2019


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Mechanisms Driving Digital New Venture Creation & Performance:
An Insider Action Research Study of Pure Digital Entrepreneurship in EdTech

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Technological University Dublin

PhD 2019
Mechanisms Driving Digital New Venture Creation & Performance:
An Insider Action Research Study of Pure Digital Entrepreneurship in EdTech

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Thesis submitted in fulfilment of the requirements for the award of
Doctor of Philosophy (PhD)

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Co-supervisor: Prof. Thomas Cooney

July 2019
Digitisation has ushered in a new era of value creation where cross border data flows generate more economic value than traditional flows of goods. The powerful new combination of digital and traditional forms of innovation has seen several new industries branded with a ‘tech’ suffix. In the education technology sector (EdTech), which is the industry context of this research, digitisation is driving double-digit growth into a projected $240 billion industry by 2021. Yet, despite its contemporary significance, the field of entrepreneurship has paid little attention to the phenomenon of digital entrepreneurship. As several scholars observe, digitisation challenges core organising axioms of entrepreneurship, with significant implications for the new venture creation process in new sectors such as EdTech. New venture creation no longer appears to follow discrete and linear models of innovation, as spatial and temporal boundaries get compressed.

Given the paradigmatic shift, this study investigates three interrelated themes. Firstly, it seeks to determine how a Pure Digital Entrepreneurship (PDE) process develops over time; and more importantly, how the journey challenges extant assumptions of the entrepreneurial process. Secondly, it strives to identify and theorise the deep structures which underlie the PDE process through mechanism-based explanations. Consequently, the study also seeks to determine the causal pathways and enablers which overtly or covertly interrelate to power new venture emergence and performance. Thirdly, it aims to offer practical guidelines for nurturing the growth of PDE ventures, and for the development of supportive ecosystems.

To meet the stated objectives, this study utilises an Insider Action Research (IAR) approach to inquiry, which incorporates reflective practice, collaborative inquiry and design research for third-person knowledge production. This three-pronged approach to inquiry allows for the enactment of a PDE journey in real-time, while acquiring a holistic narrative in the ‘swampy lowlands’ of new venture creation.

The findings indicate that the PDE process is differentiated by the centrality of digital artifacts in new venture ideas, which in turn result in less-bound processes that deliver temporal efficiencies – hence, the shorter new venture creation processes than in traditional forms of entrepreneurship. Further, PDE action is defined by two interrelated events – digital product development and digital growth marketing. These events are characterised by the constant forking, merging and termination of diverse activities. Secondly, concurrent enactment and piecemeal co-creation were found to be consequential mechanisms driving temporal efficiencies in digital product development. Meanwhile, data-driven operation and flexibility combine in digital growth marketing, to form higher order mechanisms which considerably reduce the levels of task-specific and outcome uncertainties.

Finally, the study finds that digital growth marketing is differentiated from traditional marketing by the critical role of algorithmic agencies in their capacity as gatekeepers. Thus, unlike traditional marketing, which emphasises customer sovereignty, digital growth marketing involves a dual focus on the needs of human and algorithmic stakeholders. Based on the findings, this research develops a pragmatic model of pure digital new venture creation and suggests critical policy guidelines for nurturing the growth of PDE ventures and ecosystems.
DECLARATION

I certify that this thesis which I now submit for examination for the award of Doctor of Philosophy (PhD), is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been cited and acknowledged within the text of my work.

This thesis was prepared according to the regulations for graduate study by research of the Technological University Dublin and has not been submitted in whole or in part for another award in any other third level institution.

The work reported on in this thesis conforms to the principles and requirements of the Technological University Dublin's guidelines for ethics in research.

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Signed ...................................................... Date ........................................

Kisito Futonge Nzembayie
ACKNOWLEDGEMENTS

A project of this magnitude is hardly accomplished by the effort of a single individual. Hence, I’d like to express my sincere gratitude to the key actors who made it possible. Without the unwavering support of my wife and backbone, Liu Xiaoling, and the inspiration I derive from my two beautiful daughters, Alexandra and Athena, this PhD project might never have happened in the first place. To say I am deeply grateful for their significant, but not immediately apparent role in this dissertation would be an understatement.

From family to my academic family, words can hardly express how grateful I am to my lead supervisor and mentor, Dr. Anthony Paul Buckley, whose continuous support has been pivotal in navigating my academic journey, while earning several awards along the way. Likewise, I express sincere gratitude to my co-supervisor, Prof. Thomas Cooney, who provided a much needed critical third eye and wise counsel that contributed towards overcoming major challenges and further sharpening the quality of our work.

Technological University Dublin deserves special thanks for the award of Dean’s Scholarship under the Fiosraigh programme, which funded the academic project. Likewise, I am grateful to my fellow PhD research colleagues for the many office chats that enabled the cross pollination of ideas. The same goes for the members of staff in the college who occasionally offered constructive feedback and encouragement prior to, and during the PhD journey. The collegiate atmosphere evident among staff and students, makes the college a healthy and nurturing environment for studies.

To the collaborators on the primary research project whose names I cannot mention for ethical reasons, I thank you all for making this project a success.

Finally, I will always be grateful to my parents who instilled the strong work ethic that drives my actions. Likewise, I am thankful for the encouragement I received from my siblings, Jude, Isabel, Roger, Vera and Renita, who were ever so keen to have a ‘PhD in the family’ as one way of crowning Dad’s many accomplishments as a school educator.
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GLOSSARY OF TERMS

Given the domain-specificity and recency of some of the constructs encountered throughout this research, the reader’s comprehension may be enhanced by an early familiarity with them. Hence, this glossary of terms was developed.

Actionable mechanisms: They are mechanisms enabled by human action.

Actor mechanisms: They are cognitive mechanisms of actors.

Actor-independent mechanisms: They are mechanisms generated by external enablers such as technology, socio-economic change and regulation.

Affordance: It refers to the potentiality of technology, as distinct from its features.

Bounce rate: The speed at which a visitor exits a web site.

Constraint: It is the opposite of the affordance construct and it examines the ways in which technologies impose restrictions on human action.

Cost Per Click (CPC): It is a digital advertising process whereby advertisers pay when their ad is clicked by users – also Pay Per Click (PPC) marketing.

Digital artifacts: It refers to ‘quasi-objects’ that exist as bits of data and are reprogrammable, editable, recombinable and distributable over the internet – e.g. mobile apps, videos, software etc.

Digital born global: It refers to a digital new venture that rapidly internationalises from inception, made possible by the reach of the internet.

Digital growth marketing: It is digital marketing whose sole purpose is to drive digital new venture growth.

Digital infrastructures: They are tools and systems that support innovation by lowering the cost of new venture co-creation – e.g. cloud storage and data analytics.

Digital platform: A code base whose architecture is designed to host complementary offerings including digital artifacts – e.g. Google and Apple app stores.
**Digitalisation**: It refers to the socio-technical process of applying digitisation to social or traditional processes which makes digital technologies infrastructural.

**Digitisation**: It is the encoding of analogue information as ones and zeroes called bits of data – e.g. an encoded digital photo exists as lines of code.

**Dynamic collectives**: It refers to a loose collection of actors who co-create value on their own terms. They are different from teams in that they are usually independent actors who do not have, or intend to have a stake in the new venture.

**EdTech**: It is short for the Education Technology industry.

**Enactive research**: It is research that merges researcher and practitioner roles.

**Entrepreneurial process**: It is the process of creating a new business venture, resulting in a new market offering which could be innovative or simply imitative.

**Fabula**: It is the objective underlying and chronological structure of a narrative as opposed to the way it is told.

**Hybrid Digital Entrepreneurship (HDE)**: It is entrepreneurship in which digital artifacts and digital platforms are the new venture ideas, but the value proposition is complemented or tightly coupled with a physical or tactile artifact or service – e.g. smartwatches such as Fitbit tightly couple digital and physical artifacts and services.

**Mechanisms**: They are causal pathways which explain the process by which the cause produces the effect. Mechanisms are usually not directly observable.

**Network Effects**: It is the idea that the value of a network increases as its user base grows, which represents the source of value creation in digital new ventures.

**Operand resource**: It refers to the role technology plays as an enabler of innovation rather than being the object or trigger for innovation.

**Operant resource**: It refers to the role technology plays when it is the object, trigger and sustenance for innovation rather than simply being a support for it.
Opportunity Confidence (OC): It is the outcome of the evaluation of a new venture idea and the degree to which it is deemed favourable or unfavourable prior to enactment.

Pragmatic mechanisms: It is a generic reference to actor-dependent mechanisms.

PreK-12: It refers to fourteen years of formal education beginning from nursery school or preschool.

Pure Digital Entrepreneurship (PDE): It refers to entrepreneurship in which the new venture ideas are solely based on the creation and distribution of digital artifacts and digital platforms as new market offerings. For example, Twitter.com and Facebook.com are outcomes of PDE.

SEO: Search Engine Optimisation (SEO) refers to a series of techniques for optimising digital content and products, in order to increase visibility, by ranking highly on Search Engine Results Pages (SERPs).

SMO: Social Media Optimisation (SMO) refers to a series of techniques for posting and optimising content on social media channels, with the goal of improving their findability and virality.

Sociomateriality: It is a relational theory which argues that social and material agencies are mutually constitutive.
1 \textit{CHAPTER ONE. CONTEXT \& PURPOSE}
1.1 CONTEXTUALISING RESEARCHER POSITIONALITY

Reason and Marshall (1987, p. 112) state that ‘all good research is for me, for us and for them’. By this statement, they imply that good social science research constitutes a three-pronged focus on the needs of multiple stakeholders, including that of the researcher. Accordingly, this study cannot be fully understood, if it is divorced from the researcher driving the knowledge creation process. Indeed, given the Insider Action Research (IAR) approach to inquiry (Coghlan & Brannick, 2014; Coghlan, 2019), self-location as a change agent needs clarification as one of its quality criteria (Bradbury, 2015, p.8). Therefore, as part of the three-voice approach to IAR inquiry, this reflexive introduction will help the reader situate both my insider positionality as participant and first-person voice as the researcher, as well as the circumstances building up to this study. By making explicit and available, relevant background information and motivation, my goal is to assist the reader in understanding the personal circumstances which triggered this study, as well as the perspective from which it is approached.

I describe myself as an accidental digital ‘teacherpreneur’ (Buckley & Nzembayie, 2016) with a portfolio of digital ventures in the global EdTech (Education Technology) language market. Having graduated in August 2000 with a degree in Journalism from the University of Buea in Cameroon, I began a career as a foreign English language teacher in China from 2002. Over the following twelve years of teaching in China, I accidentally became a digital entrepreneur. Having created and accumulated two years of rough lesson plan materials on my laptop, I decided to build a website on which to share them with other teachers back in 2005. A secondary goal of the website was to have a digital portfolio to show my capabilities to an employer and hopefully get hired. More importantly, I felt a strong sense of satisfaction when other teachers integrated materials I had created in their own teaching. Back in those days,
owning a website was quite an achievement. In due course, I discovered Google’s Adsense programme (adsense.google.com), which allowed me to monetise and sustain the website projects. Initially, I struggled to grasp an internet business model which enabled one to ‘give away all their stuff for free’, serving millions of teachers and students in the process, while getting paid by a third party. It was the perfect business model which allowed me focus on developing additional digital language education content for my users as a side project to my teaching. However, with millions of users flocking to my sites and requesting more content, I resigned from full-time teaching in 2009 to focus on growing the business. I like to think I was successful in this endeavour, having since attracted over 45 million website visits on three newer, more popular web projects, which I subsequently developed after resigning from full-time teaching – see Appendix 1.

However, I continued to wonder if all the success was a product of timing and serendipity. As my hobby became my new career, I soon developed ‘impostor syndrome’ when referring to myself as an entrepreneur. The problem was, I had no formal business education and that left me with a lot of self-doubts, lacking confidence and a professional identity crisis. To overcome these negative feelings, I packed my bags and left China to study Business and Entrepreneurship at master’s level in Ireland’s Dublin Institute of Technology (DIT) – now Technological University Dublin. I was particularly drawn to this course because it was a conversion programme, which did not prejudice my lack of formal business education. Determined to overcome my sense of inadequacy, I excelled at the master’s, earning a gold medal for top overall score and another gold medal for ‘Student Excellence’ in the college of business. While the programme led to a tremendous increase in self-confidence, I struggled to see how some of the new knowledge might be applied in a digital entrepreneurial context.
Moreover, an informal encounter with two Irish digital entrepreneurs whose ventures had failed, raised further questions. From my conversations with these entrepreneurs, I wondered whether a significant reason for their failure was the application of traditional new venture creation methods, offered by the well-meaning business incubators supporting them. It occurred to me that the bigger problem may have to do with a digital knowledge divide among policymakers and practitioners on how to nurture the growth of digital new ventures. This knowledge gap in the community of digital entrepreneurial practice may be permeating advise which is potentially counterproductive.

Meanwhile, in a concurrent development, my academic success at the master’s had put me in a favourable position for a fully-funded doctoral scholarship under the DIT Fiosraigh programme. However, while the offer was tempting, I was concerned that a four-year doctoral course would detach me from my practice as an entrepreneur, which I was eager to return to. I sat down to discuss the dilemma with both my current lead supervisor and head of college research. From the meetings, I quickly learned that researchers are not always detached observers in a business study. My knowledge of research designs turned out to be both scant and skewed. This epiphany, coupled with further reading, allowed me to connect the dots. My doctoral project would be based on achieving a greater understanding of my practice of digital new venture creation by utilising an insider action research approach. The venture would become the vehicle for real-time experimentation, reflection and learning.

I imagined that such an approach would have three main benefits. Firstly, it would reconcile my newfound interest in academia with my practice as a digital entrepreneur. Secondly, I would further develop my knowledge, while producing validated academic knowledge which would benefit practitioners such as the failed entrepreneurs I had come
to sympathise with. Finally, it would contribute to an area of knowledge which might influence policy and the development of digital new ventures. With this virtuous circle in mind, I completed my understanding of what Reason and Marshall (1987, p.112) meant when they stated that, ‘all good research is for me, for us and for them’. Therefore, ‘for me’ as the researcher, the research question is:

*How can a more conscious and self-aware enactment of digital new venture creation, develop my knowledge and confidence in leading the development of scalable digital new ventures?*

This question serves to provide the individual motivation that powers a challenging research process. Without its healthy selfishness, there would be nothing ‘for us and for them’, which is ultimately beneficial to the broader academic, theoretical and digital entrepreneurial communities of practice – i.e., the second and third-person voices.

