RELATIONSHIP BETWEEN ENTREPRENEURIAL ORIENTATION AND THE INTENTION TO PURSUE DIGITAL ENTREPRENEURSHIP: OPPORTUNITY EVALUATION IN SMALL AND MEDIUM-SIZED ENTERPRISES

by

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ABSTRACT

OPHELIA CHAPMAN. Relationship Between Entrepreneurial Orientation and the Intention to Pursue Digital Entrepreneurship: Opportunity Evaluation in Small and Medium-sized Enterprises (Under the direction of DR. FRANZ KELLERMANNS)

Over the past several years the connection between entrepreneurship and digital technologies has transformed the way business is conducted. This, coupled with reactions to the coronavirus outbreak that have caused interruptions to significant economic and business activities, has exponentially accelerated the implementation of digital technologies. Yet intentions to pursue digital entrepreneurship remain understudied, while an increasing number of small and medium-sized businesses continue the adoption of digital technologies unabated.

This dissertation examines the relationship between entrepreneurial orientation and intention to pursue digital entrepreneurship, and whether this relationship is moderated by opportunity evaluation. Data was gathered from entrepreneurs (N=240) through a cross-sectional survey approach, and regression analysis was used to analyze the data. A confirmatory factor analysis was also performed. The results indicate that entrepreneurial orientation is positively linked to intention to adopt digital technologies. The study found evidence of interaction effects between two opportunity evaluation constructs: loss estimation and perceived feasibility and entrepreneurial orientation. The results signal the importance of studying moderators of the relationship between entrepreneurial orientation and entrepreneurial intention to adopt digital technology.

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DEDICATION

This work is dedicated to my parents Sabina Kwakye and Benjamin Kwabena Ofori, without whom I would not be here, my husband, Hans Chapman, the love of my life and confidant, my siblings Sheela and Henry for their inspiration and to my children Harold, Hathlyn and Hannah Chapman, for their unwavering love, belief, encouragement, support, prayers and sacrifice in helping me achieve my dream. I pray that my life and example will be something that you will consider as a foundation for your own lives as you pursue the unique callings that God has set apart for you.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

DV	Dependent Variable
EO	Entrepreneurial Orientation
GE	Gain Estimation
IEO	Individual Entrepreneurial Orientation
TEO	Team Entrepreneurial Orientation
OE	Opportunity Evaluation
OR	Opportunity Recognition
ESE	Entrepreneurial Self-Efficacy
LE	Loss Estimation
PF	Perceived Feasibility
IV	Independent Variable

CHAPTER 1: RESEARCH OVERVIEW

Introduction of Context and Theory

Reactions by governments, organizations, and individuals worldwide to the recent global health crisis, the coronavirus outbreak, have included business closures, stay-at-home orders, and cancellation of events (Fernandes, 2020; Translated by ContentEngine, 2020). The outbreak has interrupted significant economic activities, supply chains, manufacturing, and transportation, causing a disruption of major normal operations (Craven, Liu, Mysore, & Wilson, 2020; Gormsen & Koijen, 2020). Despite these disruptions, this "can also be perceived as a period of accelerated diffusion of digital technologies and micro level initiatives" (Karabag, 2020). Digital technology is defined as "technology that relies on the use of microprocessors; hence, computers and applications that are dependent on computers such as the Internet, as well as other devices such as video cameras, and mobile devices such as phones and personal-digital assistants" (Salmons, 2008); it is "the heart of all modern communication and information systems" (Houle, 2011). Based on these and other definitions and coupled with a myriad of uses that can be attributed to digital technologies, it can be inferred that digital technologies serve and embody different purposes in different businesses. It follows, then, that in the context of a business venture digital technology represents a tool for boosting productivity, while reducing transaction costs through risk sharing, and for promoting change and innovation at the micro level of the individual economic agent (Ciborra, 2009). To date, attention has focused on large businesses and corporations such as Facebook, Amazon, Uber, and others that have leveraged digital technologies to innovate, reduce costs through operational efficiencies, and, ultimately, have transformed their businesses (Jacobi & Brenner, 2018; O'connor & Rice, 2001). Small- and medium-sized enterprises (SMEs), however, which make up about 44% of the nation's economy

(The United States Small Business Administration, 2019b), would likely benefit strongly by engaging in digital entrepreneurship (Mazzarol, 2015; Ongori & Migiro, 2010). Fundamentally, entrepreneurial opportunities created through digital media tools, information technology, platform technology, and other information-communicating equipment are referred to as digital entrepreneurship. According to Sahut, Iandoli & Teulon (2019) the phenomenon is broadly classified into two categories per existing literature: *enablers* and *outputs*. Both categories emanate from the transformation of entrepreneurship that stems from the use of digital technologies and opportunities generated from digital technologies. With is background Eddleston et al. (2008) found a positive relationship between innovative capacity and performance in technologically rich environments of small-scale businesses. Accordingly, I focus on small- and mid-sized entrepreneurial ventures and their intentions to engage in digital entrepreneurship. Small- and mid-sized ventures are defined as "independent businesses with fewer than 500 employees" (The United States Small Business Administration, 2019a).

As a guide, I employ Sussan and Acs (2017) definition of digital entrepreneurship as "any agent that is engaged in any sort of venture be it commercial, social, government, or corporate that uses digital technologies" (p. 66). Such ventures might engage in digital activities by implementing digital technologies such as platform technology, online presence, social media, cloud computing, and as-a-service computing, which can enhance value creation and entrepreneurial activities (Cenamor, Parida, & Wincent, 2019). For these digital technology-enabled activities to be of benefit, however, entrepreneurs must first evaluate the activity to be engaged in as part of the entrepreneurial process. The entrepreneurship process involves a myriad of activities that unfold over time. One such activity is opportunity evaluation, which has been a focus of the entrepreneurship literature (Ardichvili, Cardozo, & Ray, 2003; Chandra,

2017; Gruber, Kim, & Brinckmann, 2015; Keh, Der Foo, & Lim, 2002; Scheaf, Loignon, Webb, Heggestad, & Wood, 2020; Wood & Williams, 2014). The rapid proliferation of digital technologies simultaneous with new functionalities continue to alter traditional business strategies and processes. The intention of an entrepreneur to adopt and engage in a digital technology and leverage new functionality can play an important role during the evaluation process. While many studies have investigated intention to engage in an activity or behavior in various settings and disciplines, such as education, psychology, and marketing (Hansen, Jensen, & Solgaard, 2004; Mathieson, 1991; Zhang, Duysters, & Cloodt, 2014), few have examined digital entrepreneurship. Therefore, an empirical study to determine the relationship between entrepreneurial orientation (EO) and intent to engage in digital activity will benefit and enhance our understanding of the entrepreneurial evaluation process and digital entrepreneurship.

There are many aspects of the entrepreneurial process; however, the primary focus of entrepreneurship research involves the activities that constitute this process. Although these activities are many (Webb & Pryor, 2015), it is well established among entrepreneurship scholars that the essential activities of the entrepreneurship process include opportunity recognition, alertness, prior knowledge, and evaluation (Baron, 2006; Hajizadeh & Zali, 2016; Haynie, Shepherd, & McMullen, 2009). Hence, in exploring intention to pursue digital activities it is imperative to consider opportunity evaluation as a moderating factor in its relationship with EO.

At the organizational level, Rauch et al. (2009) defined EO as " the strategy-making processes that provide organisations with a basis for entrepreneurial decisions and actions" (p. 762). Studies on EO have mainly focused on its relationship with performance. The concept is sometimes described by a set of three behaviors: innovativeness, proactiveness, and risk taking; at other times, as a set of five behaviors: competitive aggressiveness, autonomy, innovativeness,

proactiveness, and risk taking (Covin & Slevin, 1989; Lumpkin & Dess, 1996; Miller, 1983). All five dimensions are defined as behaviors of an organization and provide an indication of the organization's entrepreneurial behavior (Bolton & Lane, 2012). Bolton and Lane (2012) suggest that if a higher EO score induces higher performance in a firm by measuring these dimensions, then it is reasonable to measure these same dimensions at the individual level.

A growing number of entrepreneurs have established and transformed businesses through the power of the Internet and digital technologies across industries; examples include PayPal, Amazon, Alphabet, eBay, Netflix, Facebook, and Instagram. For instance, industrial businesses have seen their services transformed with the Internet of Things (IoT), a type of digital technology. According to Ardolino et al. (2018), IoT is foundational to any service transformation. In the retail sales industry, Hagberg et al. (2016) show how retailing has been transformed by the interface of exchanges, actors, settings, and offerings and how these have been seamlessly interwoven with digitization to enhance and improve performance. Businesses consider the use of digital technologies as part of their strategic decision processes. Decision making – choices among desirable alternatives, are a major part of the strategic making process. EO suggests a combination of strategy and decisions situate firms such that it eventually leads to high performance. Studies have linked entrepreneurial orientation with high performance (Rauch, Wiklund, Lumpkin, & Frese, 2009). The processes vary and include the use of digital technologies considering the rate of transformation in today's dynamic environment. Investigating what necessitates the intention to use digital technologies in relation to strategic making processes would benefit and strengthen a firms EO position, its competitive position and ultimately enhance its performance. Despite the importance of the use of digital technologies and the impact of their evaluation on entrepreneurial action, research considering the intersection of

digital technologies and entrepreneurial pursuits has largely been neglected (Kraus, Palmer, Kailer, Kallinger, & Spitzer, 2019; Nambisan, 2017). Few studies have focused on exploring and understanding intent in the evaluation process and how it can potentially lead to action or engagement in a digital activity.

To address this gap, I adopt the theory of planned behavior (TPB), which has been well-studied in various settings and disciplines, including entrepreneurship (Kautonen, Van Gelderen, & Fink, 2015; Lai, 2017; Lortie & Castogiovanni, 2015). At its core, this theory helps explain how human behavior forms based on three constructs: attitudes toward an act or behavior, subjective norms, and perceived behavioral control over the behavior (Ajzen, 1991). These constructs together, when favorable, predict behavioral intentions, which, in turn, lead to displayed behavior or actions (Ajzen & Fishbein, 1969). Pavlou and Fygenson (2006) empirically used the power of the TPB in predicting electronic commerce adoption. In the era of enhanced digital technologies, as products and services become increasingly digitized, a focus on enhancing features and products of one's own innovation efforts ceases to keep pace with competition and customer demand (Yoo, Henfridsson, & Lyytinen, 2010). Instead, adapting to and leveraging the creativity of others through digital activities have kept up with the evolving demands of customers while enhancing performance. For instance, while the literature shows that digitization has become a strategic priority for SMEs as a result of the ability of digital platforms to enhance performance (Cenamor et al., 2019), it is sparse on the digital activities of entrepreneurs, their EO, and the relationship of these activities with intention to adopt them.

I focus on the entrepreneur's intention to engage in digital activities. In their review, Kraus et al. (2019) identified six streams of research pointing out society's great attraction to new digital business models and contrasted it with a lack of research on opportunities,

challenges, and success factors in digital entrepreneurship. I begin by building on prior research on digital entrepreneurship within SMEs and highlighting the important role digital technologies have played in enhancing performance (Chen, Jaw, & Wu, 2016; Li, Su, Zhang, & Mao, 2018). I explore EO specifically by examining how it influences and/or predicts intention to engage in digital activities and how this intent is formed, using the TPB as a lens to examine this process. This is followed by a look at what moderates this intention by exploring the relationship between EO and its influence on the entrepreneur's decision to engage in a digital activity. In doing so, this will shed light on whether this relationship is moderated by opportunity evaluation (Scheaf et al., 2020), which includes a consideration of potential gains, losses, and perceived feasibility. Thus, I seek to understand the intent of the evaluation process of the entrepreneur prior to and, ultimately, when engaging in digital technologies.

Research Objective

Digital entrepreneurship is a nascent phenomenon that is attracting worldwide attention while continuing to shape entrepreneurship research. The purpose of this study is to theoretically propose and empirically investigate a set of factors that influence entrepreneurs in their intention to engage in digital technologies. In their review, Kraus et al. (2019) identified six streams of research "digital business models, digital entrepreneurship process, platform strategies, digital ecosystem, entrepreneurship education, and social digital entrepreneurship" that will help deepen our understanding of digital entrepreneurship. They pointed out that the individual level of the entrepreneur has not been appropriately considered in the digital entrepreneurship literature and

that few research studies have addressed individual prerequisites for successful digital entrepreneurship. I intend to heed the call to carefully consider digital technologies and their unique characteristics in entrepreneurship pursuits (Nambisan, 2017). Accordingly, my first objective is to review and synthesize the digital technologies and entrepreneurship literature by focusing on micro and SMEs and then to empirically test a set of factors that influence intention to engage in digital technologies using the TPB as a lens. Thus, I plan to address the following questions:

Does EO influence entrepreneurial intention to engage in digital activities in SMEs?

Do opportunity evaluation judgments (i.e., gain estimation, loss estimation, and perceived feasibility) moderate the relationship between EO and intention to engage in digital activities?

I will address the call for further research in digital entrepreneurship by specifically focusing on one aspect of the digital entrepreneurship process and opportunity evaluation judgments of a digital activity as part of digital entrepreneurship.

Contributions

This research makes three contributions to the digital entrepreneurship and entrepreneurship literature. First, it advances our understanding of the entrepreneur's intention to engage in digital activities via digital technologies through the lens of the TPB. As more and more entrepreneurs engage in digital activities, this study provides a clear understanding of entrepreneurial pursuits and actions by focusing on EO and the intention to adopt digital technologies, an area which is practically nonexistent in the literature. Thus, I empirically develop and test the theoretical idea that EO corelates with intention to engage in digital activities and that this relationship is enhanced or diminished by opportunity evaluation. Second,

by identifying and proposing drivers that support digital entrepreneurship by exploring the moderating effects of how entrepreneurs evaluate digital opportunities with gain estimation, loss estimation, and perceived feasibility as a "judgement of opportunity attractiveness" (Scheaf et al., 2020: 22), I will enrich our understanding of how different levels of gain estimation, loss estimation, and perceived feasibility facilitate an individual's intention to engage in digital activities. Finally, I provide an alternative approach to the dominant view of technology acceptance constructs of ease of use and perceived usefulness in the information systems literature by exploring loss, gain, and perceived feasibility as an alternative model in adopting a technology, such as the well-researched and established Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). This will provide the information systems literature a wider option to examine these moderating effects on EO and intention to engage in digital activities.

CHAPTER 2: LITERATURE REVIEW AND DEVELOPMENT

The first section of Chapter 2 consists of a literature search followed by a review of digital entrepreneurship. This is followed by definitions and a table of selected definitions, which is then followed by sections on digital activities, digital entrepreneurship and the entrepreneurial process, the TPB, EO, and opportunity evaluation. Building on the review and seeking to address the identified gaps, the final section presents a research model and development of hypotheses integrating EO and intention to engage in digital activities as moderated by gain estimation, loss estimation, and perceived feasibility.

Literature Search

I used ABI/INFORM, a multidisciplinary database that focuses on business research, to search for relevant articles. The search focused primarily on digital entrepreneurship and the opportunity evaluation process as it relates to digital technologies and the TPB. No date limit was placed on the search for articles. In addition, ACM Digital Library, a database of articles published by the Association of Computing Machinery, was used to gather articles on digital Technologies and digital entrepreneurship. Other resources included the Proquest dissertation database and Science Direct. A Google advanced search was conducted for review articles from specific journals, such as the *Academy of Management Review*, *Decision Support Systems and Organizational Science, Entrepreneurship Theory and Practice, Information Systems Journal, Journal of Business Venturing,* and *MIS Quarterly.* Search terms used included digital entrepreneurship, technology entrepreneurship, digital transformation, digital options, digital engagement, entrepreneurial orientation, and opportunity evaluation. Empirical and nonempirical articles were reviewed. Due to the paucity of studies in digital entrepreneurship,

articles included here are global in nature. Although included in the review, non-peer-reviewed articles received less emphasis.

Digital Entrepreneurship

Scholars from entrepreneurship, strategy, and information systems acknowledge the entrepreneurial opportunities created through digital media tools, information technology, platform technology, and other information-communicating equipment; they refer to the process as digital entrepreneurship (Hull, Caisy Hung, Hair, Perotti, & DeMartino, 2007; Le Dinh, Vu, & Ayayi, 2018; Sussan & Acs, 2017). This nascent phenomenon (Kraus et al., 2019: 5) was developed at the conjunction of entrepreneurship and digitization about a decade ago (Hervé, Schmitt, & Baldegger, 2020). Historically, information technology began to change societies and industries worldwide over 50 years ago, with waves of technological changes that gave rise to new opportunities leveraged and exploited by entrepreneurs via digital technologies (Steininger, 2019).

Fundamentally, the phenomenon of digital entrepreneurship is based on the digital enablement of business processes and functions, such as marketing, operations, sales, and finance, which are transformed into digital environments or cause? a complete technological disruption. Discussions on digital entrepreneurship have focused on the creation of new ventures and the transformation of existing businesses through digital technologies (Matt, Hess, & Benlian, 2015; von Briel, Davidsson, & Recker, 2018). Consistent with this view, academic interest in digital entrepreneurship has become intense, as evidenced by an increasing number of literature reviews (Kraus et al., 2019; Steininger, 2019; Zaheer, Breyer, & Dumay, 2019), editorials (Kraus et al., 2019; Shen, Lindsay, & Xu, 2018), quantiative studies (Ngoasong, 2018; Pergelova, Manolova, Simeonova-Ganeva, & Yordanova, 2019), and qualitative studies (Li et

al., 2018; Nichols, Melo, & Dewland, 2017). Yet, despite the increased interest in digital entrepreneurship, definitions used by scholars remain inconsistent.

Due to its novelty, digital entrepreneurship lacks clarity on the scope and nature of the field (Zaheer et al., 2019); current literature is fragmented. This fragmentation, in part, is rooted in the dynamic and rapidly evolving nature of technological advancement, which ultimately produces new effects on the way businesses are run and conducted. As to these rapid technological advancements within entrepreneurship, Krause et al. (2019) acknowledge that digital entrepreneurship is a "phenomenon that arose through technological assets like the internet and information and communications technology" (p. 354). In addition, Steininger (2019) identified information technology as playing four roles: facilitator, moderator, ubiquity, and an outcome of entrepreneurial operations. These roles enable value creation, which, in turn, offers the entrepreneur unlimited opportunities to explore and exploit.

Another indication of this broad nature of digital entrepreneurship is shown by Hull et al. (2007) when they subdivide digital entrepreneurship by typology and categorize it as either mild, moderate, or extreme. Each category refers to the extent to which digital technologies have been adopted. According to Hull et al. (2007) a business with a compliment to traditional processes, such as having an online presence, is considered mild digital entrepreneurship; one that engages in a digital activity via digital infrastructure with a focus on digital products is considered moderate digital entrepreneurship; and completely enabled digital businesses, such as Facebook, Uber, Amazon, and Twitter, are considered extreme digital entrepreneurship. Hull et al. (2007) note that a business built entirely on the Internet and with digital technologies represents the foundation and emergence of digital entrepreneurship; it is an indication that the phenomenon covers a spectrum of businesses, depending on its phase and level in the

digitization process. Hence, for SMEs, deploying a digital technology can help leverage a business strategy in an existing or new business or process. As a fundamental source of new jobs and with tremendous potential to boost a nation's economy, SMEs, due to their flexibility, adaptability, and scalability, tend to realign and integrate digital technologies as soon as these technologies become available, affordable, and feasible (Zhao, 2019).

