interview Protocols

1. I will greet the participant and reintroduce myself.
2. I will then go over the consent form to make sure the participant has read over it and know their rights as a participant.
3. I will ensure the participant is ready and will email the online questionnaire link to the 8 questions, acknowledging the pseudonym given to the participant as well as the time and environment.
4. Once the questions have been completed, I will set up a time for transcript review and conduct member checking of interpreted data.
5. After the member checking has been conducted and confirmed by participants, I will let the participant know that their time was appreciated.
6. If additional follow-on questions are necessary, I will contact the participant for additional information. I will then repeat steps 4 and 5 above.

Appendix D: CITI Certification

CITI PROGRAM

Completion Date 30-Aug-2019
Expiration Date N/A
Record ID 33029839

This is to certify that:

George Rapciewicz

Has completed the following CITI Program course:

Student Researchers (Curriculum Group)
Student Researchers (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Walden University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w37d93bad-f159-442c-b2a7-f203ef3ba0c1-33029839

Appendix E: Letter of invitation

January 10, 2022

Letter of Invitation

Dear Sir/Madam,

As part of my doctoral research at Walden University, I would like to invite you to participate in a research study I am conducting to explore innovative strategies that business managers within supply chain management organizations can use to enhance marketing capabilities and increase profitability using technology within the United States. The findings of this study may help managers of supply chain organizations to identify innovative strategies that business managers within supply chain management organizations can use to enhance marketing capabilities and increase profitability using technology. The participants for this study shall be owners or managers of supply chain management organizations (SCMO) who have been in operation for a period not less than 5 years. The participants will also have significant success in the sustainability of their firm.

The mode of data collection shall be via an online questionnaire for accuracy. The duration could take anywhere from 15 minutes to 1 hour depending upon how in-depth the participant wants to go into each question. There may also be a follow up done via email or an audio recorded interview done via telephone or videoconferencing. I will also ask you to provide of non-confidential documentation relating to the subject of innovative strategies by email. All data collected will be treated as confidential, and your participation in the study is voluntary.

Enclosed with this letter is the Participant Consent Form. If you are interested in participating in the study, kindly review the form carefully and send an email with the words “I consent”. If you need any clarifications about the study, you may contact the researcher via phone at 760-809-2694 or e-mail at george.rapciewicz@waldenu.edu

Your participation will contribute to the success of the proposed study and could stimulate interest among (SCMO) managers in the United States and appropriate

innovative strategies needed to enhance marketing capabilities and increase profitability using technology.

Sincerely,

George Rapciewicz Jr.