1.2 **THEORETICAL CONTEXT & RATIONALE**

Digital entrepreneurship is of enormous economic significance. As McKinsey (2016) reports, soaring cross-border data flows now generate more economic value than traditional flows of traded goods. In 2014, this translated into a $2.8 trillion increase in global GDP. Moreover, the shift to more digital forms of global value creation fundamentally alters innovation and entrepreneurship regarding who participates and how new ventures are created (Yoo, Boland, Lyytinen & Majchrzak, 2012; Lyytinen, Yoo & Boland, 2016). Digital platforms and related technologies enable near-costless communications and transactions, allowing start-ups and individuals to network and co-create value with an ever-changing cast of collectives, dispersed across geographical regions (McAfee & Brynjolfsson, 2017; Nambisan, Lyytinen, Majchrzak & Song, 2017). Hence, today’s digital start-ups can easily become micro-multinationals and lean born global new ventures (Bell & Loane, 2010; Rasmussen & Tanev, 2015). Their emergence can disrupt entire industries, as previously unknown firms such as Airbnb and Uber
suddenly appear with disruptive business models (Porter & Heppelmann, 2014; Amit & Han, 2017). Consequently, Tapscott (2014, p. xxiv) cautions that in an age of networked intelligence, punishment is swift for organisations, industries and societies that fall behind.

The velocity, scope and systems impact of change brought about by digitisation has led to the assertion that we are on the cusp of a Fourth Industrial Revolution (Schwab, 2017) or Second Machine Age. This age is believed to have already begun and is accelerating into a future defined by the ‘digitisation of just about everything’ (McAfee & Brynjolfsson, 2014, pp. 57-70). The digitisation of virtually everything will continuously merge digital, biological and physical spheres in ever more powerful ‘new combinations’ (Schumpeter, 1942; World Economic Forum, 2016). Accordingly, McKinsey (2016) reports that over fifty per cent of services that can be digitised have already been digitised. Likewise, machine-to-machine (M2M) communication will account for forty per cent of data flows by 2025. Furthermore, the application of artificial intelligence based on machine learning algorithms in business and economic spheres, is poised to become ever more prevalent and disruptive.

Consequently, ubiquitous digitisation of value creation processes calls into question widely accepted assumptions of entrepreneurship and innovation (Brynjolfsson & McAfee, 2017). Knowledge is therefore required to advance new hypotheses and theories, as well as guide sound policy implementation and practice. As Storey and Greene (2010, p. 208) maintain, nurturing the growth of gazelles (young fast-growth firms), should be a fundamental element in enterprise policy development. Digital gazelles have indeed had a transformational impact on global economies in just under thirty years. To put it into perspective, as of April 2017, four digital technology-based firms (Apple, Google, Amazon & Facebook), which were started about twenty years ago,
had a market capitalisation roughly the GDP of the Indian economy at over $2.3 trillion (Galloway, 2017, p. 1). Recently, new digital ventures based on *uberised* (like Uber) sharing business models and platforms, continue to disrupt industry structures and question extant assumptions of what it means to create value in the digital age. Similarly, the on-demand economy has altered value chains, calling for a re-examination of how value is created, as well as the mechanisms through which business ventures create and sustain a competitive edge (Porter & Heppelman, 2014; Amit & Han, 2017).

In fact, virtually all industries now have a segment with *tech* as a suffix in their nomenclature which indicates the powerful new combinations of digitalisation (digital & traditional). For instance, MarTech (Marketing Technology), FinTech (Financial Technology), MedTech (Medical Technology), LegalTech (Legal Technology) and EdTech (Education Technology) are among the novel nomenclatures that have recently emerged to christen these emerging hybrid industries. In EdTech, which is the industry context of this research, technology is driving rapid growth in demand for digital learning solutions to a projected $240 billion sector by 2021 (Docebo, 2017). Hence, Buckley and Nzembayie (2016) draw attention to the little-known grassroots action of digital teacher-entrepreneurs (teacherpreneurs) in EdTech, who leverage the enabling power of digital technologies to solve problems of access in the education sector.

Yet, despite its contemporary significance, the field of entrepreneurship has largely neglected the role of digital technologies in entrepreneurial pursuits (Davidson & Vaast, 2010). Remarkably, digital entrepreneurship only very recently received agenda-setting entries in top journals of entrepreneurship (Nambisan, 2016; Kraus, Palmer, Kailer, Kallinger & Spitzer, 2019). Earlier and current attempts at describing the phenomenon have mainly been undertaken by scholars in Management Information Systems (MIS) and technology-related disciplines (Hull, Hung, Hair, Perotti &
DeMartino, 2007). As the rather scant but rapidly growing literature on digital entrepreneurship indicates, digitisation challenges the degree to which existing theories can inform on the varied issues surrounding the digital entrepreneurial process (Nambisan et al., 2017). To underscore the point, Benner and Tushman (2015) reflect on their decade-old award-winning article in the Academy of Management Review by noting that,

…because of the shift in the locus of innovation and because some of our core organising axioms may be challenged or fundamentally changed by the digital revolution, the nature of innovation and organisational scholarship may be at a transition point. (p. 2)

The disruptiveness of digital technologies on extant assumptions of entrepreneurship appears to be particularly visible in purer forms of digital entrepreneurship (von Briel, Recker & Davidsson, 2018; Nzembayie, Buckley & Cooney, 2019). Such forms of value creation are the result of a different type of economics based on the digitisation, processing and commercialisation of information as new market offerings (Giones & Brem, 2017). Purer forms of digital value creation operate in the context of what is commonly termed ‘economics of bits’ – characterised by the production of non-rival digitised offerings, with ‘close to zero marginal cost of reproduction’ (McAfee & Brynjolfsson, 2014, p. 62). Non-rival products and services can be consumed by many people simultaneously without being depleted. Hence, Shapiro and Varian (1999) argue that digitised ‘information is costly to produce but cheap to replicate’. Owing to these characteristics, the mechanisms which drive the emergence and performance of pure digital new ventures are bound to upend some of the more traditional beliefs surrounding entrepreneurship, which is rooted in the creation of physical and tactile market offerings.

Given the wider theoretical and practical implications, there is evidence to suggest that my earlier hunch and personal quest, align with an even bigger theoretical and practical question ‘for us’ and ‘for them’.
1.2.1 Overarching Research Question

This research therefore seeks to answer the following overarching question:

*How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process and the consequential mechanisms driving emergence and performance?*

The overarching question combines two interrelated questions into one. The first question can be stated as follows - *How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process?* This question focuses on gaining a holistic narrative of a digital entrepreneurial process. Meanwhile, the second question can be stated as follows – *What mechanisms are consequential in driving emergence and performance?* This question seeks answers to the mechanisms and deep structures which causally interrelate to drive the digital entrepreneurial process. A mechanism is here defined as ‘a cause or causal pathway, or an explanation without explicit theorising about the nature of the mechanism’ (Ylikoski, 2018, p.3). As Ylikoski explains, mechanism-based explanations provide answers to a *how*-question underlying a causal *why*-question. They explain how the cause produces the effect by describing the process by which it happens (Gross, 2009).

Taking a critical realist ontological stance, philosopher Bhaskar (1997), argues that the search for generative mechanisms which underlie observable social phenomena, should be the defining quest of social science research. Accordingly, several scholars argue that mechanism-based theorising is particularly appropriate for process-oriented and phenomenon-driven field research based on technology-enabled economic change (Henfridsson & Bygstad, 2013; Bygstad, Munkvold & Volkoff, 2016; von Briel, Davidsson & Recker, 2018). However, there are two challenges involved in mechanism-based theorising. Firstly, mechanisms are often not directly observable and are, therefore, obliquely identified by their effects or roles (Hedström & Ylikoski, 2010). Secondly, they
exist in hierarchical order and coexist with interrelated mechanisms that collectively form higher-order mechanisms. Hence, Sayer (2000, p.58) notes that ‘a particular mechanism can produce completely different actions at different times, and inversely, the same event can have completely different causes’. Thus, an underlying network of mechanisms potentially criss-cross the emergence of a digital new venture. For this reason, it is necessary to emphasise those mechanisms which are consequential in shaping critical events at various temporal phases of emergence, as opposed to all mechanisms. From a pragmatist stance, Gross (2009) argues that the emphasis should be on actor-centred social mechanisms, while critical realism emphasises actor-independent mechanisms. By combining both perspectives, this study aims to arrive at ‘causally deep’ explanations (Van de Ven & Engleman, 2004) for the complex drivers of digital new venture creation and performance.

1.2.2 Research Objectives

I therefore deconstruct the overarching question of this research into the following four interrelated objectives:

i. To enact and gain insights from a pure digital entrepreneurial process in an EdTech (Education Technology) context;

ii. To identify and critically evaluate the consequential mechanisms and their generative structures which causally interrelate to trigger and drive digital new venture emergence, as well as enhance new venture outcomes;

iii. To extrapolate and infer from the current case, key insights which are potentially generalisable to other contexts;

iv. To develop next practices and guidelines which may assist in nurturing the development of digital new ventures for entrepreneurs and policymakers.
The stated objectives signal the need for an immersive and experiential approach to inquiry, which is briefly discussed subsequently and further expatiated in Chapter Five.

1.3 Research Design & Scope

To meet the stated objectives, this study adopts an *enactive* approach (Johannisson, 2011), which utilises an Insider Action Research (IAR) design (Coghlan, 2019; Nzembayie et al., 2019). This research design combines first-person reflective practice, with second-person collaborative inquiry and design research, for third-person knowledge production in an entrepreneurship context. Accordingly, as the researcher, I double as an insider participant, enacting a pure digital entrepreneurial new venture creation process in an EdTech context, in collaboration with principal actors, as the vehicle for real-time exploration and learning. The cycles of events and reflections form the basis for a holistic process narrative. The narrative is reflected upon and analysed with the goal of identifying consequential mechanisms driving the process of new venture emergence in its different phases. In an abductive approach, the case is then used to develop key propositions and inferences that may be extrapolated to inform wider contexts.

Enactive process research is often considered challenging and risky within the constraints of short-term academic research (Van de Ven & Engleman, 2004; McMullen & Dimov, 2013). Role duality is among the well-known challenges of such forms of inquiry (Coghlan, 2019, p.81). Therefore, for this study to be feasible, it needs delimitation within the constraints of what can be foreseeably accomplished in a dissertation, without compromising authenticity. Consequently, empirical work in this study is limited to the early phases of digital new venture emergence. This phase is concerned with the possible validation or falsification of a number of key business model
hypotheses (Ries, 2011; Blank & Dorf, 2012). Following Selden and Fletcher (2015), the entrepreneurial journey is conceptualised as an emergent hierarchical system of artifact creation processes, with the lower echelons of the process being crucial. Thus, the early phases are critical to new venture emergence because ventures which survive have been known to have a higher chance of future growth (Kazanjian & Drazin, 1990). Accordingly, this study focuses on the lower echelons of digital new venture emergence as it offers the possibility for significant generation of data and knowledge to enable the creation of scalable new digital ventures.

1.4 DISSERTATION STRUCTURE

To provide a logical flow of the dissertation, I develop the following structure and chapter summaries:

Chapter Two is the first literature review chapter. It provides a general background to entrepreneurship scholarship and state-of-the-art theories of the entrepreneurial process. It identifies and reviews established mechanisms which are assumed to drive entrepreneurial decision-making and action under uncertainty. From the literature, a traditional model of the entrepreneurial process is constructed, around which a holistic narrative of new venture emergence can be woven. The model also serves as an analytical tool for examining how the digital entrepreneurial process differs from traditional assumptions of entrepreneurship in Chapter Three.

Chapter Three builds on Chapter Two by defining digital entrepreneurship and its distinctive technological basis. It focuses on pure digital entrepreneurship (PDE) as it relates to the context of this study. The chapter examines the fundamental similarities and differences between digital and traditional assumptions of entrepreneurship. However, in examining the distinctive technological basis of digital entrepreneurship, this chapter
explores the generative mechanisms of digital artifacts, digital platforms and digital infrastructure, which underlie digital new venture creation. Further, it concludes by developing a framework of potential causal mechanisms driving digital new venture creation. Thus, it suggests possible answers to the research question from the literature, which are examined through primary research.

**Chapter Four** is the contextual chapter that examines the external enablers and enabling conditions (Davidsson, 2015) that give rise to generative mechanisms driving the initiation and creation of digital new ventures in the EdTech sector. The chapter builds on the previous, to develop a revised mechanism framework based on the EdTech context.

**Chapter Five** is the methodology chapter. It expatiates on the research design adopted in meeting the stipulated objectives. It examines and justifies the ontological and epistemological stance of this research, as well as the use of an IAR design and a narrative approach to analysis and mechanism-based theorising.

**Chapter Six** is the first empirical chapter that presents the narrative and outcomes of the enacted live case. It punctuates the narrative with reflective pauses and ends with retrospective sensemaking and visual mapping. Hence, it closely aligns with Objective One of this study.

**Chapter Seven** is the second empirical chapter that presents the findings of narrative thematic analysis. Thus, it surfaces the consequential mechanisms which drive pure digital new venture creation in this context, and abductively offers generalisable statements. Hence, it is primarily focused on meeting Objectives Two and Three of this study.

**Chapter Eight** is the third empirical chapter that develops a pragmatic model of pure digital new venture creation based on findings presented in Chapters Six and Seven.
Accordingly, it suggests critical mindsets, toolsets and skillsets needed to drive the emergence of similar new ventures at various temporal phases of emergence. Finally, the chapter considers key policy implications and recommendations for enterprise and regulation. Hence, it addresses Objective Four of this study, aimed at the community of digital entrepreneurial practice.

Chapter Nine concludes the study by summarising key contributions to knowledge, limitations and recommendations for future research. It wraps up the study with my reflexivity on self-development as both a practitioner and researcher.
2 CHAPTER TWO. THEORIES OF THE ENTREPRENEURIAL PROCESS
2.1 INTRODUCTION

This chapter critically examines established theories, concepts and assumptions which explain the entrepreneurial process, as a precursor to the following chapter on digital entrepreneurship. It begins by briefly tracing the evolutionary history of entrepreneurial thought, as the basis for discerning state-of-the-art debates in the discipline. Further, it examines the unifying framework which makes entrepreneurship a distinctive domain of scholarship. Consequently, the chapter highlights the consensus that entrepreneurship is a multidimensional study of the process of new venture emergence. Furthermore, the chapter proceeds to review theories and explanations of mechanisms driving new venture creation and performance. Finally, informed by these discussions, it synthesises an eclectic mix of highly relevant concepts and constructs, to arrive at a conceptual model of the entrepreneurial process, framed as a theoretical finding. The model provides a summative conceptualisation of traditional assumptions of the entrepreneurial process, around which narratives of new venture creation can be woven. It offers a framework for determining the extent to which digital entrepreneurship is similar and different to widely held assumptions of entrepreneurship. Figure 2.1 is a brief overview of the chapter structure.