Digital Entrepreneurship Definitions

Because the term, digital entrepreneurship, is multifaceted and broad in scope, definitions in the literature are varied. Terms that have been used include, but are not limited to: digital innovation, digital venturing, digital transformation, digital ecosystem, and digital innovation. Researchers have used these terms to describe the phenomenon in different ways. Typically, the definition is based on the context and extent to which digital technology is used. For instance, Kraus et al. (2019) identified 35 articles in which the terminology used included digital venture, digital innovation, digital enterprise, or digital business. In fact, Shen et al. (2018) identified a diversified and yet related set of phenomena in digital entrepreneurship that consist of digital platforms, players, institutions, and agency; they offered insights with the objective of directing and classifying the future of digital entrepreneurship research to further streamline our understanding. Despite the relatedness surrounding these terminologies, a deeper look at the definition's scholars have used, thus far, reveals a lack of consistency in defining the digital entrepreneurship phenomenon.

Selected Definitions of Digital Entrepreneurship

Selected definitions were based on articles reviewed. Keywords used in the search to compile these articles were: "digital entrepreneurship," "defin*," "digitization," and "digital

transformation." The common theme of the 10 articles selected is that they uniquely define and capture the broad spectrum of the digital entrepreneurship phenomenon.

Table 2.1: Definitions of Digital Entrepreneurship

Citation	Definitions
Antonizzi and Smuts, H. (2020, April).	"Entrepreneurial opportunities being created and pursued through the use of technological platforms and other information communicating equipment"
Kraus et al. (2019).	"Digital entrepreneurship: pursue new venture opportunities presented by new media and internet technologies"
Guthrie (2014)	"The creation of a venture to produce and generate revenue from digital goods across electronic networks"
Davidson and Vaast (2010)	"The pursuit of opportunities based on the use of digital media and other information and communication technologies"
Hair et al. (2012)	"Digital entrepreneurship may be defined as entrepreneurship in which some or all of the entrepreneurial venture takes place digitally instead of in more traditional formats"
Hull et al. (2007)	"Digital entrepreneurship is a subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized"
Le Dinh et al. (2018)	"Digital entrepreneurship is defined as the reconciliation of traditional entrepreneurship with the new way of creating and doing business in the digital era"
Sahut et al. (2019)	"Process of entrepreneurial creation of digital value through the use of various socio-technical digital enablers to support effective acquisition, processing, distribution, and consumption of digital information"
Sussan and Acs (2017)	"Digital entrepreneurship […] includes any agent that is engaged in any sort of venture be it commercial, social, government, or corporate that uses digital technologies. […] In other words, they are performing activities that need digital engagement but may not in themselves be digital, for example, an Uber taxi driver"
Zhao & Collier (2016)	"Digital entrepreneurship is broadly defined as creating new ventures and transforming existing businesses by developing novel digital

	technologies and/or novel usage of such technologies”

Antonizzi and Smuts (2020), who explored the characteristics of digital entrepreneurship and considered its interrelationship with digital transformation, posit that digital entrepreneurship is multifaceted and consists of business entrepreneurship, knowledge entrepreneurship, and institutional entrepreneurship. They characterized *business entrepreneurship* as “the practice of seeking out or identifying business opportunities that can be exploited; *knowledge entrepreneurship* as the identification and quest for information or knowledge-based prospects, encompassing the expansion of existing knowledge bases as well as the development of new ones; and *institutional entrepreneurship* as the actions of entrepreneurs who make use of resources when creating new organizations or upgrading old ones”. Together, these characteristics form the foundation of digital entrepreneurship and its ability to take traditional practices and alter them digitally (Antonizzi & Smuts, 2020). This definition recognizes entrepreneurial opportunities created and pursued through the use of digital platforms and other communication technologies. Nambisan (2017) identified the use of digital platforms as a vehicle to entrepreneurship; a digital platform is a shared, common set of services and architecture that host complementary offerings. One of its benefits, which is the potential to “deepen specialization while offsetting production, marketing, and distribution capabilities” (Nambisan, 2017: 1032), explains the attractiveness of digital platforms as a venue for entrepreneurship.

In their review Kraus et al. (2019) combined two definitions: “a subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized” (Hull et al. 2007, p. 293) and “the sale of digital products or services across

electronic networks" (Guthrie, 2014, p. 115). This forms the basis of their understanding the phenomenon and criteria for selecting the 35 articles included in their systematic literature review and demonstrates the multiplicity in explaining the phenomena. Le Dinh et al. (2018) reconciled traditional entrepreneurship and the evolvement of new technologies in creating new entrepreneurial opportunities. This definition also acknowledges a shift in business models as a result of entrepreneurial activities that involve the transfer of traditional assets or service through digitization. In the same vein, Zhao and Collier (2016) recognized a shift in business model and specifically noted the novel development or use of digital technologies. Although they noted similar characteristics of digital entrepreneurship and digital transformation in their study, Antonizzi and Smuts (2020) characterized the phenomena of digital entrepreneurship and digital transformation as not mutually exclusive. They suggest that while digital transformation provides opportunities to create new markets, digitization enables digital entrepreneurship and digital transformation. Only Zhao and Collier (2016), however, highlighted transformation in their definition. A common theme is the recognition of a shift in entrepreneurial activities from physical and/or traditional business activities to that of digital activities. Due to the multifaced nature of the phenomenon, the differences in definitions cover a wider spectrum but generally center around the medium, format, and usage of digitization (i.e., digital platforms, digital communication tools, Internet technologies, and electronic networks). Additional differences lie in a shift in business models in terms of strategy that involves engagement in digital activities on the one hand and a shift in format (digital activity) on the other.

Due to the multiple opportunities arising from this phenomenon, definitions of technology-enabled activities in entrepreneurship tend to be broad, multifaceted, and all-encompassing. For instance, digital entrepreneurship, as "creating new ventures and

transforming existing businesses by developing novel digital technologies and/or novel usage of such technologies" (Zhao & Collier, 2016: 1), is generalized to include the use of technology in creating new ventures and the alteration of existing ones. According to Hull et al. (2007), digital entrepreneurship is "a subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized" (p. 5). This definition places digital entrepreneurship into a subgroup of entrepreneurship that deals with digitization.

To capture the multifaceted and broad scope of digital entrepreneurship, I consider digital entrepreneurship as "the reconciliation of traditional entrepreneurship with the new way of creating and doing business in the digital era" (Le Dinh et al., 2018, p. 1) and "any agent that is engaged in any sort of venture be it commercial, social, government, or corporate that uses digital technologies" (Sussan & Acs, 2017, p. 66). Thus, for the purposes of this study, I define digital entrepreneurship as "the strategic reconciliation of traditional entrepreneurship with the opportunity of creating new markets and a way of doing business by any agent or business that uses digital technologies." This definition incorporates strategy, entrepreneurship, and digital transformation and embraces the differences (medium, format, and usage) revealed.

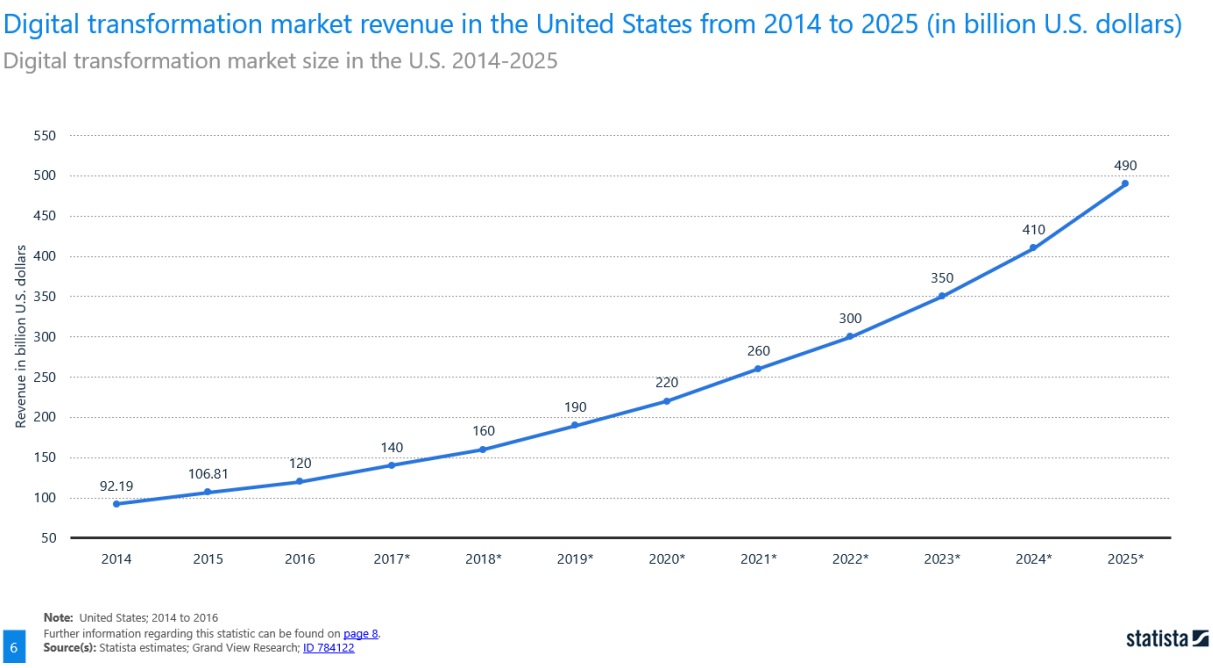
Digital Activities

Digital technologies continue to be implemented by many organizations across all manner of industries, some affecting all business processes, and others affecting only some processes. Entrepreneurs increasingly utilize digital technologies as a result of the rapid growth and pervasive digitization of innovation processes and outcomes. Accordingly, entrepreneurship in the digital environment fosters agility, digital options, and a heightened state of alertness (Sambamurthy, Bharadwaj, & Grover, 2003). In addition, some technological know-how is required, which normally leads to more digital business, greater access to information about

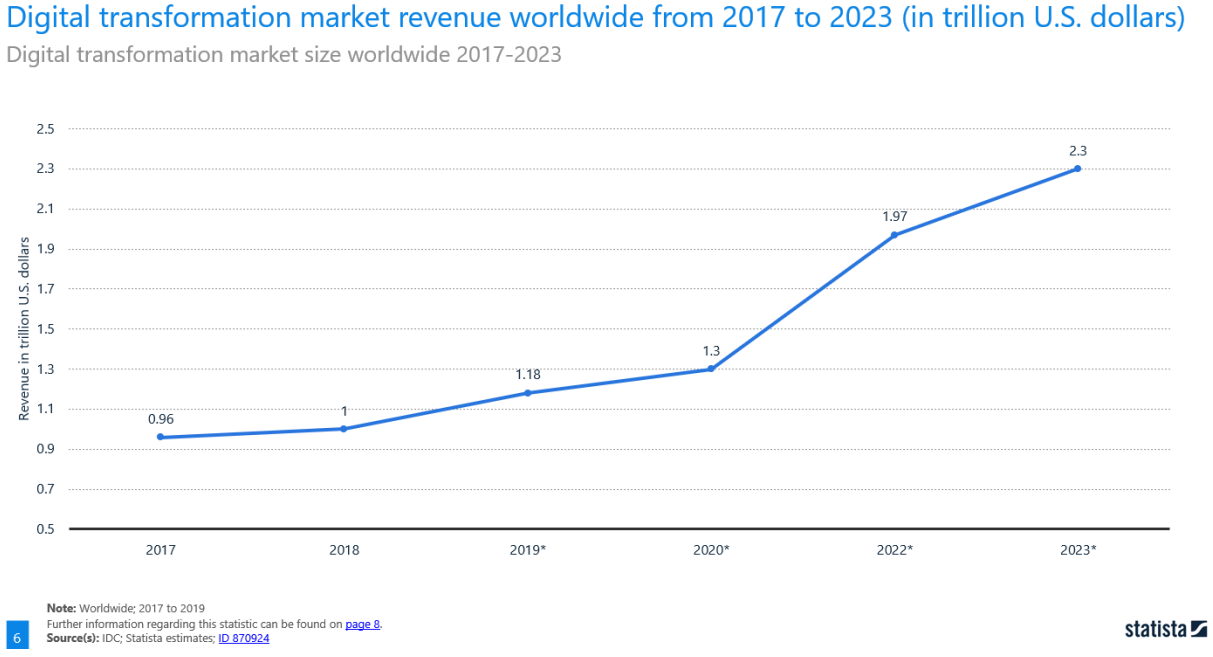
customers, competitors, and stakeholders, and access to wider and more varied markets. This has contributed to the emergence of the digital entrepreneurship phenomenon, which, in turn, is seen by many as a catalyst for entrepreneurial opportunities and a fundamental pillar of economic growth as strategies from transition to implementation are developed (Matt et al., 2015).

The technology-enabled use of information and digital technologies have a profound impact on business ventures (Nambisan, 2017); for example, social media, mobile technologies, cloud computing, online presence platform technologies, online marketing, technology infrastructure, cloud computing, and data analytics. (von Briel et al., 2018). Engaging in any such digital activity can ultimately help in broadening our understanding of the role of specific aspects of digital technologies in shaping entrepreneurial opportunities, decisions, actions, and outcomes (Nambisan, 2017; von Briel et al., 2018). Existing brick and mortar businesses may also engage in digital activities to market their products or services online. Businesses that explore digital technologies do so with the goal of exploiting and scaling their business operations and processes to reap the benefits while catering to the new digital marketplace consumers who use interactive tools to explore products and services. Therefore, for businesses to generate new customer value, they must explore digital options to rethink how to meet customer demands (Berman, 2012).

In considering digital options, it is important to note that the estimated size of the digital market in the United States will more than double, from $220 to $490 billion, based on data from Statista, a statistical information database (Retrieved May 20, 2020 from https://www-statista-com.liblink.uncw.edu/). Estimates for digital transformation revenue worldwide for the period 2017-2023 is projected to be $2.3 trillion (see below).



The graph shows the estimated digital transformation market revenue in the United States from 2014 to 2025. In 2016, the digital transformation market in the United States generated some $120 billion (US).



The graph shows the estimated digital transformation market revenue worldwide from 2017 to 2023. In 2018, the digital transformation market worldwide generated some $1 trillion (US).

Furthermore, according to the Forrester (2018) report, 20% of businesses are completely digitized, 60% are in the process, and 20% have no digital presence (Retrieved May 20, 2020 from https://go.forrester.com/blogs/predictions-2019-transformation-goes-pragmatic/). This is particularly important because, based on this report, 80% of businesses will be transitioning to the use of digital technology at some point. Understanding what determines the intention to engage in such activities can provide significant benefits for entrepreneurs and practitioners. Small- and medium-sized enterprises have the opportunity to explore digital technologies and exploit their benefits; in addition, due to their size, they can easily adapt and change course in dynamic environments, specifically, where technology enabled services and innovation exist.

Digital Entrepreneurship

The end of the last century saw enhanced economic performance and the development of new information technology options that escalated through the advancement of telecommunications (Datta & Agarwal, 2004; Oliner & Sichel, 2000; Wymbs, 2004). The advent of the new millennium has led to innovations such as social media, Web 2.0 technologies, self-driving cars, Bluetooth technology, IBM Watson, the IoT, cloud computing, and digital technologies. Today, we live in a world of digitalization as technological progress continues to change the way we work, live, and survive. Key innovations, such as the Internet, create a global platform that leads to new product and services configurations (Nambisan, 2017; Spohrer & Maglio, 2008). Given the numerous implications of and developments caused by this phenomenon, practitioners and academics continue to explore how this is impacting

entrepreneurship, both theoretically and empirically, and its related outcomes and connection. Research on digital entrepreneurship appears to be in its infancy; the list of articles published on the topic is not extensive. According to Kraus et al. (2019), only one such article was published on the topic prior to 2010. Therefore, I decided to focus on articles published within the last decade with an emphasis on the digital entrepreneurial process. Based on the literature, I examined the scant quantitative and qualitative articles as well as theoretical and review articles that consider how SMEs can leverage digital entrepreneurship to engage in digital activities (see Table 2.2).

Table 2.2: Selected Studies in Digital Entrepreneurship 2010 - 2020

Author/Year	Research Method	Research Question	Research Objective	Key Findings
Antonizzi and Smuts (2020)	Review	"What are the characteristics of the relationship between digital entrepreneurship and digital transformation?"	Investigate digital entrepreneurship and digital transformation, their characteristics and inter-relationships	Framework, identifies and maps digital entrepreneurship/digital transformation characteristics to three dynamic capability components: sensing, seizing and transforming/shifting
Davidson and Vaast (2010)	Theoretical	"How can we better understand the nature of entrepreneurship in the digital economy?"	Explores "three forms of entrepreneurship jointly and the sociomaterial practices through which they are enacted"	"digital economy entails three distinct and interrelated types of opportunities: business, knowledge and institutional"
Dutot and Van Horne (2015)	Qualitative	N/A	Digital entrepreneurship intention in a	Conceptual Model, "factors influencing

			developed vs emerging country (France/UAE)	entrepreneurial intention"
Herrmann et al. (2018)	Quantitative	"What factors support the intention of entrepreneurs to go digital?"	"Digital transformation and disruption of the healthcare sector: internet-based observational study"	"Established corporations rely more on incremental innovation that supports their current business models, while start-ups engage their flexibility to explore new market segments with notable transformations of established business models: start- ups offer higher promises of disruptive innovation and more diversified value propositions addressing broader areas of the health care sector"
Herve et al. (2020)	Quantitative	"How the degree of digitalization affects the orientation of firms and how this orientation affects the intensity of internationalization "	"How the use of digital technologies can support entrepreneurs' behaviors, support decision-making and enhance the propensity to internationalize"	"Highlights how the degree of digital transformation affects companies' EO, and measures how each EO component is linked to MSMEs' internationalization intensity"
Kraus et al. (2019)	Review	N/A	Gather literature on digital entrepreneurship "and to provide an up-to-date compilation of	Identified six streams of research: "digital business models; digital entrepreneurship process; platform

			key topics and methods discussed in relevant literature"	strategies; digital ecosystem; entrepreneurship education; and social digital entrepreneurship" Provided a future research map
Le Dinh et al. (2018)	Theoretical	How to elaborate "a Living Lab for promoting the digital entrepreneurship process?"	"Living lab for promoting the digital entrepreneurship process"	Framework to promote "the digital Entrepreneurship process"
Liang et al.(2018)	Qualitative	How do "SME entrepreneurs with inadequate capabilities and limited resources drive their drastic transformation to" cross boarder e-commerce (CBEC)	"How entrepreneurs with inadequate capabilities and limited resources drove their SMEs to successful digital transformation using services and functionalities offered by third-party digital platforms"	Process model: "third-party digital platform service providers can help SMEs transform and compete"
Nambisan (2017)	Theoretical	"How does the richness of pervasive digitization such as its variability, materiality, generativity, and emergence create a need for new theorizing in entrepreneurship? What should be the components of new theories in entrepreneurship that recognize and	"Intersection of digital technologies and entrepreneurship"	"Implications to overcome uncertainty through digitalization in entrepreneurship"

		incorporate this richness?"		
Nambisan et al. (2019)	Editorial	"Research that incorporates issues at multiple or cross levels of analysis, embraces ideas and concepts from multiple fields/disciplines, and explicitly acknowledges the role of digital technologies—and contribute to a broadened understanding of the implications of digitization for innovation and entrepreneurship "	Provide clarity on digital transformation of the economy and emphasize the "need to incorporate multiple and cross-levels of analysis" in the literature	Identified 3 related digitization themes: openness, affordances, and generativity
Ngoasong (2018)	Qualitative	"How does context influence digital entrepreneurship in a resource-scarce environment?"	"Ways in which EDCs shape the entry (or start-up) choices and post-entry strategic decisions of digital entrepreneurs in response to context-specific opportunities and challenges associated with digital entrepreneurship. "	Develops Theoretical Framework "Develops a theoretical framework that allows an analysis of the context and background of companies' digital competencies that lead to digital entrepreneurship"
Ojala (2016)	Qualitative	How do "IT entrepreneurs create and develop their business	"Business models and opportunity creation: how IT entrepreneurs	Theoretical model: Business development

		models in an environment in which both the technology and the markets are uncertain and constantly changing?"	create and develop business models under uncertainty"	
Sahut et al. 2019	Review	"How does production and consumption of digital information affect entrepreneurial action and new venture creation process?"	"Contribute to the development of a new perspective for the analysis and understanding of digital entrepreneurship"	Framework: Recommendations to advance research
Shen et al. (2018)	Review	What role does "digital technologies play in entrepreneurship. What role does users and agents play in digital entrepreneurship"	Engage in dialogue on digital entrepreneurship and "contribute to the development of cumulative knowledge in this area"	Reveal "interaction among digital platforms, entrepreneurs, institutions and investors"
Spiegel et al. (2016)	Qualitative/ Quantitative	"What are the characteristics of early stage internet start-up business models and how are these actually developed? Are early stage internet start-ups with better-connected founders more successful?"	"Business model development, founders' social capital and the success of early stage internet start-ups: a mixed-method study"	Success factors
Sussan and Acs (2017)	Theoretical	External macroecosystems/ microecosystems that support platforms	The "role of agents and users in the digital economy".	Framework: "digital infrastructure governance, digital user citizenship, digital

				entrepreneurship, and digital marketplace”
Westerlund (2020)	Quantitative		1) “How internationally-oriented online SMEs differ digitalization from those focused on domestic markets, and 2) how these differences are related to the companies’ business model for scaling internationally”	“Online SMEs willing to scale internationally through digitalization need to develop a set of capabilities in partnering, customer relationship, and business process management, and invest in information and communication (ICT) resources and cyber resilience”
Zaheer et al. (2019)	Review	“Insight - how is the research on digital entrepreneurship literature developing? Critique - what is the focus and critique of the digital entrepreneurship literature? Transformative redefinition - what is the future of digital entrepreneurship research?”	Provide insight, critique, and transformative redefinition in a structured literature review	“Little consensus on definitions of key terms/delineations between the scope of the field's concepts, and very few themes and contexts of entrepreneurship have been explored. A dearth of integrative dynamic frameworks to help scholars and practitioners understand the complex entrepreneurial process”
Zhao and Collier (2016)	Theoretical	“What role do social networks play in digital opportunity identification and	“Identify and analyze determinants of digital entrepreneurship	Framework

		exploration at individual, institutional and societal levels? How, and to what extent, do social networks become or lead to an important source of social capital in digital entrepreneurial development and performance"	and their cause-and-effect relationships"	

Although Zhao and Collier (2016) broadly define digital entrepreneurship, they agree with and cite the European Commission's definition: "Digital entrepreneurship embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies. Digital enterprises are characterized by a high intensity of utilization of novel digital technologies (particularly social, big data, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders. They create the jobs and growth opportunities of the future." (p. 2176).

Shen et al. (2018) shed light on the role of technologies in entrepreneurship and showcase the interaction of digital platforms, entrepreneurs, institutions, and investors. Following a thematic call for papers, the goal of their review was to contribute to the development of a new perspective for the analysis and understanding of digital entrepreneurship. In doing so, the authors suggested an expansion of the digital economy literature with characteristics, consumption, and creation of digital information as well as a potential digital

entrepreneurship divide (i.e., the gap in the amount of digital skills and knowledge that entrepreneurs need to thrive) (Sahut, Iandoli, & Teulon, 2019).

Looking at three topics associated with digitization, "openness, affordances, and generativity", Nambisan et al. (2019) suggest that digital transformation of the economy should integrate multiple and cross-levels of analysis that are open to ideas and concepts from multiple fields and disciplines and to clearly recognize the role of digital technologies in this transformation (Nambisan, Wright, & Feldman, 2019). Zaheer et al. (2019) analyzed 133 articles by discipline, time, methodology, geography, and theoretical focus and provided insight, critique, and a transformative redefinition of digital entrepreneurship. They called for an understanding of the differences between traditional and digital entrepreneurship and an extension of the need to "acknowledge ways in which digital technologies are implicated in digital entrepreneurship" (Zaheer et al., 2019: 10), citing the level of digitization and its effect on the process and outcomes of digital entrepreneurship.

These studies cover a broad spectrum that is comparable to that of the digital entrepreneurship phenomenon. The review articles generally provide pathways, frameworks, or research maps that offer a guide for future research directions (Antonizzi & Smuts, 2020; Kraus et al., 2019; Sahut et al., 2019). Others are characteristic in nature and reveal key interactions among digital transformation, digital entrepreneurship, digital platforms, entrepreneurs, and institutions (Antonizzi & Smuts, 2020; Shen et al., 2018). Zaheer et al. (2019) provided insights into recent developments and critiqued the research to date. The theoretical studies examined frameworks aimed at promoting digital entrepreneurship and provided a clearer understanding of the digital economy and the digital entrepreneurship process. The intersection of digital technologies and entrepreneurship and the implications of digitization were also addressed

(Davidson & Vaast, 2010; Le Dinh et al., 2018; Nambisan, 2017). The empirical and qualitative studies are classified by discipline (entrepreneurship, management, information science, economics, education, telecommunications, and marketing) and affirm the multidisciplinary nature of the phenomenon. It is therefore evident that the digital entrepreneurship phenomenon is still developing and will require more studies to understand its intricate nature.

The Theory of Planned Behavior

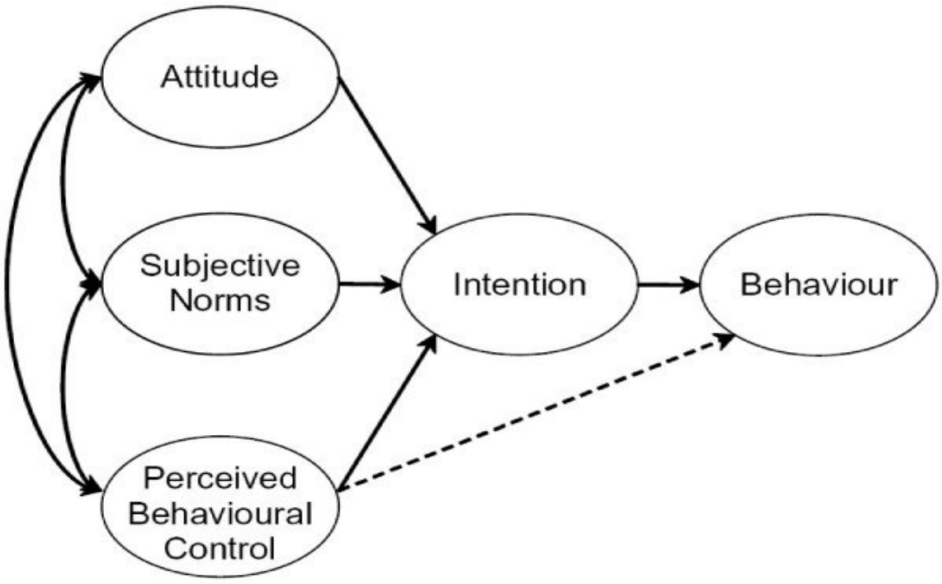


Figure 2.1 Source: Adapted from Ajzen (1991)

As its theoretical lens, this study will utilize the TPB, which has been well-studied in various settings and disciplines, including entrepreneurship and information systems (Kautonen, Van Gelderen, & Fink, 2015; Lai, 2017; Lortie & Castogiovanni, 2015). At its core, this theory helps explains and predict how human behavior forms based on three constructs: attitude toward an act or behavior, subjective norms, and perceived behavioral control over the behavior (Ajzen, 1991). These composite constructs together, and when favorable, predict behavioral intentions, which, in turn, lead to displayed behavior or actions (Ajzen & Fishbein, 1969). For example,

Pavlou and Fygenson (2006) empirically used the TPB in predicting electronic commerce adoption, while Kim (2010) developed an integrated model to predict the continued use of Mobile Data Services (MDS) based on the expectation–confirmation model (ECM) and the TPB. Therefore, the TPB is appropriate for use in this study.

Scholars have used TPB in technology-related studies to understand the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance (UTAUT 2). To explain and predict the process of e-commerce adoption by consumers, Pavlou & Fygenson (2006) used the TPB to capture the process of obtaining information and purchasing a product from a web vendor. Pavlou and Fygenson (2006) associated a relationship between the two processes and derived the intention, attitude, subjective norms, and perceived behavioral control for each behavior. Their findings emphasized trust and adoption variables for predicting e-commerce adoption while justifying the integration of trust and technology variables within the TPB framework (Pavlou & Fygenson, 2006). According to an investigation into the role of TAM and the TPB in predicting mobile banking adoption, regression results indicated a significant impact of perceived usefulness on attitude toward mobile banking (Aboelmaged & Gebba, 2013). Similarly, findings in another study showed that the TPB explained college students' acceptance of mobile learning; specifically, attitude, subjective norms, and perceived behavioral control positively influenced their intention to adopt mobile learning (Cheon, Lee, Crooks, & Song, 2012). In a facilitating context, the TPB was utilized to explain influences on intention and behavior. Findings confirmed the important roles of hedonic motivation, price value, and habit in influencing consumer acceptance and technology use in UTAUT2 (Venkatesh, Thong, & Xu, 2012). Furthermore, with a goal of predicting factors influencing the use of e-democracy, Hujran et al. (2020) found that perceived public value, perceived ease of use, and enjoyment

jointly determined the attitude of citizens toward e-democracy based on the TPB, TAM, and UTAUT 2.

Entrepreneurial Orientation

Entrepreneurial orientation has been widely recognized by scholars in the strategy and entrepreneurship literature as a firm-level type of strategic positioning that captures an organization's strategy-making practices, decision-making activities, processes, managerial philosophies, and firm behaviors that lead to entry in a new business (Lumpkin & Dess, 1996; Rauch et al., 2009; Wiklund & Shepherd, 2003). Entrepreneurial orientation has been defined in a variety of ways. A review of the EO construct reveals a set of definitions that demonstrate a subtle and yet dramatic portrayal of the concept (Covin & Wales, 2012). Its origin in entrepreneurship is traced to Miller's (1983) article, "The Correlates of Entrepreneurship in Three Types of Firms," in which he presented innovativeness, proactiveness, and risk taking as dimensions of the EO construct. His study results show that the combined dimensions are intuitively reasonable as determining factors of entrepreneurship (Miller, 1983).

A growing number of studies posit that each of the three dimensions contribute uniquely to a firm's EO. Schumpeter (1934) conceptualized that *innovation*, the creation and development of new products and processes, is a fundamental charge to entrepreneurial organizations. The distinction between innovation generation and innovation adoption was explored; results revealed that environmental dynamism and proactivity influence innovation adoption (Pérez-Luño, Wiklund, & Cabrera, 2011). *Risk taking* is associated with entrepreneurship and is considered a "paramount attribute" (Kreiser, Marino, & Weaver, 2002: 78) of entrepreneurs. Creating new opportunities for oneself or taking the initiative to improve one's current circumstances is deemed a proactive behavior. On the organizational level, the

pursuit of environmental opportunities as well as the achievement of a firm's objectives are also risk-taking behaviors (Chipeta & Surujlal, 2017; Kreiser, Marino, Dickson, & Weaver, 2010). *Proactiveness,* the ability to anticipate future problems or demands, is useful in characterizing and distinguishing key entrepreneurial processes and is "crucial to an entrepreneurial orientation because it suggests a forward-looking perspective that is accompanied by innovative or new-venturing activity" (Lumpkin & Dess, 1996: 146). Lumpkin and Dess (1996) also identified two more dimensions, autonomy and competitive aggressiveness, as a conceptualization of EO. Here, I focus on the overall construct of EO.

In the strategy literature, the origin of EO is traced to Mintzberg (1973), who theorized that a strategic decision-making disposition is characterized by an active search for new opportunities in uncertain times. In addition, Khandwalla (1977) advanced the concept of the entrepreneurial management style as a bold, risky, and aggressive approach to decision making? (Khandwalla, 1976; Mintzberg, 1973). Subsequently, more light was shed on the EO construct when Colvin and Slevin (1989) identified and compared strategic postures of organizational structures in high performance environments.

Entrepreneurial orientation has been viewed by researchers from both dispositional (Shane, Locke, & Collins, 2003) and behavioral perspectives (Covin & Lumpkin, 2011). More recently, in their reconceptualization, Anderson et al. (2015) illustrate the view of managerial attitude and entrepreneurial behavior toward risk as necessary dimensions that collectively form a higher-order EO construct. Scholars have empirically examined the EO relationship with other variables, such as transformational leadership (Muchiri & McMurray, 2015), absorptive capacity (Wales, Parida, & Patel, 2013), and family influence and firm cycle (Stanley, Hernández-Linares, López-Fernández, & Kellermanns, 2019). On the contrary, however, EO

has been shown to have a relationship with firm performance, as indicated by the in-depth meta-analysis conducted by Rauch et al. (2009).

Most prior studies have adopted Miller's (1993) perspective of EO as the combination of innovativeness, proactiveness, and risk taking. These dimensions can combine in different ways to form configurations that represent the policies and practices that provide a basis for entrepreneurial decisions and actions. Consequently, decisions and actions fueled by innovativeness, risk taking, and proactiveness (together at higher levels) increase performance. A myriad of studies on the EO-performance relationship found that businesses that adopted higher EO levels performed better (Lumpkin & Dess, 2001; Wiklund & Shepherd, 2003). Other researchers, however, were unable to find a significant relationship (Covin, Slevin, & Schultz, 1994; George, Robley Wood Jr, & Khan, 2001). To assess this variation, Rauch et al. (2009) found that the correlation between EO and performance is moderately large (r =0.242) and suggested that an assessment of additional moderators will benefit research in this area. Although the literature discusses several moderating variables (Brouthers, Nakos, & Dimitratos, 2015; Lumpkin & Dess, 1996), there is little consensus on what constitutes suitable moderators (Rauch et al., 2009). Firm size is frequently examined as a moderator because the smaller the organization, the greater a direct influence can be exerted by top management. In addition, the flexibility of smaller firms allows them to quickly change and take advantage of new opportunities. Industry is another variable that moderates the EO-performance relationship. Firms operating in dynamic industries (e.g., high tech) are more likely to benefit from entrepreneurial initiatives, thereby strengthening this relationship. Therefore, I consider EO as a behavioral construct and I draw on Covin and Slevin's (1991) position that behaviors give meaning to the entrepreneurial process:

> "A behavioral model of entrepreneurship is suggested because behaviors rather than attributes are what give meaning to the entrepreneurial process. An individual's psychological profile does not make a person an entrepreneur. Rather, we know entrepreneurs through their actions. Similarly, non-behavioral organizational-level attributes, like organizational structure or culture, do not make a firm entrepreneurial. An organization's actions make it entrepreneurial. In short, behavior is the central and essential element in the entrepreneurial process" (p. 8)

In support of this view, behavior, as shown by the TPB, helps explain human behavior via attitudes, subjective norms, and perceived behavioral control over the behavior, which, in turn, predicts intention (Ajzen, 1991). The TPB model has been used to predict several entrepreneurial activities and, specifically, intentions (Mathieson, 1991; Pavlou & Fygenson, 2006).

Entrepreneurial orientation has been proposed as a firm-level construct and has been extensively studied in the entrepreneurship literature. Researchers studying EO have primarily focused on a positive relationship with performance (Lumpkin & Dess, 1996; Wiklund, 1999); a meta-analytic study (Rauch et al., 2009) supports this relationship. While this assertion has been widely supported, other studies show mixed results (Hughes & Morgan, 2007; Wiklund & Shepherd, 2005), indicating that this relationship can exist in some contexts more so than in others. One suggestion has been to deviate from viewing EO as an advantage. This suggestion argues that there is a positive benefit in pursuing EO; however, researchers should consider associating EO with outcome variance, which can potentially fluctuate on the spectrum of success and failure (Wiklund & Shepherd, 2011).

With this background, I consider gain, loss, and feasibility (as part of overall opportunity evaluation) as moderating effects on the relationship between EO and the intention to engage in digital activities by assessing pathways to opportunity attractiveness via these dimensions and how they influence intention. In formulating the items to measure gain estimation, Scheaf et al. (2020) referred to personal gain estimation as rewards, benefits, and/or profits. Loss estimation items focused on the ”potential losses for me” of opportunity pursuit. The cost of adopting a new technology, technique, or process has been found to be one of the main deterrents as to why organizations are reluctant to engage in digital activities.

According to Antonizzi and Smuts (2020), “The inordinate costs associated with both adopting new technologies or operational methods, as well as improving on existing technology or operational methods, is the principal reason organisations are reluctant to digitally transform” (p. 247). This approach will help explore the degree to which gain estimation or loss estimation will influence intention to engage in a digital activity. For the third dimension, perceived feasibility, items focused on whether individuals believed they were capable or able to personally pursue a specific opportunity (Scheaf et al., 2020). Therefore, I will utilize the new measure that has been tested, validated, and found to capture and “connect opportunity evaluation with entrepreneurial action or inaction” (Scheaf et al., 2020: 22) in order to elucidate our understanding of the digital entrepreneurship process.

Table 2.3 is a selection of some seminal studies in EO. Also included is a selection of empirical studies in the context of digital entrepreneurship that utilize EO and their relationship to the study at hand. Both sets of selected articles provide support for this dissertation (type of support is listed in the last column).