Figure 2.1 Chapter Structure

Thought Evolution
- Schools of thought
- Theoretical developments
- From traits to phenomenon

Entrepreneurial Process
- Entrepreneurship as process - phenomenon & scholarly focus
- New venture creation - mechanisms & performance

Findings/Conclusions
- Extant models of process
- Findings - conceptual process model
- Conclusions

Source: Researcher
2.2 Evolution of Contemporary Entrepreneurial Thought

The evolution of entrepreneurial thought is often traced back to Richard Cantillon (1732), an Irish-born banker working in France. He first coined the term *entrepreneur*, to refer to one of three classes of actors in an economic system. This entrepreneurial actor depended on the aristocracy for capital to buy goods at a certain price, to produce other goods to sell at an uncertain price. Hence, risk and uncertainty became ingrained in entrepreneurial thought early on. From its Cantillonian days, different schools of thought have made tremendous contributions in developing the field of entrepreneurship. A timeline of this contribution spanning from around the 1700s to 2000s has been captured by a few publications (Murphy, Liao & Welsch, 2005; Pittway, 2012, p. 9). These publications illustrate that the development of contemporary thought followed the ebb and flow of schools of economic thinking which emerged over time. As such, one can use the chronology in which various schools appeared to map these developments (Herbert & Link, 1988; Binks & Vale, 1990; Chell et al., 1991).

2.2.1 Entrepreneurship & Different Schools of Economic Thought

The French, British and Neoclassical schools, as well as the Austrian and Neo-Austrian schools, coupled with Schumpeterian thinking, stand out as landmarks in the evolution of entrepreneurial thought.

*French Classical School:* Owing to the French etymology of the word entrepreneur, it is hardly surprising that early thinkers of entrepreneurship were French economists. In his work, Cantillon (1732) introduced the entrepreneur as the risk-taker who purchased goods to sell at an uncertain price. As such, the propensity towards *risk-taking* was earlier introduced in entrepreneurial thought as an actor-derived mechanism driving the process. Based on this early introduction, Jean Baptiste Say (1816; 1836),
built on Cantillon’s work to construct a theory of production and distribution based on three agents – human industry, capital and land. In so doing, he gave prominence to the entrepreneur by arguing that while land and capital were essential for production, it was human industry that was indispensable to production (Barreto, 1989). Human industry, according to Say, was comprised of ‘effort, knowledge and the applications of the entrepreneur’ (Koolman, 1971, p. 271).

**British Classical and the Neoclassical Schools:** By contrast, British economists such as Adam Smith (1904) and Stuart Mill (1909) were late in explicitly appreciating the role played by entrepreneurs in the economy (Pittaway, 2005, 2012). This was partly blamed on the lack of an English equivalent of the word *entrepreneur*, and a different economic climate in Britain relative to France. Koolman (1971) suggests that perhaps British economists were more preoccupied with macroeconomic thought, while French economists were concerned with microeconomic connections. Given the differences in economic preoccupations, British economists arguably offered little contribution to entrepreneurship thought at the agent level. The lack of development of entrepreneurial thought further worsened under the arrival and subsequent dominance of neoclassical economics (Kirzner, 1980). Barreto (1989) blames the neglect on the wide acceptance of the theory of the firm which emerged from neoclassical thinking. This thinking advanced the idea that production, rational choice and perfect information did not warrant an entrepreneurial function. Further, it is marked by an emphasis on equilibrium, which assumes that individuals act rationally when making economic decisions; and thus, it disregards other aspects of human behaviour.

**Austrian and Neo-Austrian Schools:** However, it was economists from the Austrian and Neo-Austrian schools who subsequently revived entrepreneurial thought.
Economists from the Austrian and Chicago schools departed from neoclassical thinking, instead arguing from a disequilibrium theory of capitalist markets. As such, they began by asserting that risk and uncertainty are important aspects of economic systems which allow entrepreneurs to make a profit. Accordingly, economist, Frank Knight (1921), argues that supply and demand cannot be in equilibrium because other forces shaped the conditions of markets. Since markets must be in a constant state of disequilibrium, entrepreneurship represents a type of decision-making which prompts action in the face of uncertain future occurrences. In so stating, Knight enshrines the idea of *uncertainty* as a cornerstone of most contemporary entrepreneurship theories. This would later become the basis for the seminal paper on the distinctive domain of entrepreneurship scholarship proposed by Shane and Venkataraman (2000), as well as effectuation theory (Sarasvathy, Dew, Velamuri & Venkataraman, 2003; Foss & Klein, 2012) – examined subsequently.

Likewise, Kirzner (1973) later develops the disequilibrium strand in entrepreneurship by focusing on the opportunities for profit created by uncertainty and imperfect knowledge. Accordingly, opportunity was seen to arise from imperfect distribution of information and knowledge in an economy (Hayek, 1945). This state of imperfect knowledge presents opportunities for exploitation by ‘alert entrepreneurs’ Kirzner (1979, p.38). Alert individuals are believed to possess distinct packages of prior knowledge (Shane, 2000) which helps them identify opportunities and form new venture ideas. Further, Casson (1982) complements Kirzner by focusing on the role information exchange and knowledge markets can have on the alertness of entrepreneurs. Given the argument, the mechanisms driving entrepreneurship could be determined by exploring the interrelationship between the micro and the macro.
Schumpetarian Thought, Mark 1 & 2: At the micro level, the entrepreneurial agent was given a central role as driver of process by Joseph Schumpeter. Departing from neoclassical thinking, Schumpeter (1942, 1963) argued that the essential question in capitalism is not how it supports existing market structures but how it creates and destroys them. He describes this process as ‘creative destruction’. This view of capitalist systems made the role of the entrepreneur prominent, as an innovator who creates ‘new combinations’ of products, processes and new markets. Schumpeter, however, did not expatiate on characteristics which distinguished the entrepreneurial agent from ordinary individuals. Further, in Schumpeter (1963) Mark 2, he was more concerned with the role of large firms which made it more difficult for entrepreneurs to challenge their dominance. However, subsequent scholarship made Schumpeter’s Mark 1 and its emphasis on the individual, a prime focus.

2.2.2 Evolution of Theories of the Entrepreneurial Agent

Schumpeter Mark 1 had alerted scholars from different disciplines to the possibility that somehow the entrepreneurial agent was special. Consequently, from the 1960s to 1990s, entrepreneurship scholarship became dominated by psychological, sociological, behavioural and cognitive theories (Pittaway, 2005). These theories seek to explain the mechanisms driving the emergence of the entrepreneurial process by making the entrepreneurial agent the centrepiece of investigation.

Personality Traits Theories: Personality theories came to inform earlier attempts at understanding the entrepreneur. Theorists like McClelland (1961) suggested that an individual’s high ‘achievement motive’ predisposes them to act entrepreneurially. Another dominant personality theory was the ‘locus of control’, derived from Rotter’s (1966) social learning theory. It proposed that some individuals believe achievement of
their goals is strictly based on their own actions. As such, those who believe they can control their destinies are more driven to become entrepreneurs. To add to the personality-based view of the entrepreneur, Brockhaus (1982) considered a risk-taking propensity as being a necessary mechanism which drives entrepreneurial action. The common thread in these theories was the attempt to link single traits as causal variables that drive a tendency for action and success as an entrepreneur. However, they were unsuccessful in proving a predictive capability. Furthermore, they incorrectly categorised entrepreneurs as a homogenous group (Pittaway, 2005; Delmar & Witte, 2012). Against the many criticisms of personality theories, Aldrich (1999, p. 76) concluded that they were ‘an empirical dead end’.

**Sociological Perspective:** The failure of personality theories to yield valuable and conclusive insights prompted a sociological perspective on entrepreneurship. Accordingly, Kets de Vries (1977) and Shapero (1975) suggested that entrepreneurs were displaced and socially marginalised individuals, who had been forced into an entrepreneurial way of life by circumstances. Negative factors were considered a dominant driving mechanism behind entrepreneurial action. This perspective on the entrepreneurial individual has become the basis for specific running themes in contemporary entrepreneurship research such as minority, immigrant and ethnic entrepreneurship.

**Cognitive Models:** Shortly following the sociological perspective, there was an emergence of cognitive models of entrepreneurship during the 1980s and 1990s. These models evolved along two main lines of inquiry – self-efficacy and attitude models (Delmar, 2006). Self-efficacy is the belief in one’s capabilities for planning and executing tasks, while attitude-based models seek to explain behaviour when actions are not under
complete control (Mason & Harvey, 2013). Models on cognition, conceive human behaviour as directed by goal setting, motivation and the perception of control. They are considered advantageous in predicting and explaining entrepreneurial behaviour (Delmar & Witte, 2012, p.178). However, Delmar and Witte state that the main limitation of cognitive models is the assumption that individuals construct their own realities.

By the mid-1980s, the validity of personality theories and an excessive focus on the entrepreneurial agent was challenged. In a seminal work, Gartner (1988) argues that ‘Who is an entrepreneur?’ was the wrong question for entrepreneurial scholarship. In so doing, his work became influential in refocusing entrepreneurship studies on entrepreneurial action and the role of uncertainty (McMullen & Shepherd, 2006). Consequently, state-of-the-art entrepreneurship debates have come to revolve around what entrepreneurs actually do, the mechanisms by which they do it, as well as the economic significance of their actions. Like all developments in entrepreneurship, this shift in focus coincided with major economic developments. Situations such as the collapse of several large corporations in the 1970s led to an economic zeitgeist which questioned the emphasis on an economy dominated by a few large organisations. Hence, the need for entrepreneurship education began to gain prominence.

2.3 **ENTREPRENEURSHIP AS PROCESS – PHENOMENON & DOMAIN OF SCHOLARSHIP**

The societal recognition of the entrepreneurship phenomenon has resulted in the rapid growth of entrepreneurship as a domain of scholarship. To examine the distinctiveness of the domain of entrepreneurship, what is meant by *entrepreneurship* needs to be defined and clarified. Hence, this section examines definitions of the phenomenon and the conceptual framework that has come to unify state-of-the-art scholarship in entrepreneurship.
2.3.1 Entrepreneurship - Phenomenon & the Multitude of Definitions

Entrepreneurship, as Penrose (1959) cautioned, is a ‘slippery concept’ which is onerous to define as it involves individuals and their behaviours. For this reason, an agreed definition largely remained elusive. As Davidsson (2016, pp.1-5) maintains, the multitude of definitions and connotations of what entrepreneurship is, makes the domain fascinating, yet frustrating to research. This lack of common understanding probably owes much to the multidimensional nature of the phenomenon and the different contexts from which entrepreneurship is approached. To avoid the bewilderment that defining entrepreneurship presents a researcher, this section follows the examination of this question by Davidsson, as discussed in Chapter One of his book, *Researching Entrepreneurship: Conceptualisation & Design* (2016). The work is characterised as useful by the research community because it synopsises the themes which emerge from various definitions over the years, subsequently underscoring the need to separate the definition of entrepreneurship as a *phenomenon* from entrepreneurship as a *domain* of scholarship.

Perhaps, exploring the themes which are emphasised by various definitions is a more worthwhile approach in making sense of the many definitions. Recurrent concepts include *new venture creation, process and opportunity, risk and uncertainty, and value creation*. For instance, Lumpkin and Dess (1996) define entrepreneurship as new entry into markets with the introduction of new or existing goods and services. This definition underpins the argument that entrepreneurship is the act of launching a new venture, with a new market offering. Similarly, Low and MacMillan (1988) consider entrepreneurship to be the creation of a new enterprise or organisation (Gartner, 1988; Bird & Wennberg (2014). The idea of newness may have been inspired by Schumpeter’s (1942) christening
of the entrepreneur as an innovator who creates ‘new combinations’ made manifest in new market offerings.

Other definitions emphasise the process of new venture creation – alternatively conceptualised as the pursuit of opportunity. Among them, Stevenson and Jarillo (1990) define entrepreneurship as the process through which individuals, either on their own or inside an organisation, pursue opportunities without regard to the resources which they currently control. The process view is equally captured by Hisrich, Peters and Shepherd (2008), whose multi-thematic definition, conceptualises entrepreneurship as the process of creating something of value by committing time and effort, assuming various forms of risks, and reaping the rewards in terms of monetary, personal satisfaction and independence. The risk-reward view of the phenomenon is equally shared by Kihlstrom and Laffront (1979). These definitions often overlap and use similar concepts.

Hence, one analysis concludes that the pursuit of opportunity, starting a new business venture, value creation, risk-taking, profit and new combinations were themes shared by most definitions of entrepreneurship (Morris, Lewis & Sexton, 1994). Similarly, Gartner (1990) identifies the entrepreneur, innovation, organisational creation, value creation, and profit and growth as prevalent themes in the definitional literature. What the multiple themes in the definitions suggest is that entrepreneurship is a multidimensional phenomenon. Hence, the themes are various angles for the examination of the complex process of entrepreneurship.

2.3.2 Toward a Succinct Definition of Phenomenon & Domain

Perhaps, Kirzner’s (1973, pp. 19-20) many reflections on the entrepreneurship phenomenon, contributes in providing a succinct, yet holistic definition of entrepreneurship both as a phenomenon and an area of scholarship. Steeped in a
disequilibrium economic perspective, he defines entrepreneurship as ‘the competitive behaviours that drive the market process’. Further, Kirzner (1997) goes on to state that entrepreneurship is a mechanism through which temporal and spatial inefficiencies in an economy are discovered and mitigated by ‘alert entrepreneurs’ (1979). Kirzner’s conceptualisation of entrepreneurship is often lauded because it successfully combines the individual, process and societal facets of entrepreneurship into an integrative, yet synoptic definition. He depicts entrepreneurship as a micro-level phenomenon which has macro-level implications. Further, he situates entrepreneurship within a market context (Davidsson, 2016, pp. 6-7). The result, according to Davidsson, is an easy-to-communicate definition, as consistent with definitional guidance from (Suddaby, 2010).

While a Kirznerian definition advances scholarly examination, Davidsson argues that it remains fluid and lacks a concrete scholarly demarcation. Hence, several scholars have argued that entrepreneurship lacks distinctiveness as a domain of scholarship (Bygrave, 1989; Low, 2001).

The problem with entrepreneurship as a domain of scholarship, according to Venkataraman (1997), is that it involves a nexus of two phenomena – the presence of lucrative opportunities and the presence of enterprising individuals. Therefore, merely focusing on the individual, as was the case with earlier personality and cognitive theories, provides an incomplete picture (Gartner, 1988). Thus, it made the search for an integrative framework elusive. To carve out a distinctive field of scholarship, Shane & Venkataraman (2000), in their agenda-setting paper in the Academy of Management Review, proposed a conceptual framework that has helped to organise scholarship. The framework begins with a disequilibrium (Knight, 1921) assumption and proceeds to build on Venkataraman’s (1997) definition of entrepreneurship. This definition conceptualises entrepreneurship studies as, ‘the scholarly examination of how, by whom and with what
effects opportunities to create future goods and services are discovered, evaluated, and exploited’ (Shane & Venkataraman, 2000, p. 218).

Following this definition, the entrepreneurship discipline is conceptualised as studying the phenomenon of individuals discovering and exploiting opportunity. Hence, it has been described as the Individual-Opportunity (IO) nexus. However, unlike prior studies, the focus on the individual is in terms of exploring the tendencies for certain actors to respond to situational cues of opportunities and the mechanism through which they do so. Simply put, entrepreneurship requires agency, which acts (Shane, 2003) to produce a variety of outcomes – i.e., ‘with what effects’. Finally, by including the ‘creation of future goods and services’, Shane and Venkataraman reinforce the idea that entrepreneurship is a process of emergence leading to new economic activity (Davidsson, 2003; Davidsson, 2016, p.23).

2.3.3 Entrepreneurial Opportunity & the Ontological Impasse

The IO nexus of entrepreneurship has helped to organise scholarship on the phenomenon. However, the contentious debate on what is meant by opportunity has only recently begun to abate. Its ignition derives from the conflicting ontological assumptions that opportunity is an objective phenomenon, independent of the entrepreneur’s knowledge (Eckhardt & Shane, 2003, 2013), versus opportunity as the subjective constructions of the entrepreneur (Alvarez & Barney, 2007, 2013). If opportunities are discovered, it would suggest they exist objectively, thereby leaving little room for a social constructivist worldview which sees opportunity as created by agents.

Opportunity Discovery Theory: From an objectivist stance, opportunity is defined as a chance to profitably introduce new goods, services, raw materials and organisational methods to market (Casson, 1982; Eckhardt & Shane, 2003). This stance depicts
opportunities as existing in the environment independent of the knowledge of the entrepreneur. Therefore, it can only be discussed as a speculative idea which can be fully articulated and explained retrospectively (Dimov, 2011). Kirzner (1979) explains that opportunities are discovered by ‘alert entrepreneurs’, and they follow intuitively from political, economic and technological change (Schumpeter, 1963), imperfect information and knowledge (Hayek, 1945), as well as changes in values and preferences (Davidsson, 2003). Klein (2008) argues that these assumptions can be perceived as external structures and generative mechanisms, giving rise to entrepreneurial action (Kirzner, 1979, 2009).

**Opportunity Creation Theory**: From the micro-level, the macro-level definition of opportunity is elusive, as it raises the tension between ex-ante foresight and ex-post insight when calling something an opportunity (Dimov, 2011). At the individual level, opportunities are created internally by the actions of entrepreneurs (Alvarez & Barney, 2007, 2013) and represent a stream of continuously modified and developed ideas (Davidsson, 2003; Dimov, 2007). As such, opportunity cannot be separated from the individual (Sarason, Dean & Dillard, 2006), as it is interwoven with the entrepreneur’s beliefs, cognitions, motivations (McMullen & Shepherd, 2006) and prior knowledge (Shane, 2000). Thus, it exists only in the entrepreneur’s imagination (Klein, 2008), and constitutes an organising vision (Lichtenstein, Dooley, & Lumpkin, 2006). This view is based on a social constructivist paradigm which considers opportunities as emanating from the subjective interpretations of individuals. The subjective view favours a focus on motivation, knowledge, cognitive and learning abilities in examining drivers of process (Dimov, 2012, p.133). McMullen and Shepherd (2006) describe this view as first-person opportunity.

The contrasting views of opportunity are best contextualised within the broader paradigmatic wrestling that tends to create an impasse in management disciplines. This
tension has been criticised for adding little value in terms of understanding societal phenomena (Gulati, 2007). Indeed, following Bygrave’s (2007) lamentation that the entrepreneurship paradigm was becoming increasingly aloof from any nexus with practical utility, several scholars have attempted to refocus scholarship on the phenomenon. Accordingly, research needs to focus on the entrepreneurship phenomenon – described as the process of emergence of new economic activity (Wiklund, Davidsson, Audretsch & Karlsson, 2011). Similarly, Crawford, Dimov and McKelvey (2016) renew calls for scholarship which once and for all, puts the opportunity debate to rest and aim scholarship efforts at the societal phenomenon.

2.3.4 Entrepreneurial Opportunity – Beyond the Impasse

Novel perspectives on how to re-conceptualise entrepreneurial opportunity have emerged to move the discipline beyond the impasse. Dimov (2011) suggests a substantive approach, while Garud and Giuliani (2013) offer a narrative perspective. Likewise, taking the view that entrepreneurship is a science of the artificial, a number of scholars propose a new nexus for scholarship revolving around action and interaction - examined subsequently.

**Opportunity in Substantive Terms:** Dimov (2011) proposes a way forward by situating entrepreneurial opportunity within a substantive construct. From this vantage point, he presents three different tangible premises for studying opportunities: 1) opportunity as happening, with the new venture idea as the unit of observation, 2) opportunity as expressed in actions, with the entrepreneurial action being the unit of observation, and 3) opportunity as instituted in market structures - whereby market interaction becomes the unit of observation (Dimov, 2011). Further, he argues that opportunities happen through the generation and modification of new venture ideas. Research, he maintains, should dwell on the circumstances through which this process
occurs. Likewise, if one can observe actions as already taken by certain individuals, there is hardly need to focus on why the actions occur, but rather why they occur in a certain way. Finally, an opportunity becomes established in market structures through the gradual formation of exchange relationships. Such relationships, with their inherent competition and interaction, can provide insights into the ways opportunities are perceived, articulated and modified.

**Narrative Perspective – Opportunity as Meaning-making:** Meanwhile, Garud and Giuliani (2013) adopt a narrative perspective in progressing beyond the opportunity impasse. They explain that ‘meaning making’ associated with opportunities is a continuous process which occurs through non-stop interaction between actors and artifacts (Garud, Gehman & Giuliani, 2014). Drawing from actor-network theory (ANT), a narrative perspective considers actors to be part of a synergistic ecology between social and material elements (Latour, 2005) - which provide the basis for entrepreneurial narratives. ANT is premised on a relational ontology, which interprets opportunity as emerging from the interweaving and recombining of social and material elements – consequently enabling and constraining the orientation and possibilities of agents in dynamic ways (Garud, Kumaraswamy & Karnøe, 2010). Agency is distributed and emergent, while discovery and creation are interwoven in dynamic ways as the entrepreneurial journey develops.

Further, the narrative perspective adopts a temporal dimension of the entrepreneurial process which endogenises time. What this means is, entrepreneurial narratives enable actors to look back into the past to understand what occurred (Weick, 1995), and imagine a future accomplishment of a venture (Van Lente, 2000). It implies that from their inception, new venture ideas are by their very nature incomplete. It also suggests a different notion of time in which the past, present and future are intertwined
Ricoeur, 1984). The interaction between the relational and temporal elements of a narrative perspective translates into meaning – whereby, meaning making is not objectively given or subjectively constructed, but unfolds in a continuous relational process. Thus, opportunity emerges and develops from plotting social and material elements from the past, present and future, into a comprehensive narrative (Garud & Giuliani, 2013, p. 159). For this reason, Garud and Giuliani (2013) conclude that ‘entrepreneurial journeys are dynamic processes requiring continual adjustments by actors’. Thus, research in this area would be better served by the development of a comprehensive narrative which does not seek to fragment the entrepreneurial process into a set of distinct causal variables.

*Entrepreneurship as Action & Interaction in Artifact Creation:* Meanwhile, Venkataraman, Sarasvathy, Dew and Forster (2012) sought to move beyond the opportunity impasse by arguing for a new nexus of entrepreneurship scholarship revolving around action and interactions. Accordingly, they draw from Herbert Simon’s philosophy to recast entrepreneurship as a *Science of the Artificial* (Simon, 1996; Sarasvathy, 2003). This philosophy holds that human artifacts are ‘objects and phenomena in which human purpose, as well as natural laws, are embodied’ (Simon, 1981, p. 6). Thus, artifacts arising from entrepreneurial action and interaction are but manifestations of knowledge, which is put to use in ways that transform the extant world (Venkataram et al., 2012, p. 30). Hence, a focus on the actions and relationships which result in new artifacts should represent a prime concern of scholarship. Taking this view into account, Selden and Fletcher (2015, p. 605) re-conceptualise the entrepreneurial process as an emergent hierarchical system of artifact-creating processes.
They go on to identify six subsystems in this hierarchy (see Figure 2.2). The first level is the sense-making subsystem involving the creation of a business idea (an artifact). The business idea is then functional at the second level, which is the entrepreneur-stakeholder interaction subsystem resulting in the birth of an operational business model (artifact). Further on, the business model is functional at the third level in the emergence of firm capabilities and marketable commodities (artifacts). Meanwhile, at the fourth level, the marketing of commodities is functional to the emergence of a Kirznerian or Schumpeterian market system. Further up the hierarchy at the fifth level, the market subsystem is functional to the formation of clusters and regional relationships (artifacts). Finally, at the sixth level, a combination of levels 1-5 becomes functional to the society as culture, discourses and practices.

Figure 2.2 Hierarchical System of Entrepreneurial Emergence

Source: Selden & Fletcher (2015, p. 606)
Selden and Fletcher distinguish between the lower hierarchy of levels 1-3 which constitutes the emergence of an entrepreneurial journey (McMullen & Dimov, 2013), and levels 4-6 which are patterns of emergence in higher level populations. Levels 1-3 appear consistent with the entrepreneurial process as delimited by this study - since it involves the new venture creation stages of converting a business idea into a codified business model and usable market form (Lichtenstein & Kurjanowicz, 2010; Dew et al., 2011).

2.4 NEW VENTURE CREATION - EXTERNAL ENABLERS & NEW VENTURE IDEA

A more recent development in entrepreneurship appears to have put the opportunity debate to rest - thereby enabling a more pragmatic examination of processes and mechanisms driving new venture emergence. This key development is based on the award-winning paper by Davidsson (2015) and its follow-on developments (Davidsson, 2016, pp. 235-241; Davidsson, Recker & Von Briel, 2018; Davidsson, 2019). In this seminal piece, Davidsson proposes a re-conceptualisation of the opportunity construct and the entrepreneurship nexus by arguing that the problem with the opportunity construct is that it bundles within it, multiple sub-constructs. Deconstructing these constructs enables empirical investigation into the entrepreneurial process with practical utility. Accordingly, he proposes a new framework that separates the opportunity construct into three individual sub-constructs - *External Enablers, New Venture Ideas, and Opportunity Confidence*.

From the opportunity construct de-construction, Davidsson firmly supports the position that entrepreneurship is a process of new venture creation. New venture creation is more generically described as organising involving the ‘assemble of ongoing interdependent actions into sensible sequences that generate sensible outcomes’ (Weick, 1979, p.3). It is a multidimensional phenomenon which includes the environment, the
individual, process and outcomes (Gartner, 1985; Bhave, 1994). Wherein, the environment presents sources of external enablers as actor-independent causal structures and generative mechanisms, while entrepreneurial agents are micro-level units for identifying social mechanisms (Gross, 2009) which drive the entrepreneurial process towards a variety of outcomes. Outcomes include the birth of a new venture, which is an effect of the process of emergence. The venture introduces new market offerings that satisfy unmet needs for users and customers. Consequently, Davidsson (2003, 2012) advances a more pragmatic definition of the new venture creation process as that of setting up a new business activity resulting in a new market offering in a start-up or within an established organisational context. The new market offering may be innovative or simply imitative; with imitative offers having been found to outnumber innovative ones (Reynolds, Bygrave & Autio, 2003). This process of setting up a new business activity could begin as a proactive, reactive or fortuitous search (Davidsson, 2003; Dahlqvist, Chandler & Davidsson, 2006).

Venture performance in the entrepreneurial process can be evaluated in multiple ways. Among them, survival and success are seen as more reliable and generic (Chrisman, Bauerschmidt & Hofer, 1998). Survival depends on the ability of the venture to continue on a self-sustaining trajectory. Meanwhile, venture success is a relative measure that occurs when the venture creates value for its customers or users in a sustainable and economically efficient manner (Schumpeter, 1942, 1963; Barney, 1986). A venture is considered new if it has not reached a phase where it could be considered a mature business. The time it takes for a new venture to become mature varies depending on industry, resources and strategy among others. It may take several years for new ventures to become profitable (Weiss, 1981) – reasonably assumed to be around three to five years on average, and up to twelve years in some cases (Kazanjian & Drazin, 1990). Thus, a
survival approach to conceptualising venture performance is based on the assumption that ventures which survive have a higher chance of growing to profitable and mature ventures in future. Therefore, survival is the prime concern of early developments of the entrepreneurial process.

Against this general introduction to new venture creation, the constructs of external enablers, new venture ideas and opportunity confidence hold promise as core constructs, underpinning an entrepreneurial process narrative, upon which the search for mechanisms that underlie new venture creation can begin. To reiterate, a mechanism is defined as ‘a cause or causal pathway, or an explanation without explicit theorising about the nature of the mechanism’ (Ylikoski, 2018, p.3). Mechanisms tell us how the cause produces the effect by describing the process by which it happens. As such, they can be distinguished from simpler causal claims that only identify what makes a difference to the outcome. Thus, tenets of mechanism-based theorising (see Chapter Five) are employed to subsequently examine how external enablers and their characteristics offer actor-independent mechanisms which ultimately get translated into actionable or social mechanisms (Gross, 2009) at proximal levels of new venture creation.

2.4.1 External Enablers (EE) – Characteristics, Mechanisms & Roles

An External Enabler (EE) is an aggregate level occurrence, defined as, ‘a distinct external circumstance, which has the potential of playing an essential role in eliciting and/or enabling a variety of entrepreneurial endeavours by several (potential) agents’ (Davidsson, 2015). Examples of EEs include changes in technology, demography, culture, human needs and wants, as well as macroeconomic conditions, institutional framework conditions and the natural environment. More recently, Davidsson (2019), in an unpublished piece, develops this idea by arguing that, ‘it is much more useful and defensible to reserve the EE concept to instances of significant change to the business
environment, assuming the starting point is a reasonably functioning society and economy’.

This distinction is critical. Without it, the EE construct may appear indistinguishable from what has gone before – such as STEEPLE (Social, Technological, Economic, Environmental, Political, Legal & Ethical) and related frameworks which have been used to analyse business environments traditionally. Further, agents neither need to be aware, have strategic intent or assess EEs correctly in order to benefit from them. This argument eschews the need for measurement, which is typical of the ‘objective opportunity’ perspective. Davidsson et al. (2018) further identify several mechanisms and roles detailing the specific benefits that EEs can bestow upon particular new ventures. They offer a framework that describes types of enablers, their characteristics, mechanisms and roles in new venture creation – see Figure 2.3 subsequently.