Table 2.3: Summary of Selected Seminal and Empirical studies on EO Articles

Author(s)/Year	Type of Study	Key Findings	Sample size	Support for Dissertation
Abebe (2014)	Empirical	"E-commerce adoption has a significant, positive influence on SMEs' average sales growth rate. Adopters of e-commerce technology have higher average sales growth rate than non-adopters"	55	EO & Ecommerce Adoption
Covin & Slevin (1989)	Empirical	"Performance among small firms in hostile environments was positively related to an organic structure, an entrepreneurial strategic posture, and a competitive profile characterized by a long-term orientation, high product prices, and a concern for predicting industry trends"	161	EO Dimensions
Herve et al. (2020)	Empirical	"The more a company digitalizes its functions, the more it favors entrepreneurial behavior in leading successful strategic decisions in foreign markets"	190	EO & Digitization Interaction
Lumpkin & Dess (1996)	Theoretical	"Clarifies the nature of the entrepreneurial orientation construct and propose a contingency framework for investigating the relationship between EO and firm performance"	N/A	EO & Dimensions
Miller (1983)	Empirical	"Clarifies the correlates of entrepreneurial firms, Conceptualization of EO"	52	EO & typology of firms
Rauch et al. (2009)	Meta-Analysis	"Meta-analysis indicated that the correlation of EO with performance is moderately large (r = .242) and that this relationship is robust to different	S= 53 N=14259	EO & Performance

		operationalizations of key constructs as well as cultural contexts"		
Wales (2016)	Review	"Reviews and synthesizes EO research and future directions"	N/A	EO & Theory
Wiklund and Shepherd (2011)	Empirical	"EO as a performance–variance-enhancing strategic orientation rather than a performance–mean-enhancing orientation"	2455	EO & Failure/Success Interaction

Abebe (2014) explored the relationship between e-commerce adoption and the performance of SMEs; specifically, diving into the degree to which EO moderates that relationship. Covin & Slevin (1989) found that the performance of small firms in hostile environments was positively related to an organic structure; therefore, an entrepreneurial strategic posture is beneficial to this study with its focus on small firms, as the evolving changes in digital activities is comparable to hostile business environments. Quantitative research demonstrates that the more a company digitalizes its functions, the more it favors entrepreneurial behavior to lead to successful strategic decisions, not only locally but in foreign markets as well (Hervé et al., 2020).

In their systematic review, Mustafa et al. (2018) addressed the following research questions: "1) What is the current state of knowledge concerning employee entrepreneurial behaviors in pursuit of corporate entrepreneurship? 2) What are the contextual determinants of employee entrepreneurial behaviors in established organizations?" and showed that context influences employee entrepreneurial behavior. Wiklund and Shepherd (2011) encourage researchers to consider EO as a performance variable that enhances strategic orientation while

exploring the impact of EO on a firm from a success or failure perspective. Wales (2016) analyzed and synthesized EO and provided an integrative guide to enable researchers to more readily assimilate influential works on EO. The next section discusses opportunity evaluation and the constructs of gain estimation, loss estimation, and perceived feasibility, which moderate the relationship between EO and intention to engage in digital activities.

Opportunity Evaluation

The evaluation of opportunities to introduce new goods and services is fundamental to the entrepreneurship process, as one's beliefs about the appeal of an opportunity are motivations that initiate whether actions are taken. Digital technologies, one of the vehicles that drives new products and services, are a necessary component of the processes that underpin new market offerings and are considered during opportunity evaluation. According to Haynie (2009), opportunity evaluation involves an entrepreneur who engages in a first-person assessment with the intent of introducing new goods and services to their firm. Previous studies on opportunity evaluation are somewhat fragmented (Wood & McKelvie, 2015), due, in part, to the varied terms used to explain it. Opportunity confidence (Dimov, 2010), opportunity feasibility and desirability (Autio, Dahlander, & Frederiksen, 2013), and gain and loss potential have all been proposed as foundations of opportunity evaluation. Some studies, however, fail to provide any definition, "while others provide statements that require the reader to infer what opportunity evaluation means" (Wood & McKelvie, 2015: 260). This, in turn, points to a mixed underlying judgment criterion and a lack of cohesiveness in the literature. To address this, Scheaf et al. (2020) examined the theoretical and methodological problems and synthesized disparate constructs to provide clarity; they proposed that "opportunity evaluation culminates in a judgment of personal opportunity attractiveness which consists of gain estimation, loss

estimation, and perceived feasibility" (p. 14). The constructs gain estimation and loss estimation are two separate constructs that draw on different theoretical logic. Gain estimation is an integration of the concepts potential profit and probability of success (Grichnik, Smeja, & Welpe, 2010), financial returns (Corbett, 2005), gain belief (Shane & Venkataraman, 2000), desirability belief (Mitchell & Shepherd, 2010) and opportunity attractiveness (Shepherd, Patzelt, & Baron, 2013). The theoretical logic behind gain estimation is the potential of a firm to generate competitive advantage and entrepreneurial returns. Loss estimation on the other hand is an integration of the concepts of risk perception (Foo, 2011; Keh et al., 2002), perceived risk and loss perception (Grichnik et al., 2010; Shane & Venkataraman, 2000). The theoretical logic here is the assessment of risk in terms of the size of potential loss or perceived costs associated with failed venturing. These two constructs together with perceived feasibility are the three dimensions of opportunity attractiveness which I use in my study as moderating variables. Therefore, I draw on Sheaf et al (2020) definitions of the three dimensions of opportunity attractiveness and utilize their measures in assessing weights placed on the dimensions in determining intention to engage in digital activities. Hence, the dimensions of gain estimation, loss estimation, and perceived feasibility are moderators, as shown in Figure 2.1. Definitions appear in Table 2.4.

Table 2.4: Construct Definitions

Constructs	**Definitions**	**Supporting Reference**
Gain Estimation	"Assessing the potential personal monetary and non-monetary benefits resulting from opportunity pursuit"	Scheaf et al. (2020)
Loss Estimation	"Individuals' assessments of the personal costs potentially resulting from failed venturing in pursuit of specific opportunities"	Scheaf et al. (2020)

Perceived Feasibility	"Individuals' assessments of their ability and capacity to execute the tasks associated with a specific opportunity pursuit"	Scheaf et al. (2020)

Entrepreneurial opportunity is a core construct in entrepreneurship. According to Shane and Venkataraman (2000), opportunities in a business venture occur when products and services can be sold above their production costs. The inference here is twofold. First, there is an indication of opportunity evaluation when the opportunity is explored. Second, there is an implication of either gain or loss. According to Haynie et al. (2009), "opportunity evaluation describes the process of evaluating a set of circumstances that if acted upon, may result in wealth generating products and services" (p. 340). This supports Gruber et al.'s (2015) assertion that the subjective belief in an opportunity allows value generation and drives entrepreneurial action. Since the exploitation of opportunities typically requires a commitment of resources, entrepreneurs' evaluations are essential in determining if it is meaningful to proceed or abandon a specific opportunity. The first three entries in Table 2.5 show constructs that laid the groundwork for the fourth article, which culminated in the measurement used for all three constructs. Table 2.5 consists of a selected set of studies that emphasize the three moderating constructs (gain estimation, loss estimation, and perceived feasibility) and a discussion of the studies.

Table 2.5: Selected studies on Opportunity Evaluation

Author/Year	**Research Type**	**Sample Size**	**Findings**	**Support for Dissertation**
Gruber et al. (2015)	Empirical	141	"Differences in opportunity preferences of individuals with technological, management, and entrepreneurship experience"	Opportunity Evaluation/GE
Keh et al. 2002	Empirical	500	Risk perception mediates opportunity evaluation	Loss Estimation

Mitchell and Shepherd (2010)	Empirical	677	"Images of self – vulnerability and capability – impact one's images of opportunity"	Perceived Feasibility
Scheaf et al. (2020)	Empirical	855	Framework, measure for opportunity attractiveness	GE, LE, PF & Measurement used

Gruber et al. (2015) advanced opportunity evaluation research by investigating how individuals may diverge in their views of what defines opportunity evaluation. They found differences in the opportunity preferences (template) of individuals with technological, management, and entrepreneurship experience and that experienced entrepreneurs emphasize factors that allow quick cash generation. This position affirms the consideration of gain estimation when an entrepreneur decides to engage in a digital activity. The estimation of a higher cash generation, therefore, is a motivation to engage in the activity being evaluated (Gruber et al., 2015). The perception of loss also plays a role in the decision to pursue an opportunity. In their assessment of risk perception, Keh et al. (2002) considered "the probability of loss, level of uncertainty in the situation, size of possible loss, and overall risk of the venture" (p. 133). These individual items capture the potential for losses, thereby supporting the moderating effect of loss estimation in this study. The next moderator, perceived feasibility, considers the individual's assessment of their ability and capacity to execute the tasks associated with a specific opportunity pursuit. Mitchel and Shepherd (2010) hypothesized that the likelihood of an individual acting on an opportunity increases with the knowledge related to that opportunity, "but does so at a faster rate when the window of opportunity is wide than when it is narrow".

Within the literature on entrepreneurship, definitions have centered at the micro and macro levels (Van Praag & Versloot, 2007). On a micro level, Luger and Koo (2005) define an

entrepreneurial firm as "a business entity which did not exist before during a given time period (new),which starts hiring at least one paid employee during the given time period (active), and which is neither a subsidiary nor a branch of an existing firm (independent)" (p. 9). On a macro level, Wennekers et al. (2002) integrated the two ontological views and defined entrepreneurship as "the perception and creation of new economic opportunities combined with decision-making on the location, form and use of resources" (p. 28). With a focus on SMEs and technology, I draw on and use the definition of entrepreneurship as "the discovery, evaluation and exploitation of future goods and services" (Eckhardt, & Shane, 2003, p. 336). This definition recognizes the importance of evaluation in the entrepreneurial process by suggesting that before an idea becomes an opportunity it must be evaluated; for an opportunity to be evaluated, the entrepreneur must identify it as such. Similarly, Ardichvili et al. (2003) proposed that to create a successful business, the entrepreneur must first recognize, develop, and evaluate an opportunity, a three-phased process referred to as "the triad." (Ardichvili et al., 2003) Bonney and Williams (2009) listed awareness, problem solution discovery, and evaluation as three theorized cognitive processes for opportunity recognition. Evaluation, therefore, is an integral part of the opportunity recognition process that merits further assessment of the relationship between EO and intention to engage in a digital activity.

For entrepreneurs, one of the main considerations for starting, adding to, or enhancing a business venture is value creation, which translates into the evaluation of gain or loss as the bottom line. Scholars have referred to evaluation as one of the three pillars of the opportunity recognition process. In empirically assessing the evaluation process, Scheaf et al. (2020) measured and tested opportunity evaluation and demonstrated that the three constructs (gain estimation, loss estimation, and perceived feasibility) comprehensively captured the evaluation

process in entrepreneurial action. Upon reviewing a collection of judgment standards to determine what makes an opportunity pursuit personally attractive, they validated a new measure and found the dimensions of opportunity attractiveness also to be gain estimation, loss estimation, and perceived feasibility. I adopted their measure to test whether these three constructs, as dimensions of opportunity attractiveness, strengthen or weaken the relationship between EO and intention to engage in digital activities.

Research Model and Hypothesis Development

My research model seeks to address the gaps discovered in the literature review and in addition, provide a synthesis of the literature reviewed. Extant studies have investigated EO by addressing individual characteristics, traits, behavior, and impact on business. The research on behavior approaches argues that an entrepreneur's state of mind changes the role they play and impacts their business (Gartner, 1988).

The attraction of an opportunity to an entrepreneur drives intention to engage in a behavior or an activity. Behavioral intention has been identified by researchers as one of the most immediate predictors of actual behavior (Schlaegel & Koenig, 2014). The TPB has been widely applied as a framework to explain and predict behavioral intentions in different research settings (Kautonen et al., 2015; Koropp, Kellermanns, Grichnik, & Stanley, 2014; Schlaegel & Koenig, 2014). According to the TPB, attitude, subjective norms, and perceived behavioral control are positively associated with intention, which, in turn, leads to an action or behavior (Ajzen, 1991; Pavlou & Fygenson, 2006). Previous research has shown that innovativeness, proactiveness, and risk-taking traits reliably resulted in EO (Bolton & Lane, 2012; Covin et al., 2020).

Table 2.6 lists the four hypotheses developed for this study. The research model is a moderation model. Hypothesis 1 (H1) is a prediction within theory; Hypotheses 2, 3, and 4 (H2, H3, H4) are moderations across theory. More specifically, the theoretical hypotheses address the relationship of EO with entrepreneurial intention as a proxy for intention to engage in digital activities within the confines of the TPB. The varying degree of choices of estimation and perception of the entrepreneur in making the decision to engage in a digital activity, along with different degrees of loss estimation, gain estimation, and perceived feasibility, either strengthen or weaken the theoretical relationship. Hypothesis 1? examines the impact of EO on intention to engage in a digital activity.

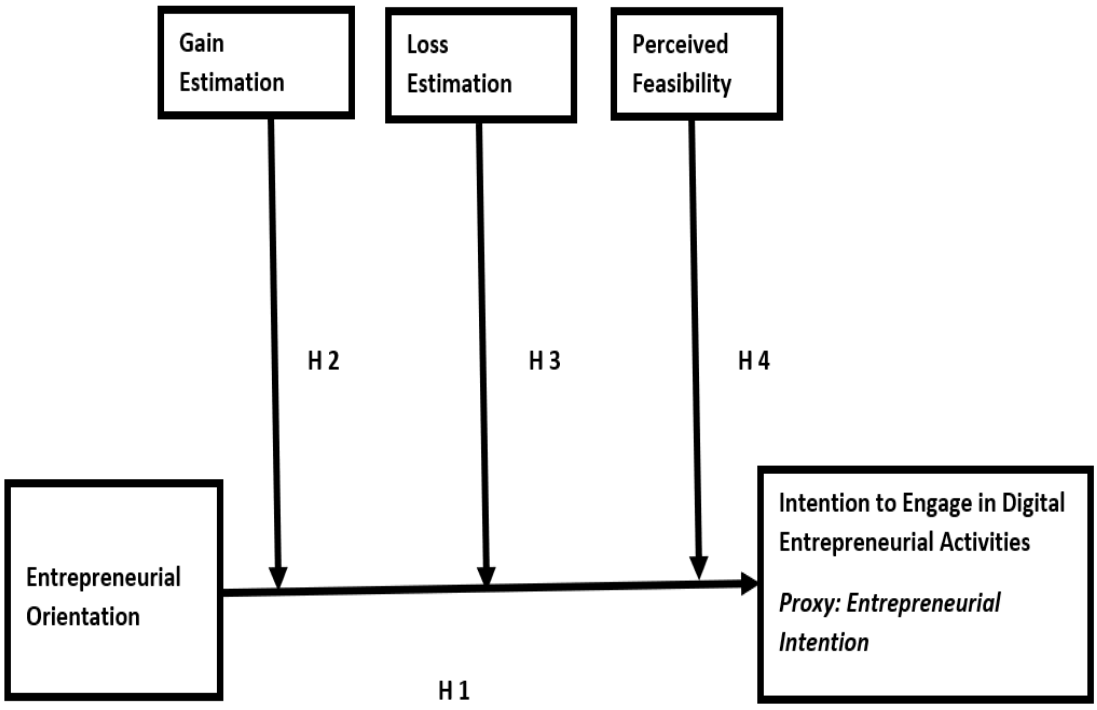


Figure 2.2 Theoretical Model of Entrepreneurial Orientation and Intention to Engage in Digital Entrepreneurial Activities

Table 2.6: Hypothesized Relationships

EO & Intention to Engage in Digital Entrepreneurial Activities	
H1	Entrepreneurial Orientation is positively associated with intention to engage in digital activities. Specifically, intention to engage in digital activities increases with a higher level of EO
Moderating Role of Opportunity Evaluation: Gain Estimation, Loss Estimation, Perceived Feasibility	
H2	Gain estimation moderates the relationship between entrepreneurial orientation and intention to engage in digital activities such that the higher levels of gain estimation enhance the positive relationship between EO and Intention to engage in digital activities
H3	Loss estimation moderates the relationship between entrepreneurial orientation and intention to engage in digital activities such that the higher levels of loss estimation diminish the positive relation between EO and Intention to engage in digital activities
H4	Perceived feasibility moderates the relationship between entrepreneurial orientation and Intention to engage in digital activities such that the higher levels of perceived feasibility enhance the relationship between EO and Intention to engage in digital activities

Hypothesis Development

The research model, as shown in Figure 2.2 is a moderation model that depicts the development of four hypotheses that predict a relationship between EO and intention to engage in digital activities. This association is moderated by opportunity evaluation in the form of gain

estimation, loss estimation, and perceived feasibility. Therefore, I expect a positive relationship between EO and intention to engage in digital activities.

A popular model of EO proposed by some researchers suggests five dimensions: proactiveness, risk taking, innovation, autonomy, and competitive aggressiveness (Lumpkin & Dess, 1996; Zehir, Can, & Karaboga, 2015). Others have studied EO as a three dimensional construct: innovation, risk taking, and proactiveness (Dai, Maksimov, Gilbert, & Fernhaber, 2014; Kreiser & Davis, 2010). The dimensions provide an indication of an organization's entrepreneurial nature, such that higher levels of EO are usually equated with higher levels of performance. Applied to the individual level, the dimensions of innovation, proactiveness, and risk taking correlate well with entrepreneurial tendencies. This has advanced research further in EO where one's orientation can be assessed and, in addition, has paved the way to explore opportunities with other variables. Drawing on Covin et al.'s (2020) conceptualization of EO, I define *innovativeness* as an entrepreneur's amenability to and pursuit of digital solutions to work-related tasks; *proactiveness* as an entrepreneur's bias toward discretionary action aimed at anticipating and responding to new value creation opportunities; and *risk taking* as an entrepreneur's willingness to undertake digital technology tasks with uncertain outcomes. Together, these dimensions form the overall EO construct that I examine. I link intention to engage in digital activities and EO according to Ajzen's (1991) TPB, which posits a link between one's beliefs and behavior. According to this theory, attitude, subjective norms, and perceived behavioral control together shape an individual's intention and behavior.

Entrepreneurial orientation is a psychological construct that impacts how people make decisions about new technologies; therefore, understanding EO is essential to understanding the

intention to adopt technologies. Personality traits and entrepreneurial attitudes contribute to a person's likelihood of establishing a business (Bolton & Lane, 2012). Innovativeness (how individuals respond to new things), risk taking (predisposition to take risk), and proactiveness (anticipating future needs) are attitudes that impact one's EO and form the EO construct. With this backdrop, Goktan and Gupta (2015) found that EO boosted willingness to use new technology, with results indicating that incorporating EO explains an additional 24.3 % variance in technology adoption. Also, Kraus et al. (2019) found that employees with a high level of EO are more likely to explore and discover new opportunities, such as a digital activity. Gupta et al. (2016), who explored the role of EO in facilitating technology adoption, empirically validated reactions to new technologies as one consequence of EO, thus providing a link between technology adoption and EO. Therefore, it can be inferred that EO, a psychological construct, affects how people make decisions about new technologies. On a micro level EO incorporates beliefs and values associated with predispositions of the three EO dimensions; proactiveness, risk taking and innovativeness (Goktan & Gupta, 2015). On a macro level the three dimensions provide an indication of an organization's entrepreneurial nature. Hence, I argue that higher levels of EO will create a stronger possibility to engage in a digital entrepreneurship. Furthermore, as supported by the literature, entrepreneurial action is driven primarily by entrepreneurial intention (Krueger & Carsrud, 1993). Thus, I suggest that:

H1: *Entrepreneurial orientation is positively associated with intention to engage in digital entrepreneurship. Specifically, intention to engage in digital activities increases with a higher level of EO.*

Digital technologies offer possibilities to create and deliver new value for prospective customers in the form of an opportunity. For example, e-businesses (Amit & Zott, 2001), e-commerce adoption (Pavlou & Fygenson, 2006), digital business strategies (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013), and digital transformation strategies (Matt et al., 2015) all point to the potential of value creation, new forms of interaction with customers, new opportunities, and the expectation of rewards. One factor that can alter the relationship between EO and intention to pursue digital activities is opportunities afforded by digital technologies. The exploitation of digital technologies implies changes in entrepreneurs' beliefs, behaviors, and actions. For example, the potential for exploiting new opportunities via digital platforms deepens specialization while increasing production, marketing, and distribution capabilities, which make digital platforms an attractive venue for entrepreneurship. Taking advantage of a new business environment created by digital technologies is imperative in the face of competition and for firms to stay relevant. Digital technologies can open routes to new ways of doing business; specifically, better customer experiences and engagement, streamlined operations, and new lines of business (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014). Exploiting these opportunities requires the consideration of rewards, gains, or profit. The stronger the belief of the entrepreneur about possible gains resulting from the opportunity, the stronger the desire to pursue that opportunity.