Figure 2.3 External Enablers & Actor-independent Mechanisms

Source: Davidsson et al. (2018)
The framework identifies the types of external enablers, their characteristics, mechanisms and roles.

**Characteristics** of external enablers are objective facts about them which do not vary by process across stage or agents within a spatiotemporal context (Davidsson et al., 2018). They are defined by their scope and onset. *Scope* is a spatiotemporal concept that refers to the geographical areas, industries and people affected over a duration of time. Meanwhile, *Onset* is a concept which describes how sudden or gradual an EE is – whereby, gradual suggests predictability.

**Mechanisms** refer to the specific ways in which EEs facilitate the initiation, development and performance of new ventures – or, how they are helpful. These mechanisms also vary in terms of being obvious, to requiring distinctive knowledge, skills and creativity – i.e., agency-intensity (Ramoglou & Tsang, 2016). Entrepreneurial agents may have limited knowledge of, or perfect ability to correctly identify EE and their mechanisms. Davidsson et al. (2017, 2018) present a summary of the mechanisms in the following table – summarised in Table 2.1.

**Table 2.1 Mechanisms of External Enablers**

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression</td>
<td>Reduction in the amount of time required to perform an activity</td>
</tr>
<tr>
<td>Conservation</td>
<td>Reduction in the amount of resources needed to perform an activity</td>
</tr>
<tr>
<td>Resource Expansion</td>
<td>Increase in the amount of a resource that is accessible</td>
</tr>
<tr>
<td>Resource Substitution</td>
<td>Replacement of one resource with another</td>
</tr>
<tr>
<td>Combination</td>
<td>Coupling with external artifacts or resources to provide functionality</td>
</tr>
<tr>
<td>Generation</td>
<td>Allowing the creation of new artifacts</td>
</tr>
<tr>
<td>Uncertainty Reduction</td>
<td>Reduction of the perceived uncertainty of any business decision of buyers or sellers</td>
</tr>
<tr>
<td>Legitimation</td>
<td>Psychological/socio-cultural acceptability of the venture or its offerings</td>
</tr>
<tr>
<td>Demand Expansion</td>
<td>Increase in demand at given price and functionality</td>
</tr>
<tr>
<td>Enclosing</td>
<td>Increase in a venture’s ability to capture the loyalty of buyers and the value it creates</td>
</tr>
</tbody>
</table>

*Source: Davidsson et al. (2017, 2018)*
According to Davidsson et al., one EE can provide multiple mechanisms. Likewise, one mechanism can reside in two or more EEs. Hence, research must provide further insights into how EEs interrelate with one another, with circumstances and with agents producing derived mechanisms. Similarly, there is a need to determine how enabling mechanisms combine in contributing to actions that drive venture performance.

**Roles** refer to the effects of EEs and mechanisms at various phases of new venture creation. They describe where and how enablers influence new venture creation. Roles can also influence the process without strategic intent. For example, anticipated mechanisms of an EE may be used to shape the new venture’s market offerings, design, business model or process of creation. Accordingly, Davidsson et al. identify three broad types of roles – triggering, shaping and driving success or outcome-enhancing. The *triggering* role of EEs examines how they entice entrepreneurial agents to act. This role has been the main impetus of ‘Opportunity Discovery Theory’. Meanwhile, the *shaping* role is three-pronged and examines how EEs influence the offering, venture and process. Unlike discovery theory, the ‘shaping role’ places emphasis on events, progress and changes in the process of emergence. It allows for the combination of objective external factors with dynamic process perspectives on new venture creation. Finally, the *driving success role* focuses on how EEs and their mechanisms can be correlated to venture success, or how they enhance outcomes. Conversely, a role can be explained by counterfactually imagining how the absence of an EE would influence outcomes. Outcome-enhancing can occur without intent and awareness.

EEs and their corresponding mechanisms, as well as the higher-order roles they play, are essential ingredients in developing a comprehensive narrative of the new venture creation process. However, the ways in which entrepreneurial agents interpret EEs to create derived mechanisms that drive new venture creation, indicates that explanations
also need to be found at the micro-agentic levels for a process narrative to be comprehensive. Hence, Davidsson (2015) suggests ‘New Venture Idea’ and ‘Opportunity Confidence’ as key constructs which can organise thought around this area.

### 2.4.2 New Venture Idea, Opportunity Confidence & Venture Performance

In defining the scholarly domain of entrepreneurship, Shane and Venkataraman (2000) argue, ‘that on which they act’ should be an important dimension in explaining the entrepreneurship phenomenon (von Briel et al., 2018). Accordingly, Davidsson (2015, 2016) offers the New Venture Idea (NVI) construct as an important subject in the study of process. He defines the NVI as ‘an imagined future venture’. It is more concretely conceived as an imaginary combination of product and service offerings, markets, and the means of bringing these offering into existence. Alternatively, it can be thought of as an imaginary and formative business model (Amit & Zott, 2001).

Being imaginary, determining its roles in the entrepreneurial process demands the use of cognitive theories derived from psychology. The NVI is not a manifest venture idea or business model, and it is not necessarily well articulated or complete. NVIs also include theoretical ideas which never get acted on. Further, there may or may not be a direct link between the NVI and an external enabler. NVIs are usually the result of the entrepreneur’s cognitive processes and sense-making, mainly using prior knowledge, education and personal characteristics (Shane, 2000). The slight difference between NVIs and opportunity recognition, identification or discovery theories is in terms of not assuming favourability. NVIs are cognitions which are not independent from the individuals who conceptualise them. They can, however, be shared or formulated by a researcher for the purpose of communicating to stakeholders. Several scholars find evidence which indicates that aspiring entrepreneurs do not search randomly for new venture ideas but draw from relevant prior knowledge such as work experience or a hobby.
(Vesper, 1991; Bhave, 1994, p. 230; Klofsten, 1994; Fiet, 2002; Shane, 2000). Gartner and Carter (2003) found that business ideas were the result of both systematic and fortuitous searches.

When NVIs and EEs are subsequently evaluated by entrepreneurial agents, they result in what Davidsson (2015) describes as Opportunity Confidence (OC). OC is the result of an agent’s evaluation of EE and the NVI, which provides the basis for the decision to begin committing resources towards an actual new venture enactment. As such, it draws on the entrepreneurial agent’s cognition, prior knowledge and motivation, which are among the micro-level explanations of mechanisms driving the new venture creation process (Baron, 1998). Therefore, focal agents, together with their decision-making processes, represent avenues for explaining the cognitive mechanisms which translate into actions that influence the new venture creation process.

Additionally, Davidsson et al. (2017) argue that new venture performance and behaviours of actors may also be explained by the characteristics of the new venture idea. Evaluating characteristics of the NVI may be one way in which entrepreneurial agents arrive at OC and subsequently act. For an objective examination of NVIs, Rogers (1995) offers Diffusion of Innovation (DOI) theory as a framework for examining the characteristics of successful new venture ideas. Successful ideas are those that can spread. According to the theory, the diffusion of new venture ideas is defined as the process in which an innovation is communicated through certain channels over time among the members of a social system. Members in the social system are classified according to the level of innovativeness. At initial stages of adoption are innovators and early adopters. In the middle, the early and late majority make up the largest chunk of the social system, while laggards close the curve as late adopters.
Rogers goes on to identify five main characteristics that determine how rapidly new venture ideas spread. They are relative advantage, compatibility with existing values and practices, simplicity or ease of use, trialability and observability. With particular reference to technological ideas, Moore (1999) complements Rogers by explaining that some ventures fail because they cannot ‘cross the chasm’ from early adopters to early majority. One reason for failure reverts back to the characteristics of the original NVI – i.e., it does not meet Roger’s characteristics defined in DOI.

However, critics of DOI are not convinced about some of its core assumptions. With relevance to this research, Lyytinen and Damsgaard (2001) remain unconvinced by the supposition that technologies move in a discrete package from an independent innovator through a diffusion area. From a network-centric context of innovation, they criticise the belief that innovation has separate, distinguishable and objective features, which are easily recognisable by interested parties. Likewise, they object to the idea that the adoption of an idea always follows a rational calculus. Thus, while the characteristics of new venture ideas described by DOI offer guidance, doubts exist as to their applicability in explaining venture performance in a network-centric context – such as the digital entrepreneurial context examined in the next chapter. Therefore, an overemphasis on explaining performance through characteristics of the new venture idea, as defined by DOI, would be misplaced. Hence, focusing on how new venture ideas form, get enacted and reform is essential for developing a more comprehensive narrative of the entrepreneurial process (Dimov, 2011; Garud & Giuliani, 2013). Whereby, the dynamic formation, enactment and reformation of new venture ideas are intertwined with the focal entrepreneurial agents driving the process, as well as the environment in which they are embedded.
2.5 **Entrepreneurial Agency**

At this stage in the literature review, it is evident that entrepreneurial agents and their characteristics play a crucial role in shaping venture performance. In Aristotelian terms, agents are the sources of *efficient causes* of change (expanded in Chapter 5). Hence, Casson (1982) defines the entrepreneurial agent as ‘someone who specialises in making judgmental decisions about the coordination of scarce resources’. While entrepreneurship is not a solitary activity, focal entrepreneurial agents are considered essential in leading the process (Cooney, 2005). These agents, according to Drucker (1985, p. 32), are individuals who search for change, respond and exploit them. Determining why certain individuals respond to situational cues, initiate and act upon new venture ideas remains a crucial avenue for examining the social mechanisms driving the process of new venture emergence.

2.5.1 **Cognition & Motivation Mechanisms of Agents**

Cognitive and motivation models provide useful frameworks for explaining decision-making that results in behaviours which drive new venture creation and performance. Given that cognition and motivation are so intricately linked, McMullen and Shepherd (2006) argue that they can hardly be discussed as separate concepts. Cognition and motivation theories are deemed useful because they possess superior explanatory power than single traits theories (Delmar & Witte, 2012).

According to Baron (2004), they can generally be grouped under three main lines of inquiry. Firstly, ‘Why do some individuals and not others initiate and act on new venture ideas?’ Secondly, ‘What leads certain individuals to identify and combine external enablers to form new venture ideas?’ Finally, ‘Why do some individuals perform better than others?’ Ultimately, these questions search for answers to the ‘entrepreneurial
mindset’ – i.e., the ability to rapidly sense, act and mobilise under conditions of uncertainty (Ireland, Hitt & Sirmon, 2003; Haynie, Shepherd, Mosakowski & Earley, 2010). Recurrent in the entrepreneurship literature are three distinct categories of cognitive mechanisms which purport to explain micro-level factors driving new venture emergence and performance - attitude-based models, achievement context models and ability models.

**Attitude-based Models:** Eagly and Chaiken (1993, 2007) define attitude-based models as the evaluation of an object or concept and the degree to which it is judged as good or bad. Attitude models of cognition hold that individuals carefully assess the information they have about a given situation, and then use their knowledge to form beliefs or attitudes. These attitudes become proximal and critical determinants of behaviour (Bagozzi & Warshaw, 1992; Ajzen, 2005, p. 94). Ajzen’s (1991) theory of planned behaviour is an attitude model commonly used to explain entrepreneurship entry and new venture idea initiation, performance (Krueger 1993; Davidsson, 1995) and business growth (Kolvereid & Bullvag, 1996; Wiklund, Davidsson & Delmar, 2003). It explains that individuals will enter into the entrepreneurial process if they have enough information and knowledge to make a judgment. If their perceived uncertainty is favourable, they will be driven to start a new venture (McMullen & Shepherd, 2006). A fundamental shortcoming of attitude models, however, stems from the observation that the correlation between attitude and actual behaviour is still a ‘black box’ (Thompson, 2009). Further, the lack of clarity regarding how attitudes translate into actions and outcomes is a key limitation (Delmar & Witte, 2012, p.171).

**Achievement Context Models:** Another category of cognitive models of entrepreneurial behaviour relates to motivation in achievement contexts. It explores how
and why entrepreneurs engage in situations with risks and uncertainties. It is dominated by two models—perceived self-efficacy and intrinsic motivation (Delmar & Witte, 2012). Perceived self-efficacy is similar to the locus of control, which is now a poorly regarded personality traits theory. However, it differs in terms of its focus on an entrepreneur’s belief in their ability to muster the motivation, cognitive abilities and plan of action essential to control events in their life (Gist & Mitchell, 1992; Bandura, 2012). A higher level of perceived self-efficacy has been positively correlated with initiating and persisting in new venture creation processes (Wood & Bandura, 1989; Krueger, Reilly & Carsrud, 2000). Hence, it may explain new venture performance as survival. Presumably, a high level of perceived self-efficacy enables an entrepreneur to approach difficult tasks as challenges to be mastered, as opposed to problems to be avoided (Bandura & Locke, 2003). Hence, it has been used to explain differences in entrepreneurial new venture performance and the evolution of process.

Meanwhile, intrinsic motivation sees motivation as coming from what the entrepreneur finds self-fulfilling and enjoyable—i.e., it requires no reward except for the activity itself (Delmar & Witte, 2012, p.174). Intrinsic motivation is contrasted with extrinsic motivation—which is the result of an external controlling variable such as rewards or punishments, as perceived by the acting individual (Amabile, Hill, Hennessey & Tighe, 1994). The model assumes that entrepreneurs who are intrinsically motivated display better decision-making and enjoy a higher level of performance. The main reason for this stems from the fact that interest is necessary for creativity since creativity demands a high level of devotion (DeTienne & Chandler, 2004; Delmar & Witte, 2012, p.175).
**Ability Models:** Likewise, ability models explain new venture performance as being the function of skills and motivation of agents. Basic intelligence and interest are considered the necessary ingredients driving entrepreneurial agents to develop the skills needed to be successful. It is argued that successful entrepreneurs need to possess relevant knowledge and cognitive ability, mastery of relevant skills, as well as persistence over long periods (McCloy, Campbell & Cudeck, 1994).

Among these skills, social competence, which is the ability to interact effectively with others based on discrete skills, is also deemed necessary for entrepreneurial pursuits. Studies by Baron and Markman (2003) in the cosmetic and high-tech industries found that social adaptability (ability to adapt in a wide range of social situations) and expressiveness (ability to express oneself clearly to generate interest), were important qualities needed by entrepreneurs to drive new venture performance.

**Cognitive Biases & Venture Performance:** However, behavioural psychologists argue that human thinking is often influenced by several biases and error with relevance to entrepreneurship (Baron, 1998). Thus, the cognitive mechanisms are prone to error of perception with implications for venture performance and outcomes. Cognitive theories of entrepreneurial decision making have often developed along with the assumption that individuals possess limited knowledge of the world due to an oversupply of information. Entrepreneurs are believed to operate under conditions that overload their information processing capacities. These situations are defined by high levels of uncertainty, novelty, strong emotions, time pressure and fatigue. As such, agents tend to select and interpret information based on prior knowledge (Taylor, 1998; Shane, 2000), cognitive biases and multiple fallacies (Khaneman & Lovallo, 1994). Thus, individuals are bound to have
different perceptions and motivations of the same situation, with consequences for venture performance (Baron & Ensley, 2006; Grégoire et al., 2010).