Entrepreneurial orientation is "a tendency held by individual employees of the organization towards innovative, proactive, and risk-taking behaviors in the workplace" (Covin et al., 2020: 2). To exploit benefits, improve gains, and add value for customers, entrepreneurs need to integrate digital technologies (Sebastian et al., 2017). The introduction of digital technologies provides an opportunity for entrepreneurs to access new niche markets and offer

their goods and services to the largest number of consumers possible (Galindo-Martín, Castaño-Martínez, & Méndez-Picazo, 2019; Nambisan, 2017), which may incentivize entrepreneurs to expand their efforts. The potential for incentive will thereby strengthen the relationship between EO and intention to pursue digital activities. The expectation of possible benefits, rewards, or profits resulting from a digital activity is hereinafter referred to as *gain expectation*. The proportion of anticipated gains therefore contributes to and drives the decision to engage in digital activities. High levels of EO together with high expectation of possible profits is more likely to drive a firm to implement a digital activity thereby strengthening the EO and intention relationship. High levels of EO combined with low expectation of gains and/or rewards will likely weaken the EO and Intention relationship. In another scenario where a firm has low EO but high expectation of rewards or profit I expect this situation strengthening the EO and Intention relationship. Yet again in another instance where a firm has low EO and low gain or reward expectation I expect a weakened EO and intention relationship. The overall expectation of gains or profits, ultimately, will strengthen the relationship between EO and engagement in digital activities; that is, the higher the anticipated gain, the stronger this relationship. The concept of gain estimation was synthesized and developed under the umbrella of opportunity attractiveness constructs in the form of individual profit potential and the influence of anticipated profits, such as market newness and competitive advantage. Scheaf et al. (2020) defined gain estimation as the "individuals' assessment of the personal monetary benefits potentially resulting from pursuing specific opportunities" (p. 17). Anticipated rewards or gains, therefore, will strengthen the relationship between EO and intention to engage in digital activities. Accordingly, I posit that:

H2: *Gain estimation moderates the relationship between EO and intention to engage in digital activities such that higher levels of gain estimation enhance the positive relationship between EO and intention to engage in digital activities.*

One of the cardinal goals of a business is to make a profit. "Law is to justice, as medicine is to health, as business is to optimized collective value" (Donaldson & Walsh, 2015: 202). To optimize a collective value implies an expectation of a benefit or reward in pursuit of an opportunity by an entrepreneur or business. Businesses normally do not expect to lose in an opportunity pursuit. They may decline to invest in an opportunity when the perceived rewards to be derived from creating the proposed value are low or nonexistent (Antonizzi & Smuts, 2020). Businesses therefore pursue an opportunity when it is seen as worthy of pursuit; that is, when the sale of products and services are estimated to exceed production costs (Antonizzi & Smuts, 2020; Shane & Venkataraman, 2000). Thus, it can be extrapolated that entrepreneurs are less likely to pursue a digital opportunity if they anticipate a loss. In determining the role of EO in facilitating the adoption of technology, I focus on loss estimation instead of on perceived usefulness, perceived ease of use, and willingness, which have been studied extensively in the technology literature (Abdullah, Ward, & Ahmed, 2016; Davis, 1989; Elkaseh, Wong, & Fung, 2016).

Although technology affords opportunities, it sometimes can be a constraint. I argue that taking advantage of technological opportunities involving a lower loss (or no loss) estimation while envisaging a higher value creation strengthens the relationship between EO and intention to pursue digital activities because entrepreneurs are inclined to pursue opportunities that create value (e.g., a digital activity that promises streamlined business

opportunities and lowers cost if anticipated loss is low). Research maintains that a focus on reshaping customer value intentions and operations transformation using digital technologies allows for a new set of capabilities (Berman, 2012). Hence, if the anticipated losses from using these digital technologies are lower there is an incentive to invest in the digital activity, thereby strengthening the relationship between EO and intention to pursue digital activities. EO among other things creates competitive advantage for firms who have strategic processes in place (Lumpkin & Dess, 1996). Eventually these strategic processes result in higher firm performance. With is this in mind, in a situation where a firm has high levels of EO and high levels of loss estimation it is expected that the relationship between EO and Intention will diminish while higher levels of EO with low levels of loss estimation is expected to strengthen the EO and Intention relationship. On the other hand, a firm with a low level of EO and a high level of weaken the EO and Intention relationship while a low level of EO and low level of LE could potentially strengthen the EO and Intention relationship. Thus, when the level of loss estimation is higher, the relationship between EO and intention to engage in digital entrepreneurship weakens. Therefore, I propose that:

H3: *Loss estimation moderates the relationship between EO and intention to engage in digital activities such that higher levels of loss estimation diminish the positive relationship between EO and intention to engage in digital activities.*

The opportunity recognition process is an intentional process and offers a means to explain and predict entrepreneurship, in general. The active search for an opportunity to engage in a digital activity, therefore, is part of the intentional process that may lead to a stronger intention to implement a digital technology. As an individual assesses their competency and

degree to which they can engage in a digital activity, they develop the belief that they possess the necessary skills and abilities to be successful in the specific activity. According to the theory of entrepreneurial event, entrepreneurial intent is derived from the perceptions of desirability and feasibility and the propensity to act (Krueger Jr, Reilly, & Carsrud, 2000; Shapero & Sokol, 1982). I focus on perceived feasibility. In definitions of opportunity evaluation, perceived feasibility has highlighted the individual's ability or capability (Dimov, 2010) to develop the opportunity, while others have emphasized the individual's belief (Krueger, 1993). In developing a measure for opportunity evaluation, Sheaf et al. (2020) synthesized constructs premised on an individual's assessment and capability of an opportunity with the resulting perceived feasibility construct. As one of three constructs that predict an entrepreneurial event, perceived feasibility is defined by Sheaf et al. (2020) as individuals' assessments of their ability and capacity to execute the tasks associated with a specific opportunity pursuit (see Table 2.6). Literature shows that perception of feasibility predicts intention (Dutta, Gwebu, & Wang, 2015; Segal, Borgia, & Schoenfeld, 2005). In examining the role of perceived feasibility in moderating EO and intention to pursue digital activities, I note that entrepreneurs who perceive themselves as capable and able to execute a digital activity have a higher proclivity to engage in that activity. This is especially true in environments undergoing significant changes, such as that of technology, where opportunities flourish. If entrepreneurs perceive themselves as capable and able to use digital technology, they are more likely to proceed with exploitation of the opportunity.

Moghavvemi et al. (2017) found that perceived feasibility has a positive effect on entrepreneurs' intention to use information technology innovations, such as digital technologies, and that the significant effect of perceived desirability, perceived feasibility, and performance

expectancy are salient antecedents of intention to adopt and use an innovation. Similarly, as an antecedent to intention, (Krueger Jr et al., 2000) proposed that perceived feasibility aligns with expectancy and that a positive perception of feasibility can increase the intention to pursue digital activities. If an entrepreneur assessing an opportunity perceives they have enough skills and ability to use a new technology, they will be more interested in pursuing that opportunity, thus strengthening the relationship between EO and intention to pursue digital technology. On the other hand, an entrepreneur with low perceived feasibility (perception of ability and capability) is less likely to implement a new technology, thereby weakening the EO and intention relationship. Thus, entrepreneurs with higher perceived ability and capability to implement a digital technology enhances the relationship between EO and engagement in the activity, while a negative perception of feasibility weakens this relationship (Dutta et al., 2015). Consequently, perceived feasibility moderates EO and entrepreneurial intention to engage in a digital activity, hereinafter considered an entrepreneurial event. Therefore, I propose that:

> H4: *Perceived feasibility moderates the relationship between EO and intention to engage in digital activities such that higher levels of perceived feasibility enhance the relationship between EO and intention to engage in digital activities.*

Summary

Digital entrepreneurship is a new phenomenon that is developing at a very fast pace. The literature shows that this phenomenon is based on technological concepts that have existed and have been incrementally developed over decades. As the entrepreneur assesses whether or not to invest in a digital activity, they consider the potential for gain, loss, and feasibility. Today, digital entrepreneurship is arguably the easiest venture to undertake, given the rate of

technological advancement and the ease of adoption. As a result, it will particularly benefit entrepreneurs of SMEs who may have limited resources to improve upon an existing business. Also, SMEs have the benefits of adaptability and scalability when using digital platforms, social media, the IoT, and the heavily scaled services on platforms. Despite these benefits, the literature is scant on studies that clarify the understanding of digital entrepreneurship processes. Six streams of research have been identified in this review: digital business models, digital entrepreneurship process, platform strategies, digital ecosystem, entrepreneurship education, and social digital entrepreneurship. I examined the digital entrepreneurship process path, with the goal to help deepen our understanding of digital entrepreneurship, by focusing on EO levels and their influence on intention to pursue digital technologies in SMEs in the digital entrepreneurship and information systems literature.

CHAPTER 3: METHODOLOGY

This chapter begins with a general overview, followed by a description of the survey instrument used in this study and the approach, sample, and measures. I conclude the chapter describing of the data analysis process, including the diagnostic and bias tests conducted before testing the hypotheses in the research model.

Overview

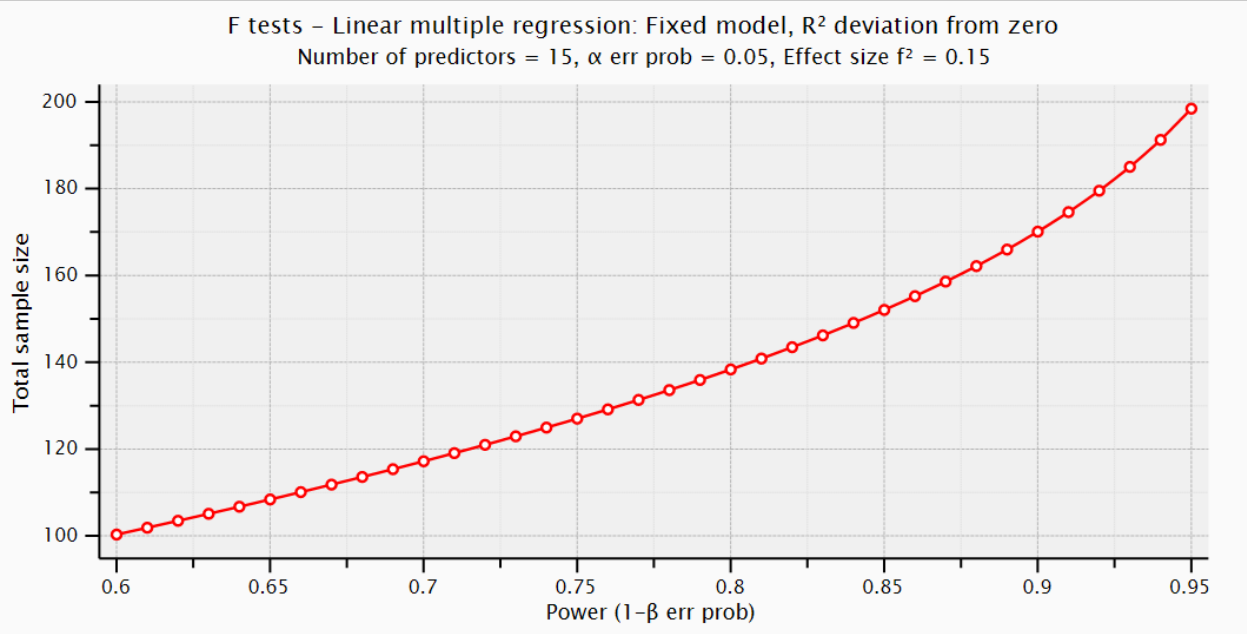
I selected a nonexperimental regression research design and collected panel data from across the United States using Qualtrics Experience Management (XM) ™ platform. The cross sectional survey leveraged quantitative methods Creswell (2010). The survey instrument comprised of 58 items drawn primarily from existing validated scales, some of which were adapted to the digital entrepreneurship environment and a couple self-generated. A link to the survey was emailed to business owners via the email addresses obtained from the database. The survey instrument comprised of previously validated and accepted scales or adapted scales to accommodate the novel phenomenon of digital entrepreneurship. Data were analyzed using ordinary least square (OLS) regression, with tests for moderation and a post hoc analysis.

Survey Instrument

The Qualtrics Survey Platform was used; this allowed for numerous browsers, was mobile compatible, and supported multiple data formats to export data for analysis. Moreover, an email address was provided for each entrepreneur in Qualtrics. Qualtrics also provided a permanent link to each participant. The survey instrument was distributed via email with a link to an online questionnaire administered through Qualtrics (XM). Respondents were required to check “I agree” to indicate informed consent about the purpose of the study and contact

information of the principal investigator and faculty adviser. Additionally, participants had the choice to abandon the survey at any time and were guaranteed that their responses were confidential. Appendix B contains the cover letter and survey.

Survey Approach



The study used G*power 3.1 software to run a power analysis to ascertain the minimum required sample size as a function of user-specified values for significance, statistical power, and effect size (Ellis, 2010; Faul, Erdfelder, Buchner, & Lang, 2009). The preliminary power analysis used a medium effect size of 0.15, a significance level of 0.05, and a power of 0.8, with 15 predictor variables (i.e., 1 independent variable, 3 moderators, and 11 controls). The G*power 3.1 software generated a sample size of 139, which represented the target sample size.

Sampling Frame

The participants were owners of SMEs. Qualtrics administered the survey to qualified participants from all industries based on the North American Industry Classification System (NAICS), a standard applied by Federal agencies to classify business establishments for the purpose of collecting and analyzing statistical data related to the U.S. business economy. Qualtrics contacted potential participants via email (see Appendix B). This email included a link to the survey which was hosted on the Qualtrics XM™ platform. Participants were obligated to read and acknowledge an informed consent notice and were required to meet certain screening criteria to complete the survey (see Appendix B). Participants who did not meet the screening criteria were informed via the platform that they were ineligible for the study and were subsequently directed to exit the survey.

Measures

The operationalization of each variable in the research model is discussed in this section. First, I describe the dependent variable. Next, I discuss the independent variable, the moderators, and the control variables.

I used established and adapted scales for each construct (see below). All scales used were a 7-point Likert-type scale, which allows for differentiation (Miller, 1956), depicts better correlations with *t* tests (Rahi, 2017), and appears to be more suited for an electronic survey (Finstad, 2010). All the constructs are summarized in Table 3.1.

Table 3.1 Summary of Variables and Measures

Variable	Measure

Dependent Variable	
Entrepreneurial Intention	7-item scale (Adapted from Linan and Chen 2009)
Independent Variable	
Entrepreneurial Orientation	9-item scale (Adopted from Miller 1983)
Moderators	
Gain Estimation	6-item scale (Adopted from Scheaf et al. 2020)
Loss Estimation	4-item scale (Adopted from Scheaf et al. 2020)
Perceived Feasibility	4-item scale (Adopted from Scheaf et al. 2020)
Controls	
Individual Level	
Subjective Norm	4-item scale (Adopted from Venkatesh and Bala 2008)
Perceived Behavioral Control	6-item scale (Adopted from Linan and Chen 2009)
	Gender
	Age
	Education
Firm Level	Industry (retail, services, other)
	Firm Age (number of years in existence)
	Firm Size (number of full-time employees)
	Digitization (degree of digitization)
	Future Digitization goals
Performance	5-item scale (Adopted from Eddleston et al. 2008)

Dependent Variable

Intention to engage in digital activities was utilized as a proxy to entrepreneurial intention. To capture intention to use digital activities several constructs were considered and explored including some in the information systems discipline. Entrepreneurial Intention emerged as an appropriate and effective measure for assessing intention in digital activities. Linan and Chen (2009) built on Ajzen's (1991) theory of planned behavior to develop an Entrepreneurial Intention Questionnaire (EIQ) that addresses the intention approach of this study. The 7 point scale was built on the core elements of personal attitude, subjective norm and perceived behavioral control, all constructs to form predictors of intention which this study aims at predicting. This when adapted to the digital technology domain fits well as a good measure for digital entrepreneurial intentions. Although the EI construct has been mainly used in entrepreneurship, its adaptation for digital entrepreneurship is appropriate as intention is being examined (Liñán & Chen, 2009). In evaluating how opportunity evaluation shapes intention to engage in a digital activity, I felt that utilizing entrepreneurial intention was sufficiently robust and accurate in measuring intention to engage in digital entrepreneurship and would efficiently reveal how entrepreneurs make decisions based on loss, gain, or perception.

From a theoretical perspective, entrepreneurial intention indicates the conscious state of mind that precedes action and directs actions toward entrepreneurial behavior. Within the entrepreneurship literature, the ultimate dependent variable is entrepreneurial intention; researchers try to explain as much of its predictive power as possible by applying the TPB (Liñán & Chen, 2009; Zaremohzzabieh et al., 2019).

Accordingly, I captured an overall measure of engagement of digital activities from the proxy of entrepreneurial intention and adapted questions from the context of "entrepreneurship"

to that of "digital activities" by asking seven questions relating to engagement in digital activities (Liñán & Chen, 2009). Specifically, owners of SMEs were asked to indicate (on a 7-point scale) their intention, readiness, and determination to use digital technologies in their firms.

Table 3.2: Scale items for Intention to Engage in Digital Activities (Adapted: Entrepreneurial Intention)

Indicate your level of agreement with the following statements from 1 (total disagreement) to 7 (total agreement)
1. I am ready to utilize digital technologies to grow (enhance) my business
2. I am ready to engage in opportunities presented by new media and internet technologies
3. My professional goal is to use digital technologies in my business whenever possible
4. I will make every effort to utilize digital technologies in my business
5. I am determined to utilize digital technologies in the future
6. I have very seriously thought utilizing digital technologies where possible in my business
7. I have the firm intention to utilize digital technologies in my business some day

Independent Variable

I measured EO on a 9-item scale (see Table 3.3), which represents the individual and collective behaviors that might influence entrepreneurship firms (Covin et al., 2020) and, specifically, how individuals might undertake an entrepreneurial event (Krueger Jr et al., 2000); that is, engagement in a digital activity. All nine items in Table 3.3 were adopted for this study. The scale captured levels of EO via the dimensions of proactiveness, risk taking, and innovation (Miller, 1983).