Counterfactual thinking is a cognitive mechanism relevant to explaining biases which result in new venture idea initiation (Baron, 1998, p. 289). The mechanism works by making individuals imagine what might have been in a given situation (Roese, 1994). It is assumed that missed opportunities may lead to intense feelings of regret and magnification of lost potential benefits from not acting. Meanwhile, a planning fallacy is another bias that explains the tendency for most people to underestimate the time required to complete various projects – or, overestimate how much they can accomplish in a given period of time on the flip side (Lovallo & Kahneman, 2003). A planning fallacy tends to result in unrealistic timetables for completing various tasks. Baron (1998) posits that entrepreneurs are more prone to planning fallacies, which results in optimistic predictions. Further, he identifies escalation of commitment and self-justification as being negative factors affecting new venture emergence. These biases enable human agents to continue investing time and resources in failing courses of action due to an initial commitment (Staw, 1981). Relatedly, there exists a tendency to justify the initial choice and decision to escalate commitment. Since entrepreneurs are believed to be more susceptible to escalation of commitment and self-justification biases, they may find themselves committing to ventures which are potentially doomed.

2.5.2 Value Co-creation & Focal Agent Leadership

Cognitive and behavioural research that overly places emphasis on the entrepreneur’s beliefs and cognitive abilities often results in a tendency to lionise focal agents (Shaver & Scott, 1991; Chandler & Hanks, 1994; Hmieleski & Baron, 2009; Fauchart & Gruber, 2011). However, research on entrepreneurial teams (Harper, 2008),
which originates in the context of corporate entrepreneurship (Shepherd, Covin & Kuratko, 2009), strategic entrepreneurship (Hitt, Ireland, Camp & Sexton, 2001) and virtual teams (Matlay & Westhead, 2005), underscores that new venture creation and performance is the result of agentic collaborations. As the literature on entrepreneurial teams suggests, a single individual hardly possesses all the skills and motivation needed to drive the process of new venture emergence with optimal performance (Cooney, 2005; Aldrich & Kim, 2007). As such, entrepreneurial teams are essential in collectively driving new venture success.

Therefore, the justification for examining the entrepreneurial mindset of focal agents may reside in identifying the kind of leadership which helps combine the skills, motivations and abilities of multiple actors to drive new venture creation and performance. Hence, entrepreneurial leadership is defined as,

…leadership that creates visionary scenarios that are used to assemble and mobilise a ‘supporting cast’ of participants who become committed by the vision to the discovery and exploitation of strategic value creation (Gupta, MacMillan & Surie, 2004; Kuratko, 2016).

Accordingly, the role of focal agents is that of providing the vision and leadership which attracts and manages the commitment of a team or founding collaborators in value co-creation (Sarasvathy, 2001; Kim & Aldrich, 2017).

Focal entrepreneurial agents are, therefore, ‘individuals who, through an understanding of themselves and the contexts in which they work, act on and shape opportunities that create value for their organisations, their stakeholders, and the wider society’ (Greenberg, McKone-Sweet & Wilson, 2011, p. 2). Consequently, Greenberg et al. propose the following model, which suggests three mechanisms for leadership that drives successful new venture creation – see Figure 2.4 subsequently.
As represented by the model, Cognitive Ambidexterity (CA) refers to the idea of engaging prediction reasoning when an entity’s future goals and circumstances mirror the past; and creation logic when the future is unknowable due to the absence of a past reference (Fixson & Rao, 2011). Meanwhile, Self and Social Awareness (SSA) deals with how the actions of entrepreneurial leaders are directed by a deep and metacognitive knowledge of themselves and their social contexts. Finally, Social, Environmental and Economic Responsibility and Sustainability (SEERS) relates to the desire to simultaneously and responsibly seek socioeconomic value which does not translate into environmental or societal degradation. The model indicates that high metacognition, an awareness of the environment and managing relationships with collaborators, are essential individual agent mechanisms needed to drive new venture performance.

2.5.3 Contextual Embeddedness & New Venture Creation

Granovetter (1985) pointed out that entrepreneurial decision making is shaped by the multiple contexts in which actors are embedded. Hence, Davidsson et al. (2017) argue that context has a moderating influence on external enablers and their characteristics, mechanisms and roles, as well as agents engaged in new venture creation. New venture performance and the entrepreneurs who affect change cannot be fully understood without
consideration of the nested contexts in which they occur (Welter, 2011; Zahra & Wright, 2011; Welter et al., 2016). As Baumol (1996) argues, the rules of entrepreneurship ‘have varied dramatically from one time and place to another’, making the spatiotemporal context of the entrepreneur an important consideration. Hence, a contextual view of entrepreneurship offers knowledge on the structures and mechanisms driving the process of new venture creation and venture performance (Low & MacMillan, 1998; Cope, 2005; Harrison & Leitch, 2005; Welter, 2011).

Contextual embeddedness presents a useful framework for exposing the concrete and unfolding ecology and their specifics, which enable entrepreneurs to identify, create and act on new venture ideas (Jack & Anderson, 2002). Moreover, contextual embeddedness has been described as a key moderator of success or failure in the entrepreneurial process (Garud et al., 2014). However, context, like similar concepts, is associated with multiple interpretations. Often, it is conceptualised as spatiotemporal circumstances external to the entrepreneur which influence new venture creation (Mowday & Sutton, 1993; Davidsson, 2015). It is also described as situational opportunities and constraints on behaviour (Johns, 2006). For this reason, Johns (1991) argues that it can be divided into substantive (context individuals or groups face) versus methodological (detailed information about the research study) contexts. In substantive terms, it is further subdivided into omnibus (broad) and discrete (specific) context dimensions. Hence, Chapter One opens with the specific context of the researcher and proceeds into the broader socio-economic and academic contexts of this research.

To offer clarity, Zahra and Wright (2011) present four dimensions for the examination of context in entrepreneurship research – spatial, temporal, social and institutional. Whereby, the spatial dimension of context refers to a physical setting or location of events or network of relationships; while the temporal dimension refers to the
sequence of events in relation to other events. Meanwhile, the social dimension refers to the network of relationships which develop among multiple groups and stakeholders in society (Welter, 2011). Finally, the institutional dimension considers the effects of various contexts, such as the characteristics of the external environment in which new ventures are created. To fully identify the influence of context on decision-making and action which drive venture performance, a relational perspective is recommended (Fletcher & Selden, 2016, p. 88). Taking a relational perspective allows researchers to more clearly identify how situational factors both enable and constrain decision making and action under uncertainty.

2.6 MECHANISMS OF DECISION-MAKING & ACTION UNDER UNCERTAINTY

External enablers and new venture ideas are inconsequential in the entrepreneurial process unless acted upon. Without action, the entrepreneurial process resides in the realms of conceptualisation (McMullen & Shepherd, 2006). Hence, new venture enactment forms the core of new venture creation. Enactment refers to acting out ideas, which in turn leads to feedback loops that result in adjustments to the original idea, as well as levels of opportunity confidence (Garud & Giuliani, 2013). As indicated above, the decision making that results in actions driving new venture performance are a function of the judgmental decisions which agents make in the face of uncertainty (Casson, 1982; Herbert & Link, 1988, p. 22). Hence, entrepreneurial decision-making is defined as the process of ‘choosing between alternative courses of action that take place in an uncertain future’ (McMullen & Shepherd, 2006, p. 134).

Milliken (1987, p. 136) describes uncertainty as ‘perceived inability to predict something accurately’ when making decisions. Alternatively, uncertainty is a sense of doubt that blocks or delays actions (Lipshitz & Strauss, 1997, p. 150). The ability to
interpret and respond to uncertainty is often a deciding factor in new venture performance (McKelvie, Haynie & Gustavsson, 2011). Also, uncertainty manifests in three forms - state, effect and response type (Milliken, 1987). State uncertainty is the inability to predict how the components of the environment are changing. This type of uncertainty appears to have attracted the bulk of scholarship, which is not the case with effect and response uncertainty. Effect uncertainty describes the inability to predict how environmental changes will influence new venture creation. Lastly, response uncertainty describes a lack of insight into response options against a changing environment, as well as the inability to predict the likely consequences of a chosen response.

According to McMullen and Shepherd (2006, p. 136), entrepreneurial action is the result of the amount of uncertainty perceived and the willingness to bear uncertainty. Further, an agent’s expertise serves to moderate the relationship between uncertainty and action in unexpected ways (Gustavsson, 2011). Surprisingly, expertise appears to moderate the relationship between uncertainty and action only in the case of effect uncertainty (McKelvie et al., 2011). Perhaps, expert entrepreneurs downplay the significance of predicting the future and focus more on creating it (Sarasvathy, 2001). Alternatively, they could be overconfident in their ability to deal with an uncertain future. Depending on the levels of perceived uncertainty, entrepreneurial agents may choose different approaches to new venture enactment.

2.6.1 Causal Mechanisms & Low Levels of Perceived Uncertainty

Choosing a causation logic to new venture creation is associated with traditional norms of the entrepreneurial process. With causal logic, an individual decides on predetermined goals and selects the means to achieve them (Sarasvathy, 2001). The outcome is believed to be given and entrepreneurs simply select a variety of means to
achieve it. The causation mechanism is, therefore, a linear process in which entrepreneurial volition results in gestational and planning activities (Baker, Miner & Easley, 2003, p.256). Thus, intentionality, objective opportunity identification and evaluation, planning and resource acquisition and the deliberate exploitation of the objective opportunity are its hallmarks (Fisher, 2012). Causation develops from decision theory which holds that decision makers dealing with a measurable or predictable future will systematically gather information and conduct analysis within certain bounds. The idea that the future is measurable or predictable stems from low levels of perceived uncertainty. Figure 2.5 is a diagram which visualises how a causal process mechanism unfolds.

**Figure 2.5 Causal Process of New Venture Creation**

![Diagram of Causal Process of New Venture Creation](image)


**Business Planning:** Delmar and Shane (2003b) found evidence which shows that a certain sequence of behaviours may be common in new ventures adopting a causation mechanism. Firstly, the entrepreneur writes a business plan followed by market research on customers. Following this, they make financial projections and establish a legal entity. After that, they proceed to obtain licenses and secure intellectual property. Finally, they seek finance, initiate marketing and acquire inputs. This sequence of events assume that the future is knowable or at least marked by low levels of uncertainty. It draws from
rational decision-making models derived from neoclassical economic thought. While Delmar and Shane (2003a) emphasise the value of such a causal approach, others particularly question the usefulness of business planning in the often uncertain and dynamic environments in which today’s ventures operate against (Blank & Dorf, 2012).

In defence of a written business plan and formal planning, Delmar and Shane argue that a business plan is useful for many reasons. Firstly, it represents an analytical tool for articulating the strengths, weaknesses, opportunities and threats to the new venture, as well as a gauge for the external environment. Secondly, it is a communication tool to aid external stakeholders such as lenders, investors and governmental agencies to understand the business. Thirdly, business plans may increase the entrepreneur’s commitment to the realisation of the new venture idea (Klofsten, 1994), as well as reduce the likelihood of the venture disbanding (Delmar & Shane, 2003a). Finally, it presents an action guide.

However, Davidsson (2012, p.99) summarises the following arguments against the business plan and blind use of a plan as a guide to action. Firstly, it may be less productive to spend time planning rather than acting. This view suggests that acting out new venture ideas is more important. Secondly, a focus on business plans may blind founders to emergent threats and opportunities along the way. Finally, commitment to business plans may lead to what psychologies describe as escalation-of-commitment (DeTienne, Shepherd & De Castro, 2008) – i.e., persisting on what is possibly a doomed plan, rather than staying flexible and responding to changing circumstances.

Accordingly, research by Brinckmann, Grichnik and Kapsa (2010) reveals that there was only a mild degree of success when new venture creation was planned for established small businesses, and less so for start-ups. This finding supports the argument
that perceived levels of uncertainty is a subjective experience which may not reflect reality. The future is simply unknown and unknowable (Sarasvathy et al., 2003; Foss & Klein, 2012), thereby making strict adherence to a business plan counterintuitive. While planning and writing a business plan may be useful, staying flexible and responsive might be even more important in today’s volatile, uncertain, complex and ambiguous business environments. Hence, emerging practitioner theories such as the Lean Start-up (discussed in Chapter 3) blame the failure of start-ups on the allure of a good business plan (Ries, 2011; Blank & Dorf, 2012).

**Gestational Behaviours:** Likewise, a number of gestational behaviours have typically been associated with causal and traditional assumptions of new venture enactment. Gartner and Carter (2003) found twenty-eight activities new start-up ventures usually undertake prior to or during the new venture creation process. However, Davidsson and Klockfsten (2003) distil these down to eight ‘cornerstones’ of business development. Firstly, there is initiation of the new venture idea. The idea captures how and for whom the new venture creates value; and how it captures some for itself to remain sustainable or profitable. Hence, the business idea is operationalised as a business model. The value creation emphasis of the business model is a subject undertaken by multiple researchers (Amit & Zott, 2001; Alvarez & Barney, 2004; Osterwalder & Pigneur, 2010).

Secondly, the value proposition needs to be translated into an attractive new market offering, defined as a product or service. Products and services need to be produced or developed. Thirdly, a market is defined in terms of geographic or demographic characteristics. However, if the product or service is innovative, the market may have to be created before it can be defined (Sarasvathy, 2001). Fourth, an organisation or legal entity is established which coordinates purchasing, financing,
production, marketing and distribution. Some scholars argue that organisational creation is a core outcome of the entrepreneurial process (Gartner, 1988; Gartner & Carter, 2003). Further, the setting up of a limited liability company has been associated with growth firms, as opposed to lifestyle businesses. However, Wiklund et al. (2011) argue that organisational creation is not a necessary outcome of entrepreneurship. Fifth, in keeping with the resource-based view (RBV) of the firm (Penrose, 1959; Barney, 1991), core group expertise and founder's prior knowledge which are valuable and hard to imitate are considered critical elements for success (Delmar & Shane, 2006; Shane 2000).

Sixth, the entrepreneurs leading the venture must be committed to the new venture. As Baum and Locke (2004) illustrate, tenacity and passion remain key drivers of long-term performance. Seventh, the achievement of first sales and building of trust is equally an essential early activity for new ventures. To this end, Bhave (1994) observes that most of the entrepreneurs in his study had their initial customers lined up prior to product creation. Finally, other important relations must be established with suppliers, investors or governmental agencies. To support this view, Davidsson and Honig (2003) demonstrated that social capital and growing one’s own business network is an important ingredient in the progress of new ventures in a start-up context.