Table 3.3 EO Scale

7-point endpoint scale where (1) denotes left end of the scale and (7) denotes right end of the scale

In general. top managers of my firm favor… (Items 1, 2, & 3 relate to innovativeness)			
1	A strong emphasis on the marketing of tried-and-true products or services	1 2 3 4 5 6 7	A strong emphasis on R&D, technological leadership, and innovations
How many new lines of products or services has your firm marketed in the past five years (or since its establishment)?			
2	No new lines of products or services	1 2 3 4 5 6 7	Very many new lines of products or services
3	Changes in product or service lines have been mostly of a minor nature	1 2 3 4 5 6 7	Changes in product or service lines have usually been quite dramatic
In dealing with its competitors my firm… (Items 4, 5, & 6 relate to proactiveness)			
4	Typically responds to actions that competitors initiate	1 2 3 4 5 6 7	Typically initiates actions to which competitors then respond
5	Is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, etc.	1 2 3 4 5 6 7	Is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
6	Typically seeks to avoid competitive clashes, preferring a "live-and-let-live" posture	1 2 3 4 5 6 7	Typically adopts a very competitive, "undo-the-competitors" posture
In general, the top managers of my firm have… (Items 7, 8, & 9 relate to risk-taking)			
7	A strong proclivity for low-risk projects (with normal and certain rates of return)	1 2 3 4 5 6 7	A strong proclivity for high-risk projects (with changes of very high returns)
In general, my firm believe that…			
8	Owing to the nature of the environment, it is best to explore it gradually via cautious, incremental behavior	1 2 3 4 5 6 7	Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objective
When confronted with decision-making situations involving uncertainty, my firm…			
9	Typically adopts a cautious, "wait-and-see" posture in order to minimize the probability of making costly decisions	1 2 3 4 5 6 7	Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities

Moderators: Gain Estimation, Loss Estimation, and Perceived Feasibility

I show that the moderating variables of gain estimation, loss estimation, and perceived feasibility affect the strength of the relationship between the independent variable (EO) and the dependent variable (intention to engage in digital activities) (Creswell & Creswell, 2017). I used these moderators to determine the pathway of opportunity attractiveness to an entrepreneur for engaging in a digital activity and distinguished the judgment criteria used to influence this activity (Scheaf et al., 2020). In doing so, the opportunity evaluation constructs were used to measure gain estimation, loss estimation, and perceived feasibility (Scheaf et al., 2020). All three moderators were measured on a 7-point Likert scale.

Table 3.4 Gain Estimation

Gain estimation is the assessment of potential personal monetary and nonmonetary benefits resulting from an opportunity pursuit (Scheaf et al., 2020). I used a 7-point Likert scale to assess the various forms of gain estimation as measured in this study (see Table 3.4).

Digital technology/activity is any technology that assists with and/or enhance your business processes and operations, e.g. the use of internet, marketing on social media, social listening, use of platforms, cloud computing, and use of applications etc. Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing this opportunity for your firm. To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).
1. I see large potential gains for myself in pursuing digital activities in my business
2. The potential upside in pursuing digital activities is large for me
3. Pursuing digital activities would result in big profits for me
4. I want to learn more about pursuing digital activities
5. I would love working on exclusively using digital technologies in my business a reality
6. Pursuing digital activities would be enjoyable for me

Table 3.5 Loss Estimation

Loss estimation is the individual's assessments of the personal costs potentially resulting from failed venturing in pursuit of a specific opportunity (Scheaf et al., 2020), hereinafter referred to as a digital activity. I used a 7-point Likert scale to assess the various forms of loss estimation as measured in this study (see Table 3.5).

Digital technology/activity is any technology that assists with and/or enhance your business processes and operations, e.g. the use of internet, marketing on social media, social listening, use of platforms, cloud computing, and use of applications etc. Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing this opportunity for your firm. To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).
1. For me, the potential for loss in pursuing digital activities is high
2. The overall riskiness of pursuing digital activities is high for me
3. The size of the potential loss in pursuing digital activities is large for me
4. For me, the exposure to loss in pursuing digital activities is sizeable

Table 3.6 Perceived Feasibility

Perceived feasibility is the individual's assessments of their ability and capacity to execute the tasks associated with a specific opportunity pursuit (Scheaf et al., 2020), hereinafter referred to as a digital activity. I used a 7-point Likert scale to assess the various forms of perceived feasibility as measured in this study (see Table 3.6).

Digital technology/activity is any technology that assists with and/or enhance your business processes and operations, e.g. the use of internet, marketing on social media, social listening, use of platforms, cloud computing, and use of applications etc. Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing this opportunity for your firm.

To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).
1. I have what it takes to engage in digital activities
2. I am well equipped to pursue digital activities (options) in my business
3. At this point in my life, it would be easy for me to go after digital opportunities
4. At this point in my life, I have no barriers preventing me from pursuing digital activities

Control Variables

Several control variables were incorporated to examine their influence on the independent and dependent variables (Creswell & Creswell, 2017). To capture the antecedents influencing behavioral subjective norms, I used a 4-item scale to examine perceived social pressure to utilize digital technologies (or not) and perceived behavioral control; I used a 7-item scale to examine the ease or difficulty of the digital activity (Liñán & Chen, 2009). Overall, a total of twelve control variables were included in this study.

Table 3.7 Subjective Norms

Subjective norms refer to the perception that "reference people" would approve of the decision whether to become an entrepreneur (Liñán & Chen, 2009). I controlled for perceived social pressure to carry out—or not to carry out—a digital activity using the scale of Venkatesh and Bala (2008). I used a 7-point Likert scale to assess the various forms of subjective norms as measured in this study (see Table 3.7).

If you decided to use a digital technology in your business, would people in your close environment approve of that decision? Indicate from 1 (total disapproval) to 7 (total approval)
1. People who influence my behavior think that I should use digital technologies
2. People who are important to me think that I should use digital technologies

3. Clients of my business have been helpful in the use of digital technologies
4. In general clients have supported the use of digital technologies

Table 3.8 Perceived Behavioral Control

Perceived behavioral control is defined as a person's perception of how easy or difficult it would be to carry out a behavior or action (Ajzen, 1991). I controlled for the perceived ease or difficulty in implementing a digital activity by employing the measure developed by Linan and Chen (2009). I used a 7-point Likert scale to assess the various forms of subjective norms as measured in this study (see Table 3.8).

To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).
1. To utilize digital activities and keep it working would be easier for me
2. I am prepared to engage in digital technologies in my business
3. I can control the process of engaging in a digital technology
4. I know the necessary practical details to start and engage in a new digital technology
5. I know how to develop a new digital technology
6. If I tried to implement a new digital technology, I would have a high probability of succeeding

Table 3.9 Firm Performance

To control for performance, respondents were asked to rate their company's current performance compared to their competitors in five areas: growth in sales, growth in market share, growth in profits, job creation, and growth in profitability (Eddleston, Kellermanns, & Sarathy, 2008).

How would you rate the current performance of your company compared to your competitors in the following dimensions?

1. Growth in sales
2. Growth in market share
3. Growth in profit
4. Creation of jobs
5. Growth in profitability

Additional controls used included the firm's industry, the firm's age(measured as years in business), the firm's size (measured as number of employees), the firm's level of digitization, future digitization enhancement goals, education, gender, and age.

Firm size: This is measured as number of full-time employees (Batjargal et al., 2013). Since I focused on SMEs, I controlled for industry using the U.S. Small Business Administration's definition; that is, a firm with less than 500 employees. Respondents were asked, "Please indicate the number of full-time equivalent employees in your firm" to determine firm size and to ensure respondents are within the qualifying limit of 500 employees.

Firm age: I asked for the number of years the firm has been in existence since founding, as past studies have included this as a statistical control. In addition, research shows that, based on firm age, some firms have a high probability of digitization (BarNir, Gallaugher, & Auger, 2003; Huergo & Jaumandreu, 2004; Rauch et al., 2009).

Firm Industry: Empirical studies have identified industry as a factor in the relationship between EO and performance (Rauch et al., 2009) and in dynamic environments where technology-enabled services and innovation exist. Respondents indicated their industry according to the NAICS categorization of industries: agriculture; forestry; fishing and hunting; arts, entertainment, and recreation; construction; educational services; finance and insurance;

information, manufacturing, professional, scientific, and technical services; retail trade; wholesale trade; and other services.

Level of digitization: Because a comprehensive measure of digitization has not yet been introduced, I developed and incorporated the following question in order to determine the respondent's current level of digitization relative to their intention: "Characterize the current degree of digitization in your business: On a scale of 1 to 7 what is the level of digitization of your business?" Responses were measured using a 7-point Likert type scale (1 = *Strongly disagree* to 7= *Strongly agree*).

Future digitization enhancement: This item was developed to gauge the entrepreneur's intention to enhance digitization in the future based on sales by asking, "Please indicate your intention to enhance your digital capabilities based on your percentage of sales (0 - 100%) in the next 3 years."

Individual level

Education: I controlled for education by asking respondents to specify their highest level of education on a scale of 0 through 6: 0 (less than high school education), 1 (high school education), 2 (some college education), 3 (2-year college education), 4 (4-year college education), 5 (professional education), and 6 (doctoral level of education).

Age: The entrepreneurship literature suggests that age plays a role as a control variable in the prediction of entrepreneurial activity (Levesque & Minniti, 2006). Therefore, I included respondent's age as a control and to account for observed variations across entrepreneurs (Lévesque & Minniti, 2011). Respondents were asked to specify their age.

Gender: I controlled for gender with a dichotomous variable (male or female) and recoded to different variables (1 for male and 0 for female) to determine if there is a relationship with gender and entrepreneurial intentions and digitization – among all three or between gender and each of the other two. (Yordanova & Tarrazon, 2010).

Data Analysis

Overview

The data were analyzed using IBM SPSS Statistics, V26, in order to obtain descriptive statistics, including means, standard deviations, and bivariate correlations; these are reported in the next chapter. In addition, the following diagnostics tests will be performed:

Common method bias test: To check for any bias in the dataset that is external to the measures used.

Normality check: To determine if the data set is well-modeled by normal distribution and whether the sample has been drawn from a normally distributed population.

Reliability check: To determine scale reliability.

Factor analysis**:** Depending on the sample size, I intend to perform factor analysis so that variability among observed and correlated variables can be described.

Summary

In this chapter, I described the methodology used to test the research model and hypotheses. First, I provide a general overview, afterwards I provide a detailed account of the survey instrument and approach, sample, and measures. Data analysis is next, I describe the

statistical analyses used to test the research model, the preliminary analysis, the diagnostics tests, and essential tests of biases. The following chapter presents the hypothesizing test results.

CHAPTER 4: RESULTS

This chapter presents a discussion of my findings from testing the hypothesized relationships in the research model. First, I provide a preliminary analysis that describes the sample, outlines the missing data statistics, checks for sample bias, and evaluates the scales used to measure each construct. I then complete a descriptive and bivariate correlation analysis, followed by the regression results of the hypotheses tests. I conclude with a confirmatory factor analysis.

Preliminary Data Analysis

A review of the initial data revealed that all variables (except for two) had complete data. Of the individual items, the firm age and enhance variables had 15 (6.3%) and 5 (2.1%) missing data. I used the Replace Missing Value function in SPSS version 26 to replace data by the overall predictor mean derived from the available data on these two predictors. The missing values were replaced by the mean of the observed values for the firm age and enhance variables.

Missing Data

Table 4.1 Missing Data Statistics

	Firm Age	Enhance	Percent (%)
Valid	235	225	6.3
Missing	5	15	2.1

Common Method Bias

The variance attributable to the systematic measurement error rather than the measures, referred to as common method bias, often poses a concern in survey research (Podsakoff, 2003).

Techniques that account for common method bias include a procedural approach (i.e., survey design) and a statistical approach. To lessen this potential concern, I used the statistical perspective. The procedural approach was not feasible due to the one-shot design intended to ensure the respondents' anonymity while increasing the likelihood of truthful responses.

A Harman's single-factor statistical test was performed as suggested (Podsakoff & Organ, 1986). This test is frequently used in business research and, specifically, in entrepreneurial intentions survey research studies (Fuller, Simmering, Atinc, Atinc, & Babin, 2016; Jena, 2020; Kuckertz & Wagner, 2010; Nabi, Liñán, Iakovleva, Kolvereid, & Stephan, 2011). It entails entering items of the multi-item constructs of the model in a factor analysis to determine the number of factors that emerge and the amount of variance explained. If no central factor emerges, one can presume that common method bias does not appear to be a concern. Accordingly, Harman's single-factor test produced a single-factor solution using all the scale items in this study. The unrotated solution was examined to determine if a single factor accounted for most of the variance in the model. Fifteen factors emerged (i.e., 9 controls, 1 independent variable, 1 dependent variable 3 mediators, and 1 dependent variable), accounting for 73.30% of the variance, with the first factor explaining 33.1%. Since a variance of 33.1% is less than the generally accepted 50% threshold, I concluded that common method variance – bias had minimal impact.

Normality Check

The data were scrutinized to determine whether the underlying statistical assumption for multivariate analysis relating to testing for normality was violated (Hair, Black, Babin, & Anderson, 2010). I conducted the Kolmogorov-Smirnov statistical test for normality, which calculates the level of significance for the differences from a normal distribution (Hair et al.,

2010). The skewness and kurtosis results were used to assess normality in the dependent, independent, and moderator variables. These tests indicated that the measures, including the dependent variable, followed a normal distribution (Table 4.2), thus satisfying the normal distribution assumption of multiple regression analysis (Hair, Black, Babin, Anderson, & Tatham, 2006). The variables were normally distributed, as the test statistics of skewness and kurtosis were within an acceptable range of ±2 and ±3 (i.e., skewness is between -2 and +2 and kurtosis is between -3 and +3) (Byrne, 2010; Hair et al., 2010). The results for skewness and kurtosis fell within this range,(e.g. dependent variable [−1.338 to 1.337]); therefore, data are considered normally distributed.

Table 4.2 Normality Statistics

	Skewness	Std Error	Kurtosis	Std. Error	Null Hypothesis	Kolmogorov-Smirnov Significance Value (The significance level is 0.050)	Kolmogorov-Smirnov Decision
Dependent Variable							
Intention	-1.338	0.157	1.337	0.313	The distribution of intention is normal	0	Reject Null Hypothesis
Independent Variable							
Ent. Orientation	-0.022	0.157	-0.205	0.313	The distribution of Ent. Orientation is normal	0	Reject Null Hypothesis
Moderators							
Gain Estimation	-1.096	0.157	0.907	0.313	The distribution of Gain Estimation is normal	0	Reject Null Hypothesis
Loss Estimation	0.009	0.157	-1.154	0.313	The distribution of loss Estimation is normal	0	Reject Null Hypothesis
Perceived Feasibility	0.841	0.157	0.462	0.313	The distribution of perceived Feasibility is normal	0	Reject Null Hypothesis

Descriptive Statistics and Correlations

Descriptive statistics and bivariate correlations between the variables in this study are provided in Table 4.1. The 240 entrepreneurs in the sample have been in business for 14.89 years and employ 54.06 employees. Firms in the information industry represent 12% of the sample; 12% are in the professional, scientific, and technical services industries; 10% are in the retail trade industry; 8% are in construction; the remaining firms are in other industries (i.e., manufacturing, administration, transportation). To measure the internal consistency between items on each scale, Cronbach's alpha was generated for all the main scale items (DV, IV, and moderators). The results were greater than the .70 acceptable range (Hair et al., 2010) indicating that the data are reliable (see Table 4.3).

Table 4.3 Scale Reliability Analysis

Construct	Items	α
Independent Variable		
Entrepreneurial Orientation	9	0.90
Dependent Variable		
Entrepreneurial Intention	7	0.96
Moderating Variables		
Gain Estimation	6	0.92
Loss Estimation	4	0.94
Perceived Feasibility	4	0.89

Correlation

As shown in the correlation matrix (Table 4.4), firm size was significantly correlated with all variables (digitization level, age, gender, enhance, education, firm age, subjective norm, and perceived behavioral control) except for industry, where correlation was significant only for the information industry. In addition, digitization level corelated with all variables and two industries

(information and other). In examining the independent and moderator variables (entrepreneurial orientation, gain estimation, loss estimation, and perceived feasibility), all showed a significant and positive relationship with intention. The strongest correlation was that between perceived feasibility and gain estimation, which had a significant and positive relationship. Upon analyzing the data, I realized that items in two constructs were somewhat similar: perceived behavioral control and perceived feasibility. In addition, I noted that perceived feasibility was highly correlated, so I removed perceived behavioral control from the list of controls and then reran the model to see if this altered the results. The results of the rerun were very similar to the previous analysis, indicating that removing the variable did not have any impact on the level of correlation among the variables.

Collinearity

The means, standard deviations, and zero-order correlations are shown in Table 4.4. Initial testing indicated that some of the variables were multicollinear (>0.7). The variance inflation factor (VIF) measures multicollinearity; a value of 10 or greater is a common threshold that suggests high collinearity. To address collinearity, all control variables were z-scored. Using the z-score values, the highest observed VIF equaled 5.97, which is below the threshold value of 10. Considering the large number of control variables in this study and the fact that my goal was to predict intention from the control and independent variables (Paul, 2006), collinearity was not a concern. Additionally, the highest value of the condition index equaled 7.4. The values in this study after z-scoring were below suggested thresholds, thereby attenuating the multicollinearity concern (Hair et al., 2010).

Table 4.4 Descriptive Statistics and Bivariate Correlations

		Mean	Std Dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Number of Employees	54.06	120.03																									
2	Dig Level	4.74	1.67	.30**																								
3	Age	45.36	15.41	-.06	-.23**																							
4	Indust: Agriculture	0.04	0.2	.01	-.1	-.06																						
5	Indust: Arts, Ent. & Recreation	0.06	0.24	-.11	-.02	-.14*	-.05																					
6	Indust: Construction	0.09	0.28	.01	-.02	-.06	-.06	-.08																				
7	Indust: Educational Services	0.04	0.19	-.01	.01	.04	-.04	-.05	-.06																			
8	Indust: Finance and Insurance	0.06	0.23	.12	-.09	.05	-.05	-.06	-.08	-.05																		
9	Indust: Information	0.12	0.33	.36**	.27**	-.03	-.08	-.1	-.11	-.07	-.09																	
10	Indust: Manufacturing	0.04	0.19	.06	.01	-.07	-.04	-.05	-.06	-.04	-.05	-.07																
11	Indust: Other	0.13	0.33	-.13	-.14*	.11	-.08	-.1	-.12	-.07	-.09	-.14*	-.07															
12	Indust: Prof., Sci. & Tech. Servs.	0.12	0.33	-.12	.02	.09	-.08	-.1	-.11	-.07	-.09	-.14*	-.07	-.14*														
13	Industry: Retail Trade	0.1	0.3	-.12	.01	.01	-.07	-.09	-.1	-.07	-.08	-.12	-.07	-.13	-.12													
14	Industry: Wholesale Trade	0.06	0.24	-.06	-.01	-.05	-.05	-.07	-.08	-.05	-.06	-.1	-.05	-.1	-.1	-.09												
15	Gender	0.53	0.5	.13*	.05	.01	.03	-.03	.03	-.12	.06	.20**	.05	-.22**	.07	-.1	.04											
16	Enhance	62.18	27.76	.20**	.37**	-.13*	-.14*	-.1	-.06	.1	-.06	.19**	.02	-.18**	-.08	.05	.15*	.02										
17	Education	4.53	1.4	.26**	.19**	.08	-.18**	-.04	-.16*	.15*	.16*	.23**	-.03	-.14*	.15*	-.11	-.04	.03	.15*									
18	Firm Age	14.89	17.21	.06	-.07	.48**	.01	-.11	-.04	.02	.04	.04	-.04	.02	.06	-.08	.03	.16*	-.07	.1								
19	Subjective Norm	5.19	1.42	.22**	.66**	-.19**	-.04	-.06	.01	.03	-.05	.21**	.03	-.17**	-.03	.01	.05	.1	.50**	.21**	-.1							
20	Perceived Behav. Control	5.06	1.38	.26**	.73**	-.17**	-.1	-.03	.04	.03	-.08	.26**	.03	-.21**	-.05	-.01	-.01	.07	.42**	.20**	-.07	.79**						
21	Firm Performance	4.83	1.33	.29**	.50**	-.19**	-.04	-.16*	.04	-.02	.05	.24**	.01	-.14*	-.12	.01	.1	.1	.33**	.18**	.03	.52**	.57**					
22	Entrepreneurial Orientation	4.31	1.4	.22**	.54**	-.23**	-.07	-.03	.01	-.06	-.1	.28**	.03	-.14*	-.09	-.01	.08	.1	.27**	.12	-.08	.51**	.54**	.63**				
23	Gain Estimation	5.27	1.46	.14*	.64**	-.18**	-.09	-.1	.04	-.01	-.13*	.24**	.06	-.20**	-.06	.03	.04	.01	.39**	.13*	-.14*	.76**	.76**	.44**	.50**			
24	Loss Estimation	4.01	1.89	.33**	.36**	-.16*	.08	-.05	-.04	.04	.09	.31**	.01	-.14*	-.11	-.04	.01	.02	.14*	.08	.08	.26**	.23**	.45**	.39**	.19**		
25	Perceived Feasibility	5.34	1.35	.18**	.64**	-.12	-.15*	-.04	.03	-.01	-.07	.23**	.04	-.11	-.03	-.02	.06	.05	.37**	.20**	-.05	.75**	.85**	.57**	.52**	.74**	.14*	
26	Intention	5.55	1.51	.20**	.54**	-.14*	-.19**	-.03	-.01	-.01	-.1	.17*	.06	-.09	-.01	.04	.1	-.04	.42**	.21**	-.09	.56**	.57**	.37**	.46**	.72**	.15*	.59**

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). N=240

Regression Results

The hypotheses were tested via bivariate regression analysis with four models, and results are provided in Table 4.4. In all models, the study controlled for firm size, digitization level, age, industry, gender, enhance, education, firm age, subjective norm and perceived behavioral control.

In Model 1, Entrepreneurial intention was regressed on the control variables. The results showed significant relationships among most of the variables. Digitization level of the firm was significantly and positively related to intention, indicating that the more digitized the firm, the higher the intention to pursue activities ($\beta = 0.17$, $p<.05$). Intention to enhance, measured based on the percentage of future sales (0 - 100%) was significantly and positively related to intention ($\beta = 0.14$, $p\leq.05$), indicating that the greater the percentage of sales, the greater the intention to pursue digital activities. The industry variables (i.e., construction, information, retail, wholesale, and other) were not significant with digital entrepreneurial intention. Subjective norm was significantly and positively related to intention ($\beta = 0.18$, $p<.05$) indicating that the more an entrepreneur sees themselves as able and capable to execute a digital activity the higher proclivity to pursue the digital activity. Perceived behavioral control was significantly and positively related to intention ($\beta = 0.224$, $p<.05$), indicating that the higher the entrepreneur's perception of ease use of a digital activity, the higher the likelihood of pursuing that activity. Overall, these significant variables were good predictors of digital entrepreneurial intentions. Model 1 was significant ($p<.05$), with an adjusted R^2 of 0.446, suggesting that the larger firm size, digitization level, subjective norm and perceived feasibility, the higher the intention to pursue a digital activity.

In Model 2, entrepreneurial intention was regressed on EO together with all the control variables. For Hypothesis 1, which argued that intention to engage in digital activities increases with a higher level of EO, results showed that EO was significantly and positively related to intention ($\beta = 0.192$ $p<.05$). Using the adjusted R^2 statistic, the model explains 41% of the variance in digital entrepreneurial intention. Based on the results, this hypothesis was supported.

In Model 3, the dependent variable, entrepreneurial intention, was regressed on the independent variable, EO, and on the three moderators (gain estimation, loss estimation, and perceived feasibility). The empirical examination did not find significant effects between intention and perceived feasibility or between intention and loss estimation; however, the results indicate that gain estimation is a driver for intention to pursue digital technologies, as shown by the significance level. While there was no hypothesis support for the moderators, there was a significant main effect (β 0.648, $p<.001$) between intention and gain estimation. The results show that loss estimation is negatively and significantly associated with entrepreneurial intention ($\beta = - 0.015$, $p<.05$). Using the adjusted R^2 statistic, the model explains 55.1% of the variance in digital entrepreneurial intention as explained by the predictor variables.

Model 4 includes the interaction terms of EO and gain estimation, EO and loss estimation, and EO and perceived feasibility. The hypothesized moderation effects of gain estimation, loss estimation, and perceived feasibility were tested. The three hypotheses argued that: 1) higher levels of gain estimation enhance the positive relationship between EO and intention to engage in digital activities; 2) higher levels of loss estimation diminish the positive relationship between EO and intention to engage in digital activities; and 2) higher levels of perceived feasibility enhance the relationship between EO and intention to engage in digital activities. Two of the interactions were not supported, these were the interactions between EO

and gain estimation and EO and loss estimation. While these interactions were not supported: entrepreneurial orientation and gain estimation ($\beta = 0.138$, $p<.10$), non-significant, EO and loss estimation, ($\beta = -0.052$, $p<.10$), EO and perceived feasibility ($\beta = -0.145$, $p<.10$) was marginally significant as presented on the interaction plot in Figure 4.1.

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was conducted using AMOS to determine which of the variables in the factor models provided the best fit to the data. The measurement model represents a CFA of the main scales used in this study (DV, IV, and the moderators) due to sample size constraints. The CFA shows discriminant validity. Comparative fit index (CFI), normed fit index(NFI), incremental fit index (IFI), and the root mean square error of approximation (RMSEA) were used to determine the overall fit of the model. Results for CFI, NFI, and IFI higher than .90 are generally considered acceptable fit, while the RMSEA, ideally, should be below.08 (Hu & Bentler, 1999; Kline, 2015). The model showed higher fit levels, with CFI of .936, NFI of .882, and IFI of .937. The RMSEA had a value of .065, below the .08 cut-off for indicating good fit. The confidence interval values of .059 for low and .072 for high need not exceed .08. Overall, the measurement model indicated a very good fit with the data.

Table 4.5 Regression Results

Variables		Model 1	Model 2	Model 3	Model 4
		β	β	β	β
Controls					
Firm size		0.047	0.049	**0.106***	**0.111***
Dig Level		**0.17***	0.135	0.073	0.074
Age		0.034	0.005	-0.014	-0.005
Industry: Agric., Forestry, Fishing & Hunting		-0.086	-0.077	-0.059	-0.061
Industry: Arts, Entertainment & Recreation		0.023	0.019	0.006	0.009
Industry: Construction		0.029	0.036	0.013	0.001
Industry: Educational Services		-0.039	-0.028	-0.008	-0.02
Industry: Finance and Insurance		-0.041	-0.022	0.003	-0.015
Industry: Information		0.004	-0.01	-0.061	-0.063
Industry: Manufacturing		0.054	0.053	0.02	0.016
Industry: Other		0.059	0.067	0.096	0.093
Industry: Professional, Scientific & Tech. Servs.		0.037	0.046	0.057	0.051
Industry: Retail Trade		0.056	0.062	0.053	0.044
Industry: Wholesale Trade		0.097	0.093	0.074	0.065
Gender		-0.081	-0.084	-0.035	-0.038
Enhance		**0.14***	**0.151***	**0.159****	**0.166****
Education		0.08	0.083	0.096	0.088
Firm Age		-0.025	-0.017	0.011	0.01
Subjective Norm		**0.188***	0.164	-0.11	-0.089
Perceived Behav. Control		**0.224***	**0.217***	-0.064	-0.077
Firm Performance		-0.008	-0.094	-0.064	-0.08
Independent Variable					
Entrepreneurial Orientation			**0.192****	**0.143***	**0.172****
Moderating Variables					
Gain Estimation				**0.624*****	**0.648*****
Loss Estimation				-0.015	-0.017
Perceived Feasibility				0.095	0.058
Interaction Effects					
Entrepreneurial Orientation and Gain Estimation					0.138
Entrepreneurial Orientation and Loss Estimation					**-0.052†**
Entrepreneurial Orientation and Perceived Feasibility					**-0.145†**
	R	**0.668*****	**0.681****	**0.773*****	0.779
	R^2	0.446	0.464	0.598	0.606
	Adjusted R^2	0.392	0.41	0.551	0.554
	ΔR^2	0.446	0.018	0.134	0.009
	F	**8.346*****	**7.39****	**23.692*****	1.519

Standardized regression coefficients shown
†significance at the 0.10 level
*significant at the 0.05 level
**significant at the 0.01 level
***significant at the .001 level

Table 4.6 Hypothesized Relationships and Results

H1	Entrepreneurial Orientation is positively associated with intention to engage in digital activities. Specifically, intention to engage in digital activities increases with a higher level of EO	**Supported**
Moderating Role of Gain Estimation, Loss Estimation and Perceived Feasibility		
H2	Gain estimation moderates the relationship between EO and intention to engage in digital activities such that the higher levels of gain estimation enhance the positive relationship between EO and Intention to engage in digital activities	Not Supported
H3	Loss estimation moderates the relationship between EO and intention to engage in digital activities such that the higher levels of loss estimation diminish the positive relation between EO and Intention to engage in digital activities	Not Supported
H4	Perceived feasibility moderates the relationship between EO and Intention to engage in digital activities such that the higher levels of perceived feasibility enhance the relationship between EO and Intention to engage in digital activities	**Marginally Supported**

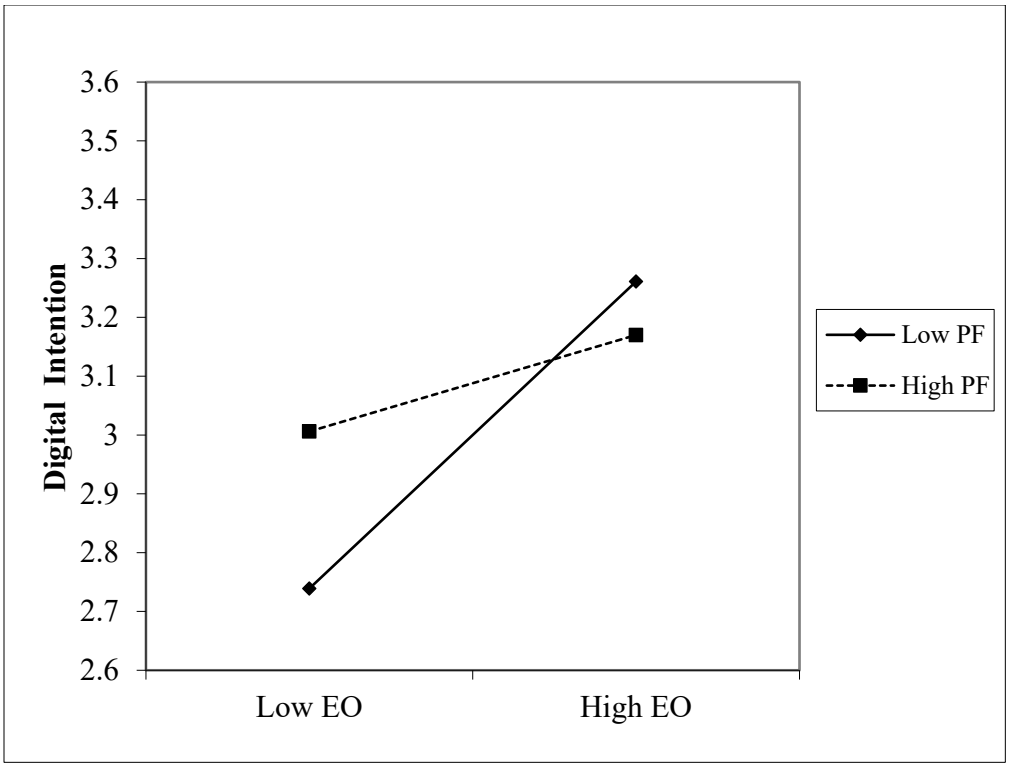


Figure 4.1 Entrepreneurial Orientation and Percieved Feasibility

Summary

The hypothesized relationships and results are presented in Table 4.4. Of the four hypotheses in this research, one was fully supported, two were not supported, and one was marginally supported. The empirical tests supported one of my predictions; that is, EO predicts entrepreneurial intention. In addition, although marginally supported, the tests indicate that gain estimation was a driver for intention to pursue digital technologies.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

I begin with an overview of the study, followed by a discussion of findings that emerged from the hypothesized relationships in the research model. Next, after describing contributions this study offers to the literature, theory, and practice, I address limitations and propose suggestions for future research. I conclude by providing answers to the research questions.

Overview

Traditional entrepreneurial practice, theory and education have evolved technologically as businesses and society continue to be transformed by digital technology. While this transformation has been swift, empirical research pales in comparison (Nambisan, 2017; Zaheer et al., 2019). With the rapid growth of digital technology in the last decade, entrepreneurial processes are being upended, with most research focused on a theoretical approach and much less on quantitative studies (Kraus et al., 2019). Much of the field of entrepreneurship has focused on sources of opportunities and how they are exploited (Shane & Venkataraman, 2000) in a more traditional sense. As digital opportunities are exploited, an evaluative process becomes necessary as firms seek to transition to digital activities and explore a more comprehensive digital technology perspective (Nambisan, 2017) rather than the piecemeal approach employed by brick and mortar firms. Investigations reveal that strategic making processes aid in providing the basis that leads to decisions and further action (Covin & Slevin, 1989; Rauch et al., 2009).

Accordingly, this study evaluated how small and medium sized business that are entrepreneurially oriented and intentions of pursuing digital technologies and whether opportunity evaluation judgements (gain estimation, loss estimation and perceived feasibility) enhance this relationship. The first objective was to review and synthesize the digital

technologies and entrepreneurship literature with a focus on small- and medium-sized enterprises. The second objective was to empirically investigate a set of predictions developed from these insights using the theory of planned behavior as the theoretical lens. The following research questions guided this process:

1. *Does EO influence entrepreneurial intention to engage in digital activities in small and medium-sized businesses?*
2. *Do opportunity evaluation judgements (i.e. gain estimation, loss estimation, and perceived feasibility) moderate the relation between EO and intention to engage in digital activities?*

Research Findings

Studies in Digital Entrepreneurship have expanded in the recent past and is currently at the cusp of rapid growth (Zaheer et al., 2019). Yet, definition of the phenomena remains inconsistent among scholars due to the broad scope, multifaceted nature and all-encompassing technology-enabled activities in entrepreneurship. Using a combination of definitions from Sussan and Acs (2017) and Le Dinh et al. (2018), I defined digital entrepreneurship from a strategic, entrepreneurship and digital transformation approach. While the literature has focused on value creation, business models and ecosystems, this study investigated whether EO impacts intention to engage in digital activities and whether this relationship is influenced by opportunity evaluation judgements.

Hypothesis 1 predicted that EO is positively related to intentions to pursue digital technologies; the results supported this prediction. Hypothesis 2 predicted that gain estimation enhances digital entrepreneurial intentions: the results did not support this prediction. Hypothesis 3 predicted that loss estimation diminishes the relationship between EO and

intentions to pursue digital technologies; the results did not support this prediction. Hypothesis 4 predicted that perceived feasibility enhances digital entrepreneurial intentions; the results marginally supported this prediction.

Relationship between Entrepreneurial Orientation/Intentions to Pursue Digital Activities

Hypothesis 1 examined EO and entrepreneurial intention to pursue digital activities. Entrepreneurial orientation suggests that strategic processes offer basis for strategic making decisions and actions (Rauch et al., 2009), while entrepreneurial intentions seek to explain the conscious state of mind that precedes and directs actions towards entrepreneurial behavior (Krueger & Carsrud, 1993). With this background, Hypothesis 1 proposed that EO is positively associated with intention to engage in digital activities. The coefficients of EO were positive and significant, suggesting that firms with higher levels of EO have a higher probability to pursue digital technologies, thus supporting this relationship. Digital technologies have transformed entrepreneurial processes and outcomes and have necessitated questions at the intersection of digital technologies and entrepreneurship (Nambisan, 2017), suggesting that firms that have high levels of EO are more likely to pursue digital technologies than firms with lower levels of EO. This is both supports and validate the EO construct in the domain of digitization (Miller, 1983; Rauch et al., 2009) and also informs practice. Additionally, the ongoing COVID-19 crisis has exponentially increased the degree of digital technology adoption as businesses shift to digitally enables products and/or services. And this has pushed companies over the technology tipping point and transformed businesses forever, As a result, understanding digital technology adoption is critical.

Opportunity Evaluation

Hypothesis 2, 3 and 4 in the research model examined opportunity evaluation judgements: gain estimation, loss estimation and perceived feasibility as moderators on the relationship between EO and entrepreneurial intentions. The introduction of these moderating variables was intended to account for the potentially varying degrees of strength that influences digital intentions and as these variables combine to form opportunity attractiveness which predicts pursuit intentions (Scheaf et al., 2020). An examination of the product terms shows that one of the interaction terms: perceived feasibility positively influence intention to pursue digital technologies when interacting with EO. This result is graphically illustrated in the interaction plot figure 4.1.

Gain estimation and the relationship between EO and digital entrepreneurial intentions

Hypothesis 2 proposed that gain estimation enhance the positive relationship between EO and Intention to engage in digital activities. The product of the interaction terms was non-significant; therefore, the study did not support this relationship. In broad terms, the hypothesis suggested that higher levels of gain estimation improve the positive relationship between EO and Intention to engage in digital activities such that entrepreneurs are more inclined to pursue digital technologies when the expectation of gains is higher, based on profit potential (Scheaf et al., 2020). This is contrary to my expectation and raises more questions, as findings have shown that profit potential is one of the main strategic actions considered for performance maximization as firms pursue opportunities (Choi, Lévesque, & Shepherd, 2008) that enhance financial gain and value creation (Wales et al., 2013). Yet, this study finds a positive main effect of gain estimation

on entrepreneurial intentions, indicating that in this context this variable drives intention and is important as a main effect and not as a moderator.

Loss estimation and the relationship between EO and digital entrepreneurial intentions

Hypothesis 3, which proposed that higher levels of loss estimation diminish the positive relation between EO and Intention to engage in digital activities was not supported. The product term of loss estimation and EO was negatively significant. This study did not support this relationship. Although the interaction was not significant, the results raises an interesting question as research suggests otherwise. There is research suggesting that the high levels of costs associated with improving and or adopting new technologies is one of the principal reasons firms are reluctant to pursue digital technologies (Antonizzi & Smuts, 2020). The question of why high levels of EO interacting with high levels of losses does not strengthen the EO and intention relationship but rather than weakens this relationship casts doubts on the assertion that higher costs discourages firms from adopting or pursuing a digital opportunity. One reason could be that potential assessment of losses are employed as a loss leader strategy in the online environment where products or services are sold at a loss to attract customers (Choi, Ryu, & Cho, 2019). This scenario has been prevalent in the current pandemic environment where the most effective way to sustain firm operations and continuity is to implement a digital technology that supports serving customers remotely.