However, Klofsten (1994) maintains that the key is to achieve a minimum acceptable level on all eight cornerstones as opposed to simply excelling at a few. While these cornerstones may be generic to most new ventures, some of them appear typical of a causation logic. For instance, the business idea is assumed to be static and does not change over time. Secondly, market definition assumes that the market can be fully known in advance. Furthermore, the product or service is assumed to be predefined throughout the process. However, as studies by Liao et al. (2005, p. 13) reveal, ‘firm
gestation is a complex process that includes more than simple, unitary progressive paths’; and involves ‘a process where developmental stages are hardly identifiable’. In sum, causal reasoning is adopted under circumstances marked by low levels of perceived uncertainty (Shah & Tripsas, 2007; Fisher, 2012). Therefore, dynamic theories of new venture creation are needed to explain decision making and action under conditions marked by high levels of perceived uncertainty. Hence, theories such as effectuation (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005) have gained prominence as alternatives to a traditional causation approach.

2.6.2 Effectual Mechanisms & High Levels of Perceived Uncertainty

Sarasvathy (2001, 2008) offers an effectual approach as an alternative process mechanism to causation (Eisenhardt, Kotha, Meyer & Rajagopalan, 2010). By contrasting a causal approach against an effectual approach, Sarasvathy (2001) argues that effectual entrepreneurs begin with given means, and focus on selecting possible effects that can be created with them. Effectuation is therefore unlike a causation process which defines an objective clearly and then systematically searches for opportunities within developed industries that meet the objectives (Fiet, 2002; Herron & Sapienza, 1992). Figure 2.6 below describes an effectual process in new venture creation.

Figure 2.6 The Effectuation Process

Source: Sarasvathy (2001; 2008)
According to effectual logic, the entrepreneur’s available means dictates the possible effects that can be created (Sarasvathy, 2001). As such, effectuators start with available means, such as who they are, what they have and whom they know – in a principle referred to as the *bird-in-hand principle*. Unlike causal entrepreneurs, effectual entrepreneurs also adopt an *affordable loss* mindset as opposed to expected returns. This principle has also been described as a ‘risk little, fail cheap’ strategy. Meanwhile, the *lemonade principle* holds that effectual entrepreneurs leverage contingencies and take advantage of surprises along the way, rather than viewing them as misfortune. To further reduce uncertainty and lower risk, effectuators form partnerships with self-selecting actors who bring new means and expand the range of possibilities that shape process - known as the *crazy quilt principle*. Thus, unlike a causal approach, effectual logic advocates focusing on strategic alliances rather than competitive analysis, adapting to changing circumstances rather than sticking to business plans; and controlling the future rather than trying to predict it. By focusing on activities within their control, effectual entrepreneurs know their actions will produce desired outcomes – *pilot in the plane principle*.

In a validation study, Chandler et al. (2011) illustrate that effectuation is a formative multidimensional construct associated with three sub-dimensions – experimentation, affordable loss and flexibility. They also found that unlike causation, effectuation positively correlates with situations of high uncertainty. Additionally, they recommend that entrepreneurs and firms develop devices which allow them to create, as well as remain responsive to environmental cues (Dew & Sarasvathy, 2001). Equally, Chandler et al., highlight pre-commitments, as being a dimension shared by causal and effectual logic. In another study, Furr (2009) found an effectual approach to be more consistent with a series of small changes through iterative incrementalism.
2.6.3 Criticisms of Effectuation Theory

While effectuation has been cast as a viable alternative to causal entrepreneurial decision-making theories, it has recently come under intense criticism. Arend, Sarooghi and Burkemper (2015) - henceforth ASB – criticise the theoretical basis of effectual claims and suggest ways in which it might be developed. Their criticisms are based on Dubin’s (1969) theory evaluation methodology (3E - Experience, Explain & Establish), in conjunction with other critical literature on effectuation. While other criticisms of effectuation exist, the one by ASB synthesises them adequately.

ASB align with Chiles, Bluedorn and Gupta (2007, 2008) to argue that effectuation is under-defined and unoriginal. The lack of originality stems from the fact that it does not acknowledge prior literature such as the process-driven approach to understanding entrepreneurial activity (Aldrich, 2001; Aldrich & Martinez, 2001; Low & MacMillan, 1988); Mintzberg’s (1979) emergent strategy construct, and strategy in non-predictive circumstances by Lachmann (1976); as well as bricolage (Baker, Miner & Easley, 2003), improvisation (Miner, Basso & Moorman, 2001) and an experimentation process (Ries, 2011; Blank & Dorf, 2012). In a similar argument, the affordable loss principle equally attracts criticism, since mitigating downsides in volatile environments is not a new concept. Following these arguments, the blunt message is that effectuation is nothing more than intellectual theft of pre-existing theories, with its own significant deficiencies.

In furthering their criticisms, ASB also state that effectuation lacks comprehensiveness because contextual competition and other important industry forces are not accounted for. They also argue that there is an unjustified optimism in the abilities of the entrepreneur to control the future. For instance, they state that effectuation
underspecifies rivalry, which in uncertain contexts, might be the only thing an entrepreneur relies on to surpass the competition. Further, they criticise it for having no stable states, as it involves a dynamic process occurring within uncertain and changing conditions. Furthermore, while taking aim at the effectual concept of non-predictive control of the future, they argue that having control implies being able to predict the actions of the initiated outcomes under control. Likewise, they argue that effectual logic is tenuous. The literature on the entrepreneurial context (Welter, 2011; Zahra & Wright, 2011; Welter, Gartner & Wright, 2016) suggests that ASB is correct in suggesting that effectuation does not value the influence context might exert over the new venture creation process. This would suggest that the *External Enabler* (EE) construct explored above, and the theory of external enablement (Davidsson et al., 2018) could help complement effectuation theory.

Further, the means-driven perspective of effectuation is also called into question by ASB, who find it unnecessarily restrictive, if not inaccurate, for the reason that creative aspects of means-driven action are not considered. Their interpretation is that if an entrepreneur’s path is only based on available means, where does that leave options such as trying to gain access to greater means beforehand? Additionally, they criticise effectuation as lacking a core part of the new value creation aspect because the sources of value creation are not specified but are assumed to be arising from the imagination of the entrepreneur. Traditional value creation, they argue, arises from innovation, arbitrage, first-mover advantage and improved offerings (Barringer & Ireland, 2009).

Finally, ASB take aim at the idea that artifact success, assumed as an outcome of effectuation is lacking an explanation. They posit that the only way entrepreneurial activity can sustain is if outcomes possess a defendable advantage over existing offerings.
such as a differentiated product, cost advantage or both (Porter, 1980). Most of the arguments against effectuation draw from the mature sister discipline of Strategic Management. It can best be framed within the broader question - What makes entrepreneurship unique? (Bygrave, 1989; Low, 2001). Arguably, effectuation theory has been seen as a significant contribution by the entrepreneurship discipline to the broader academic community. However, the underlying message from ASB and others is that it is nothing more than a ‘plagiarism’ of existing theories with tenuous foundations – and by implication, the discipline of entrepreneurship still lacks a clear identity or theoretical contribution to other management disciplines. For this reason, the ASB arguments have ignited a strong counter-response in defence of effectuation theory and the basis of the entrepreneurship discipline.

2.6.4 Defending Effectuation Theory

Read, Sarasvathy, Dew and Wiltbank (2015, 2016) - henceforth RSDW - begin with a counter-criticism based on how effectuation was theoretically evaluated. They contend that ASB used Dubin’s positivist theory evaluation technique to critique a pragmatist theory, thereby making their criticisms a straw man argument. They state that positivist notions of falsifiability and theory-testing which assume a world with stable states are fundamentally different from effectual logic, which adopts a pragmatist stance of seeing the world as in-the-making and makeable through human action. Several scholars concur with this argument by stating that effectuation is process theory which ASB wrongly evaluated with a variance approach based on positivism (Gupta, Chiles & McMullen, 2016). For instance, Garud and Gehman (2016) side with this argument by adding that the 3E evaluation technique used to criticise effectuation theory is more suited to phenomena with assumptions of linearity. Thus, 3E is a poor instrument for evaluating
process theories based on complex, pragmatic phenomena such as the entrepreneurial process.

Therefore, most assumptions against effectuation are either not assumptions at all, false and/or represent a misconstrual of effectual decision-making logic (Sarasvathy & Dew, 2005). Further, RSDW (2016) argue that by using a positivist approach, it steers ASB to review only a small piece of the literature on effectuation, omitting 77% relevant published works. Indeed, by ignoring a sizeable chunk of the literature, RSDW (2016) contend that ASB have ignored a rising tide that seeks to move the field of entrepreneurship beyond the positivist perspective; to one where only an immersive and high performing experience in entrepreneurship may lead one to believe in a different worldview. They further argue that ‘effectuation is most useful where traditional notions of optimality and bias break down or simply do not apply’. Through the following two questions, RSDW point out a major difference between a positivist versus pragmatist stance: Is effectuation true? (Positivist research question) versus Is effectuation useful? (Pragmatist research question). To a pragmatist, the first question is irrelevant.

RSDW (2016) however, agree that scholarly work on effectuation is still incomplete, inconsistent in certain respects, and far from obvious in application. In keeping with ASB’s suggestion, they argue that critical reflection can point to productive empirical research opportunities and theory improvement. RSDW equally highlight a number of areas where effectuation would benefit from additional research. Firstly, research is needed to clarify the concept of effectual control, and avoid confounding control as strategy and control as an outcome. Secondly, research is needed to specify the unit of deliberate practice in developing entrepreneurial expertise, which Baron (2009) has also alluded to. Thirdly, research could focus on the transitioning from effectual to causal approaches and vice-versa, since Sarasvathy (2001, 2008) had noted that 63% of
effectual entrepreneurs used effectuation principles more than 75% of the time - implying they also mixed other approaches with effectuation. Fourth, it is necessary to understand goal hierarchy and pre-commitment, since the effectual process enables experiential learning, and is driven by ‘high-level goals that get shaped and embodied into workable business models and opportunities through pre-commitments and self-selected stakeholders’ (Sarasvathy & Dew, 2005; RSDW, 2016). Fifth, delineating means and firm resources is needed in research (Barney, 1991; Barney, 2001), particularly what counts as means, and how means transform into resources should be differentiated. Finally, exploring equity and co-creation (Breugst, Patzelt & Rathgeber, 2015), as well as endogenising selection mechanisms, is a necessary step, since self-selected stakeholders in the effectuation process can substitute for an exogenous market as the primary selection mechanism.

Thus, in line with effectual reasoning, effectuation theory is still in the making and could use further theory development in different contexts. This view is supported by Perry, Chandler and Markova (2011) who posit that effectuation is moving to an intermediate state, requiring the development and testing of suggestive models. Perhaps, the combination of bricolage and effectuation, may provide a comprehensive explanation of decision making and action under conditions of uncertainty.

2.6.5 Bricolage Mechanisms & High Levels of Perceived Uncertainty

Bricolage is premised on the argument that new ventures are often resource-constrained and therefore need to find clever and frugal ways of getting ahead (Baker & Nelson, 2005; Garud & Karnoe, 2003). The bricolage approach to navigating penurious environments is closely related to the concept of financial bootstrapping (Winborg & Landstrom, 2001). It generally refers to resourcefulness in the ways in which
entrepreneurs get ahead without a substantial financial expense. Further, bricolage has the added benefit of being hard to replicate by large potential competitors. Baker and Nelson further explain that bricolage consists of three elements – *making do* (i.e., finding workable rather than perfect solutions), use of *resources at hand* (involves seeing value in something others would miss) and *re-combination of resources for new purposes* (reimagining new uses for things around). As such, it represents a flexible and experimental approach to new venture creation under conditions of high perceived uncertainty (Fisher, 2012). Figure 2.7 subsequently encapsulates the bricolage process.

**Figure 2.7 Process of Entrepreneurial Bricolage**

![Figure 2.7 Process of Entrepreneurial Bricolage](image)

*Source: Baker & Nelson, 2005*

Bricolage has been positively correlated with innovativeness in start-ups with limited resources (Senyard, Baker, Davidsson, 2011). While its actionable mechanisms may be deemed resourceful, Baker and Nelson caution that if over-used, bricolage may become a stumbling block to the development of a new venture. As such, bricolage, like effectuation, is not offered as a universal theory of the entrepreneurial process. Hence, it can be combined with other process theories to elucidate the actionable mechanisms that drive new venture enactment under uncertainty.
2.6.6 Bricolage & Effectuation – How they Interrelate

At the core, bricolage and effectuation are united by a shared focus on existing resources as a source of opportunity, action as a way of overcoming resource constraints, community engagement and resource constraints as a source of scarcity (Fisher, 2012). Thus, both theories extol the virtues of flexibility and experimentation, which is fundamental to the uncertain process of entrepreneurial emergence (Chandler, DeTienne, McKelvie & Mumford, 2011; Kerr, Nanda & Rhodes, 2014; Manso 2016). Thus, effectuation and bricolage theories deviate from rational goal-driven decision-making theories as consistent with causal reasoning with its roots in neoclassical economics.

Fisher (2012) identifies four dimensions which are shared by effectuation and bricolage models of decision making. Firstly, they all assume that existing resources serve as a source of entrepreneurial opportunity. Secondly, taking action is a mechanism for overcoming resource constraints. Thirdly, community is a catalyst for new venture emergence and growth. Finally, resource constraints are a source of creative innovation. Fisher, however, points out that when effectuation and bricolage are described as processes of new venture creation, it becomes difficult for a wider audience to both understand and interpret the essence of these theories. When they are conceptualised as a series of behavioural mechanisms, their value is better appreciated in the new venture creation process.

As findings originating from the field of behavioural economics suggest, human beings are not as rational as previously thought (Kahneman, 2011). Thus, effectuation and bricolage present alternatives to explaining actionable mechanisms of the entrepreneurial process as opposed to a popularised goal-driven, causal and linear approach. Notably, the bird-in-hand principle of effectuation may very well be a classic
demonstration of the ‘endowment effect’ (Kahneman, Knetsch & Thaler, 1991). The endowment effect attributes more value to what is already owned, as opposed to imagined future profits or resources. Perhaps it partly informs the stance of effectuation and bricolage based on starting and developing new ventures from means already owned.

2.6.7 Hypotheses on Decision Making Influences

To gain a comprehensive insight into the factors affecting decision making and action under uncertainty, Davidsson (2012) provides a four-dimensional hypothesis. It is based on characteristics of the new venture idea, characteristics of the environment, the stage or phase of development of the venture and characteristics of the entrepreneur.