Perceived feasibility and the relationship between EO and digital entrepreneurial intentions

Hypothesis 4 proposed that higher levels of perceived feasibility enhance the positive relationship between EO and Intention to engage in digital activities and was marginally supported. Studies have shown that perception of feasibility predict intentions (Krueger Jr et al., 2000; Liñán & Chen, 2009; Moghavvemi, Phoong, & Lee, 2017). The investigation of the interaction effect plotted in figure 4.1 provided marginal support, suggesting that perceived feasibility strengthens the relationship between EO and intention to pursue digital activities. This result compliments observations by Sheaf et al. (2020) who note that the combined dimensions (gain, loss and perceived feasibility) that form opportunity attractiveness predict pursuit intentions and validates the predictive power of the theory of planned behavior (Ajzen, 1991).

Contributions

To the best of my knowledge, this is the first empirical test involving digital entrepreneurship process proposed by (Kraus et al 2018) that links EO and entrepreneurial intentions. It expands on answers to questions involving the intersection of digital technologies and entrepreneurship while also responding to a call from Nambisan (2017) to carefully consider digital technologies and their unique characteristics in shaping entrepreneurial pursuits. As such, this study contributes to the EO, opportunity judgements and digital entrepreneurship literature.

This dissertation advances our understanding of the entrepreneur's intention to engage in digital activities via digital technologies through the lens of the theory of planned behavior. As the adoption of digital technology exponentially increases, this study provides a clear

understanding of the entrepreneurial pursuit and action by linking EO and the intention leading to the adoption of digital technologies, which is practically nonexistent in the entrepreneurship literature. This integration has demonstrated that higher EO levels can increase intentions to pursue digital technologies.

Second, the study identified and provided drivers that support digital entrepreneurship by exploring the moderating effects of opportunity judgements (gain estimation, loss estimation and perceived feasibility). The findings indicate that perceived feasibility marginally strengthens the relationship between EO and intentions to pursue digital technologies. This implies that firms intending to pursue and implement digital technologies can critically investigate and measure gain estimation moderating variable as it has been shown to be a marginal indicator of intentions when interacting with EO. For practice, this research sheds light on the ambiguity surrounding the predictors of opportunity evaluation judgements. EO structures have a direct impact on intention to pursue digital technologies, and a stronger effect when interacting perceived feasibility. Accordingly, firms may take note of this variable when implementing digital technologies, particularly considering the important role digital technologies plays in enhancing performance (Chen, Jaw, & Wu, 2016; Li, Su, Zhang, & Mao, 2018).

Furthermore, this study provided an alternative approach to the dominant view of technology acceptance constructs, ease of use and perceived usefulness in the IS literature (Davis, 1989; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003) by exploring opportunity judgments (loss estimation, gain estimation or perceived feasibility) as alternative or additions to the model in adopting a technology, such as the well-researched and established Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). Well-designed studies have shown that most “alternative” methods are used in addition, rather than instead of, thus allowing

the information systems and entrepreneurship literature to consider technology adoption from a gain, loss or perceived feasibility perspective in addition to ease of use and perceived usefulness.

Limitations and Implications

This study is not devoid of limitations. The validity and reliability of this study's findings may be a limitation due to locating respondents through Qualtrics, as the use of third-party panels can result in substandard responses, selection bias, and/or an unsuitable respondent population. This risk was partially diminished with the use of a vigorous screening process, in addition to creating a minimum duration threshold for completion of the survey instrument. Also, self-reported information from questionnaires and data, rather than interviews were used to classify participants as entrepreneurs. To conclude, common factor variance was introduced as a result of the research design, in which responses for both dependent and independent variables were gathered using a single, survey-based method (Podsakoff, 2003). This bias, partially allayed by splitting the measurement of the independent variables from the dependent variables, although the suggested procedure to alleviate bias it is to obtain measures of the independent and dependent variables from separate sources using different methods (Podsakoff & Organ, 1986).

These limitations notwithstanding, a significant strength of this study is that it is the first quantitative study in the digital entrepreneurship literature to assess the intentions to pursue digital technologies. In addition, the sample was gender balanced, and diverse in terms of age firm size, education, and industry.

Future Research

Digital Entrepreneurship is seen by many as a catalyst for entrepreneurial opportunities. In recent years researchers have examined the concept of entrepreneurial opportunities and pondered its future (Alvarez & Barney, 2020; Foss & Klein, 2020; Wright & Phan, 2020). In a world where physical and virtual environments are rapidly converging digital technologies offer possibilities to create and deliver new value by meeting customer needs anytime, anywhere. Findings in this study reiterate the importance of understanding opportunity judgments prior to implementing digital technologies.

In addition to recommendations that would address concerns (i.e., sampling, data collection, longitudinal approach, research design), there are other research possibilities. In my survey design respondents were asked to self-select a digital technology that they were intending to pursue. This might have lowered the potential impact of perceived feasibility by motivating participants to self-select familiar digital technologies that they considered familiar and easily assessable. Although this bias further emphasizes the prominent moderating role of perceived feasibility in pursuing intentions, future research should test with different survey designs that could entirely prevent self-selection bias. The measurement of digital intentions, which was adapted from the entrepreneurial intentions scale, should also be strengthened by a digital entrepreneurship scale and items that are not dependent on self-reports.

Given these findings, future qualitative and/or mixed methods studies are suggested. For example, researchers could examine focus groups of entrepreneurs prior to and/or immediately following implementation of a digital technology to further understand specific EO levels and their impact on intentions. Such a design would also allow for a quantitative analysis of how EO levels affect intentions and the eventual outcome of implementation of a digital technology.

There may be a question of whether my findings are specific to the United States (or perhaps the western countries) or if they are more universal. Future research can also examine if individual firms differ in emphasizing gain estimation, loss estimation, and perceived feasibility criteria when evaluating new offerings across cultural boundaries. Testing the robustness of this model in different settings is important, particularly, in the technology environment where business transcends cultures and as national culture has been found to impact key antecedents that lead to technology adoption (e.g. banking) (Mortimer, Neale, Hasan, & Dunphy, 2015).

This study also focused on intention to adopt digital technologies in all NAICS industries. Future research should investigate firms with intentions to pursue digital technologies that proceed with actual adoption of these technologies and their impact on performance, particularly, the information industry, which showed the highest correlation of all industries in this study. This supports findings by Rauch et al (2009) suggesting dynamic industries benefit from EO.

In summary, digital technologies have broader implications for value creation and value capture. Therefore, while intentions are an important step in the process of pursuing digital technologies, it is vital that future research move beyond intentions and focus on specific digital technologies and digitally enabled products (e.g., digital business platforms, meeting automation platforms). Other potential areas could build on the methodology employed in this study, including a longitudinal qualitative approach or an exploratory data analysis involving existing data.

Conclusion

The study extends literature into digital entrepreneurship by considering a relatively new way of linking EO and intention to pursue digital technologies. Using survey data on entrepreneurs across industries, this study examined the relationship between EO and intentions to pursue digital technologies and the impact of opportunity judgements on this relationship. The results decidedly support the main effect and are consistent with theoretical predictions. The moderating effects of gain estimation, loss estimation and perceived feasibility was also examined. I found evidence that perceived feasibility enhanced the relationship between EO and intention to pursue digital technologies when interacting with EO and that gain estimation was a driver for intentions to engage in digital entrepreneurship.

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APPENDIX A: Participant Survey

A research team from University of North Carolina Charlotte is studying digital entrepreneurship. The questions below have no right or wrong answers – we are interested in your opinions. Your response will assist in the further development of digital entrepreneurship research and understanding. All responses are confidential.

NOTE: Throughout this survey, we are only referring to entrepreneurs working in small and medium sized businesses.

In this we are interested in your intention to use digital technologies in your business. Digital technology/activity is any technology that assists with and/or enhance your business processes and operations, e.g. the use of internet, marketing on social media, social listening, use of platforms, cloud computing, and use of applications etc.

Indicate your level of agreement with the following statements from 1 (total disagreement) to 7 (total agreement)

	Strongly disagree	2	3	4	5	6	Strongly agree
I am ready to utilize digital technologies to grow (enhance) my business	○	○	○	○	○	○	○
I am ready to engage in opportunities presented by new media and internet technologies	○	○	○	○	○	○	○
My professional goal is to use digital technologies in my business whenever possible	○	○	○	○	○	○	○
I will make every effort to utilize digital technologies in my business	○	○	○	○	○	○	○
I am determined to utilize digital technologies in the future	○	○	○	○	○	○	○
I have very seriously thought utilizing digital technologies where possible in my business	○	○	○	○	○	○	○
I have the firm intention to significantly expand digital technologies in my business some day	○	○	○	○	○	○	○

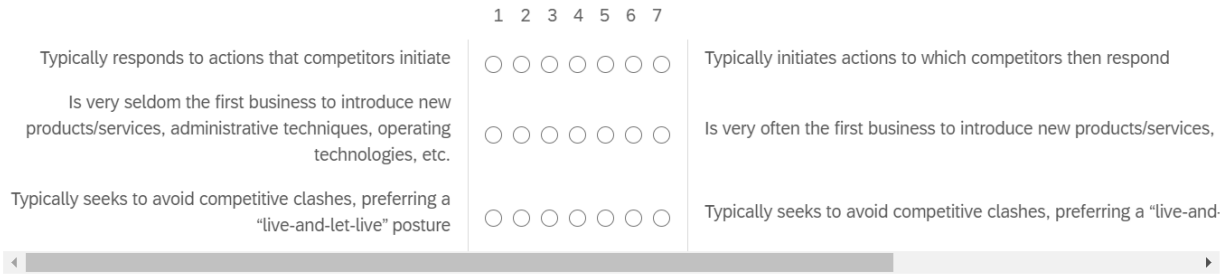
In this section we are interested in the level of entrepreneurial orientation of your firm.
Using a seven-point endpoint scale where (1) denotes the left end of the scale and (7) denotes the right end of the scale, please select what is applicable to your firm.
In general, top managers of my firm favor…

	1	2	3	4	5	6	7	
A strong emphasis on the marketing of tried-and-true products or services	○	○	○	○	○	○	○	A strong emphasis on R&D, technological leadership, and innovations

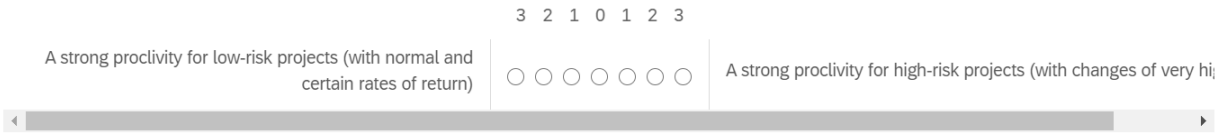
How many new lines of products or services has your firm marketed in the past five years (orsince its establishment)?

	1	2	3	4	5	6	7	
No new lines of products or services	○	○	○	○	○	○	○	Very many new lines of products or services
Changes in product or service lines have been mostly of a minor nature	○	○	○	○	○	○	○	Changes in product or service lines have usually been quite dramatic

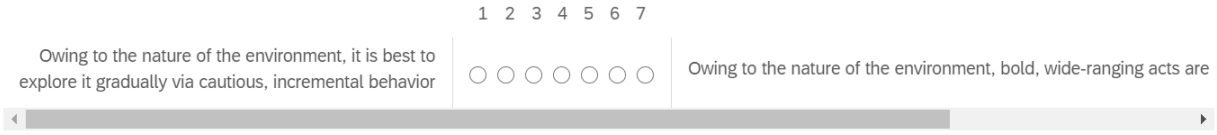
In dealing with its competitors my firm…



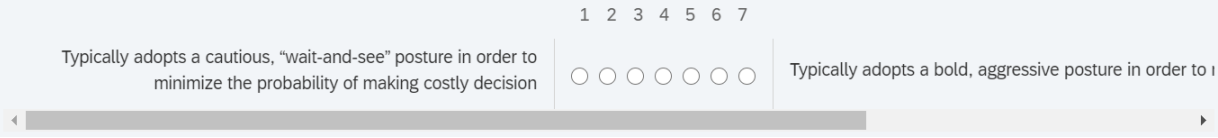
In general, the top managers of my firm have…



In general, my firm believe that…



When confronted with decision-making situations involving uncertainty, my firm…



Section 3: Digital technology/activity is any technology that assists with your business processes and operations, e.g. marketing on social media, social listening, use of platforms, etc Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing a digital technology as the basis for enhancing your own venture.

To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).

	Strongly disagree	2	3	4	5	6	Strongly agree
I see large potential gains for myself in pursuing digital activities in my business	○	○	○	○	○	○	○
The potential upside in pursuing digital activities is large for me	○	○	○	○	○	○	○
Pursuing digital activities would result in big profits for me	○	○	○	○	○	○	○
I want to learn more about pursuing digital activities	○	○	○	○	○	○	○
I would love working on exclusively using digital technologies in my business a reality	○	○	○	○	○	○	○
Pursuing digital activities would be enjoyable for me	○	○	○	○	○	○	○

Section 4: Digital technology/activity is any technology that assists with your business processes and operations e.g. marketing on social media, social listening, use of platform, etc
Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing this opportunity as the basis for your own venture.

To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).

	Strongly disagree	2	3	4	5	6	Strongly agree
For me, the potential for loss in pursuing digital activities is high	○	○	○	○	○	○	○
The overall riskiness of pursuing digital activities is high for me	○	○	○	○	○	○	○
The size of the potential loss in pursuing digital activities is large for me	○	○	○	○	○	○	○
For me, the exposure to loss in pursuing digital activities is sizeable	○	○	○	○	○	○	○

Section 5: Digital technology/activity is any technology that assists with your business processes and operations, e.g. marketing on social media, social listening, use of platforms, etc
Now, with this technology in mind, please answer the following questions. Please note, we are NOT asking you to decide if you would buy or purchase a digital technology. Instead we are interested in your reaction to pursuing this opportunity as the basis for your own venture

To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).

	Strongly disagree	2	3	4	5	6	Strongly agree
I have what it takes to engage in digital activities	○	○	○	○	○	○	○
I am well equipped to pursue digital activities (options) in my business	○	○	○	○	○	○	○
At this point in my life, it would be easy for me to go after digital opportunities	○	○	○	○	○	○	○
At this point in my life, I have no barriers preventing me from pursuing digital activities	○	○	○	○	○	○	○

Section 8: In this section we are interested in your interest as a digital entrepreneur. Please indicate your level of agreement with the following sentences from 1 (total disagreement) to 7 (total agreement).

	Strongly disagree	2	3	4	5	6	Strongly agree
Being an entrepreneur who uses digital technologies implies more advantages than disadvantages to me	○	○	○	○	○	○	○
A career as a digital entrepreneur is attractive to me	○	○	○	○	○	○	○
If I had the opportunity and resources, I'd like to invest in digital technologies	○	○	○	○	○	○	○
Being a digital entrepreneur would entail great satisfaction for me	○	○	○	○	○	○	○

Section 9: If you decided to use a digital technology in your business, would people in your close environment approve of that decision? Indicate from 1 (total disapproval) to 7 (total approval).

	Strongly disagree	2	3	4	5	6	Strongly agree
People who influence my behavior think that I should use digital technology	○	○	○	○	○	○	○
People who are important to me think that I should use digital technology	○	○	○	○	○	○	○
Clients of my business have been helpful in the use of digital technologies	○	○	○	○	○	○	○
In general clients have supported the use of digital technologies	○	○	○	○	○	○	○

Section 10: To what extent do you agree with the following statements regarding your entrepreneurial capacity? Value them from 1 (total disagreement) to 7 (total agreement).

	Strongly disagree	2	3	4	4	6	Strongly agree
To utilize digital activities and keep it working would be easier for me	○	○	○	○	○	○	○
I am prepared to engage in digital technologies in my business	○	○	○	○	○	○	○
I can control the process of engaging in a digital technology	○	○	○	○	○	○	○
I know the necessary practical details to start a engage in a new digital technology	○	○	○	○	○	○	○
I know how to develop a new digital technology	○	○	○	○	○	○	○
If I tried to implement a new digital technology, I would have a high probability of succeeding	○	○	○	○	○	○	○

How would you rate the current performance of your company compared to your competitors in the following dimensions?

	Much Worse	2	3	About the same	5	6	Much Better
Growth in sales	○	○	○	○	○	○	○
Growth in market share	○	○	○	○	○	○	○
Growth in profits	○	○	○	○	○	○	○
Creation of jobs	○	○	○	○	○	○	○
Growth in profitability	○	○	○	○	○	○	○

Which year was your company founded?

Please indicate the number of full time equivalent employees in your firm

Characterize the current degree of digitization in your business:
On a scale of 1 to 7 what is the level of digitization of your business?

	Strongly disagree	2	3	4	5	6	Strongly agree
Characterize the current degree of digitization in your business: On a scale of 1 to 7 what is the level of digitization of your business?	○	○	○	○	○	○	○

Please indicate your intention to enhance your digital capabilities based on your percentage of sales (0 - 100%) in the next 3 years

What is your primary industry?

- ○ Agriculture, Forestry, Fishing and Hunting
- ○ Mining
- ○ Utilities
- ○ Construction
- ○ Manufacturing
- ○ Wholesale Trade
- ○ Retail Trade
- ○ Transportation and Warehousing
- ○ Information
- ○ Finance and Insurance
- ○ Real Estate Rental and Leasing
- ○ Professional, Scientific, and Technical Services
- ○ Management of Companies and Enterprises
- ○ Administrative and Support and Waste Management and Remediation Services
- ○ Educational Services
- ○ Healthcare and Social Assistance
- ○ Arts, Entertainment, and Recreation
- ○ Accommodation and Food Services
- ○ Other Services (except Public Administration)
- ○ Public Administration

APPENDIX B: Cover Letter

Consent to Participate in a Research Study

You are invited to participate in a research study. Participation in this research study is voluntary. The information provided is to give you key information to help you decide whether or not to participate.

- *The purpose of this study is to explore the relation between entrepreneurial orientation and digital entrepreneurship within small and medium sized businesses*
- *You must be age 18 or older to participate in this study.*
- *You must be an entrepreneur with your own business (or an employee with a decision making role);*
    - *Must have an online presence; with or without employees and have been running your firm (or employed) for at least 1 year.*
- *Your firm must be located in the United Sates.*
- *You are asked to complete a survey asking a series of questions about your intention to use pursue digital technologies in your business, and what drives your potential judgement prior to the use of digital technologies.*
- *It will take you approximately 10 to 15 minutes to complete the survey.*
- *We do not believe that you will experience any risk from participating in this study.*
- *No benefits are extended in exchange for your participation in this study, beyond any contractually due payments from Qualtrics™.*

Your privacy will be protected and confidentiality will be maintained to the extent possible. Your responses will be treated as confidential and will not be linked to your identity. We might use the survey data for future research studies and we might share the non-identifiable survey data with other researchers for future research studies without additional consent from you.

Participation is voluntary. You may choose not to take part in the study. You may start participating and change your mind and stop participation at any time.

If you have questions concerning the study, contact the principal investigator, Ophelia Chapman, at ochapma1@uncc.edu or her faculty advisor, Dr. Franz Kellermanns, at kellermanns@uncc.edu. If you have further questions or concerns about your rights as a participant in this study, contact the Office of Research Compliance at (704) 687-1871 or uncc-irb@uncc.edu.

You may print a copy of this form. If you are 18 years of age or older, have read and understand the information provided and freely consent to participate in the study, you may proceed to the survey.

To continue please select "I Agree".