**New Venture Idea & Cost/Value Structure:** Depending on the new venture’s potential for incremental and experimental exploitation (determined by the cost of development versus value for the buyer), decision-making, and action may follow particular patterns. Firstly, when the product is costly to produce and each unit has high value to the buyer, the entrepreneur may follow a more causal approach. In addition, high value to the buyer suggests room for strategic alliances; thus making it possible for small actors to play a vital role. Secondly, some new venture ideas are difficult to exploit with small funds and an incremental strategy. Under these circumstances, huge upfront costs are needed to produce the first unit, yet value to the customer is low. Such new venture ideas will often be undertaken by large corporations or investors. They leave little room for an effectual or experimental approach. Thirdly, when the new venture idea is economical to realise and the value per unit is low, producers and customers can afford to experiment. This situation, according to Davidsson, is the best space for independent start-ups to use an incremental strategy, given that risk levels are acceptable and the possibility for profit exists. The fourth category is that a new venture idea with low cost
of realisation makes room for incremental strategies. It could be an idea based on specialised knowledge, with high value to the customer. The problem with this quadrant is that an established firm’s presence might make it difficult for new entrants. The second problem is that given the potential for high margins, a small actor approaching the market incrementally might easily be overrun by a larger later entrant.

**New Venture Idea & Degree of Uncertainty:** Another characteristic of the new venture idea is based on the level of uncertainty surrounding the opportunity. Sarasvathy et al. (2003) identify three types of opportunity. Firstly, opportunity recognition with low uncertainty is one where supply and demand are apparent. Next, opportunity discovery with medium uncertainty is described as a situation where one side of either demand or supply is evident. For instance, the applications of new digital technologies with unknown demand may present medium levels of uncertainty. Finally, opportunity creation with the highest uncertainty is one in which demand or supply is not obvious. An example would be in radical innovations which create new markets. This echoes Knight’s (1921) assertion that uncertainty arises from the level of novelty involved in the new venture idea. Under high levels of uncertainty, the entrepreneurial process may lend itself to experimentation. Likewise, cognitive psychological research on expertise suggests that analytical rationality only functions best in situations of low uncertainty (Gustafsson, 2006).

**Characteristics of the Environment:** The literature on dynamic capabilities (Teece, 2012) suggests that improvisation and trial-and-error learning are recommended in turbulent environments (Zahra, Sapienza & Davidsson, 2006). However, depending on the stage of industry and new venture development, causal and flexible approaches might be needed less or more. As the level of uncertainty decreases due to knowledge acquired
in the new venture process, there may be less need for incremental experimentation and more of causal approaches.

**Characteristics of the Individual:** The individual behind the new venture idea is also a factor determining what kind of process is adopted. Research has highlighted the need for a fit between the entrepreneur and the new venture idea. It could, therefore, be assumed that new venture creation processes will align with the type of idea and entrepreneur. Davidsson (2012) notes that while some individuals thrive on chaos, others prefer a systematic, planned approach. Thus, although a particular approach may be recommended under certain circumstances, individual motivation influences decision-making.

The hypotheses suggest that multiple aspects of the new venture creation process need to be analysed to arrive at a comprehensive understanding of the mechanisms that drive decision-making, which in turn shape actions and venture performance.

### 2.7 ENTREPRENEURIAL EXIT & STRATEGIES

Decision making and action under uncertainty leads to outcomes at different stages of the entrepreneurial process. Outcomes at intermediate stages are ‘continual adjustments’ actors make (Garud & Giuliani, 2013) towards an outcome of the entrepreneurial journey (McMullen & Dimov, 2013). Ideally, early stages of the entrepreneurial process ‘ends’ with the validation of a scalable, repeatable business model and new market offering (Ries, 2011; Blank & Dorf, 2013). However, focal agents leading the process may choose to exit it for one reason or the other. Hence, DeTienne (2010) argues that knowledge of the entrepreneurial process is incomplete without knowledge of entrepreneurial exit.
Exit: DeTienne (2010, p. 204) goes on to define entrepreneurial exit as ‘the process by which the founders of privately held firms leave the firm they helped to create; thereby removing themselves, in varying degree, from the primary ownership and decision-making structure of the firm’. Indeed, with the realisation that entrepreneurial exit can occur when ventures are in financial distress, as well as under conditions of good financial performance, exit is not the same thing as entrepreneurial failure or success (Wennberg, Wiklund, DeTienne & Cardon, 2010). Equity and psychological ownership affect the decision to exit. Exit is considered a liquidity event which allows entrepreneurs to take advantage of and engage in other opportunities. However, taking the dimension of exit as a process, the context of exit will vary at different phases of the entrepreneurial process (Wennberg & DeTienne, 2014). Thus, like most concepts in entrepreneurship, entrepreneurial exit is a multifaceted subject matter.

Exit Strategies: To offer some clarity, DeTienne, McKelvie and Chandler (2015) build on prior literature to develop a typology of entrepreneurial exit strategies which includes three higher-level exit categories – financial harvest (Mason & Harrison, 2006), stewardship and voluntary cessation. These typologies are further tied to the entrepreneur’s perceived innovativeness of their opportunity, motivations, decision-making approach, founding team and firm size. Financial harvest strategies such as IPO (Initial Public Offering) or acquisitions by another firm resulting in substantial value accrue to the entrepreneur (Cumming, 2008). Meanwhile, stewardship strategies such as family succession, employee buyout or sale to an individual, allow founders to influence the long-term viability of the organisation (Zellweger and Astrachan, 2008). Finally, voluntary cessation strategies such as liquidation and discontinuance allow founders to disband a venture when the main activity ends or changes, or when the firm fulfils the purpose for which it was formed (Harhoff, Stahl & Woywode, 1998).
In linking exit strategies to founder characteristics and motivation, DeTienne and Cardon (2012) found that entrepreneurial experience positively correlates to IPO and acquisition, but negatively correlates to independent sale and liquidation intentions. Further, entrepreneurial education positively correlates to IPO and acquisition intentions but negatively related to family succession. However, Fauchart and Gruber (2011) caution that there was too much variance in entrepreneurial motivation and characteristics to accurately decipher the reasons behind individual exit strategies. Nevertheless, Shepherd and DeTienne (2005) suggest that entrepreneurs who saw financial rewards as primary motivation were more likely to seek opportunities which provide financial harvest exits.

Exit strategies also vary depending on the characteristics of the venture and its founding decisions. Kunkel (2001) distinguishes between low and high growth ventures. Within the low growth category, a further distinction between income substitution, income supplementing and lifestyle firms are identified. Low growth firms are more likely to be small, owned and managed by a self-employed individual and are likely to close down once the need for which they were created had been achieved. For this reason, voluntary cessation is less likely to be formalised. Meanwhile, financial harvest exit strategies were often correlated with firms that had larger founding teams, (Poulsen and Stegemoller, 2008), higher levels of innovation (Cefis & Marsili, 2012) and planning-based approaches in general. By contrast, stewardship exit strategies often correlated with smaller founding teams due to a desire for autonomy and a strong locus of control. Such firms were less likely to have formalised exit strategies. Wennberg and DeTienne (2014) encapsulate entrepreneurial exit at the individual and firm level with the following framework – see Figure 2.8.
The above explored entrepreneurial exit literature helps to indicate possible areas where outcomes of the early stages or lower hierarchies of the entrepreneurial process (Sleden & Fletcher, 2015) may be delineated. With exit, adjustments and scalable business model validation suggesting areas that may mark ‘end phases’ for this study (Van de Ven, 1992), the building blocks for a conceptual process model may be assembled.

2.8 Extant Models of New Venture Creation

To develop a conceptual model, a review of extant models is essential. Moroz and Hindle (2012) have conducted a comprehensive review of over 32 process models of new venture creation in entrepreneurship. Following Phan (2004) and Van de Ven (1992), they taxonomise these models as – stage models, static frameworks, process dynamics models and quantification sequences. Using these premises, they find that a majority of entrepreneurial process models are static frameworks that do not capture sequence of dynamics. Further, they found that stage models are quite fragmented. For this reason,
only four process models are seen as converging on conceptualising the entrepreneurial process as being both generic and distinct. Hence, Moroz and Hindle echo criticisms of entrepreneurial process models by Van de Ven and Engleman (2004) as lacking in a fundamental understanding of what process theory development entails – a problem possibly attributed to the overwhelming adoption of a variance approach (Mohr, 1982) to research as opposed to a process approach to theory development.

2.8.1 Criticisms of Extant Process Models – Good, Bad & Ugly

Beginning with Gartner’s (1985) model, Moroz and Hindle lauded its simplicity but were critical of its inability to successfully incorporate a temporality and innovation dimension. Gartner’s model is further criticised for its limited focus on outcomes as profits. Meanwhile, Bruyat and Julien’s (2000) model of the entrepreneurial process does address the issue of temporality but it appears too simplistic and only partially accounts for innovation. Next, the dynamic model of effectuation (explored above) was credited for having a direct practical focus. Finally, Shane’s (2003, p. 18) model of the entrepreneurial process, around which the individual-opportunity nexus revolves, was described as being an opportunity driven means-ends framework.

Based on their review, Moroz and Hindle (2012, p. 811) arrive at six good points of convergence. First, the relationship between individuals and opportunities is crucial in all models. Second, the need to critically assess the transformative and disruptive value of knowledge is both explicit and implicit in every model. Third, there is a shared emphasis on the entrepreneurial process having an evaluation of ways to create value for stakeholders through creating new business models. Fourth, time matters in entrepreneurship, making a temporal dimension of the process important. Fifth, action matters - without action, formulating and evaluating a new venture idea remains mostly
theoretical. The sixth and final good observation is that the socio-spatial and spatiotemporal dimensions of context (discussed above) are just as important.

However, Moroz and Hindle (p. 811) offer several criticisms ranging from ‘bad, worse and ugly’. With relation to bad, no model seems to accommodate multiple perspectives. Instead, each model compels its users to adhere a priori to a prescribed philosophical perspective. None of the models synthesises multiple viewpoints into a cumulative and pragmatic whole. To make matters worse, a majority of them are simply artifacts unsupported by systematic evidence. For this reason, Moroz and Hindle (2012, p. 811) arrive at the conclusion that ‘the field of entrepreneurship needs a new, comprehensive, evidence-based model of the entrepreneurial process that is consistent with a strong theoretical and philosophical appreciation of process’. They are unequivocal in their criticism that, ‘for all superficial use of the phrase entrepreneurial process all we really have to date is a hodgepodge of different perspectives, using a variety of different multidisciplinary theories that investigate entrepreneurship in narrowly themed contexts’ (p. 810).

What is suggested by these criticisms is that the development of a harmonising model of the entrepreneurial process hinges on an inclusive pragmatist stance. A pragmatist stance is paradigm agnostic and considers truth to be that which is useful. As such, it values concepts that support action in more concrete terms, as opposed to abstract philosophical debates that increasingly become aloof from the phenomenon under study (Peirce, 1955; Bygrave, 2007; Berglund & Wennberg, 2016; Read et al., 2016). To arrive at a comprehensive process model of new venture creation, Moroz and Hindle suggest following some of the methodologic guidelines proposed by Van de Ven (2007).
2.8.2 Process Model Development & Methodological Considerations

One reason Moroz and Hindle criticise entrepreneurial process models stems from the methodologies used to develop these models. Mohr (1982) identifies two theories of change that have generally been used to develop process models in entrepreneurship – a variance and process theory approach, represented by Figure 9 subsequently. A variance approach is based on static connections of variables, while a process theory approach uses a narrative method which describes how things develop and change. According to Langley (1999), variance models deliver simplistic, potentially high generality and modest accuracy of results. Similarly, a variance approach, with its deterministic approach to causation is described as a limited way to conceptualise change and development.

*Figure 2.9 Contrasting Process & Variance Theory Development*

<table>
<thead>
<tr>
<th>Variance theory</th>
<th>Process theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining strategic change with a variance model</td>
<td>Explaining strategic change with a process model</td>
</tr>
<tr>
<td>Attributes of • environment • leadership • decision processes • performance $Y = f(x_1, \ldots, x_n)$</td>
<td>Extent of strategic change</td>
</tr>
<tr>
<td>$Y$</td>
<td>Strategy 1</td>
</tr>
<tr>
<td>$t_0$</td>
<td>Strategy 2</td>
</tr>
<tr>
<td>$t_n$</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Mohr (1982)*

However, it appears to have informed the development of most models of the entrepreneurial process, thereby attracting the above-discussed criticisms. Meanwhile, process theory methods can reach high accuracy and sophistication, but potentially lower generality of results. Van de Ven and Engleman (2004) contend that variance theory remains ‘causally shallow’, thereby making a temporal sequence of events a critical consideration in process theorising. Hence, process theory development follows six core
tenets (Poole, Van de Ven, Dooley & Holmes, 2000; Van de Ven, 2007) – expatiated in Chapter 5.

Taking these guidelines into consideration, key building blocks for a process model are selected from the literature to develop a model of new venture creation. The model serves as an underlying analytical framework around which the narrative of the entrepreneurial process can be organised.

2.9 PROCESS MODEL DEVELOPMENT OF NEW VENTURE CREATION

The challenge with developing a process model of new venture creation is that it has to combine parsimony and comprehensiveness (Moroz & Hindle, 2012). Accordingly, this research identifies essential building blocks for a process model of the entrepreneurial process based on the above literature review – see Table 2.2 subsequently.

**Building Blocks:** Three broad categories are developed which form the building blocks of the model – enabling factors, process and outcomes. *Enabling factors* are the agentic and non-agentic inputs with their related mechanisms that play a key role in driving the process. Meanwhile, *process* refers to central subjects and critical events that occur in the realisation of the value proposition, which defines the new venture idea. Finally, a number of *outcomes* are identified. Since entrepreneurship is a nonlinear process involving several feedback loops, *adjustments* are the outcomes which continuously happen along the journey. At end phases, outcomes are *new market offerings* embodied in product and services offered to customers and end users. Finally, exit refers to the potential departure of focal agents that may give the process new meaning or result in venture disbanding. Table 2 sums up the main process model building blocks.
## Table 2.2 Process Model Building Blocks

<table>
<thead>
<tr>
<th>ENABLING FACTORS</th>
<th>Definition</th>
<th>Mechanisms</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Enablers</strong></td>
<td>distinct actor-independent <em>external stimuli</em> that elicit a response from human agents (Davidsson 2015); key macro-level influences on process</td>
<td>compression, conservation, resource expansion, resource substitution, combination, generation, uncertainty reduction, legitimization (von Briël <em>et al.</em> 2017)</td>
<td>triggering, shaping process, outcome-enhancing/driving success</td>
</tr>
<tr>
<td><strong>Focal Agent(s)</strong></td>
<td>leading human agent(s) whose role is critical in driving process (McMullen &amp; Shepherd 2006); key micro-level influences on process</td>
<td>relevant cognition, motivation, decision making, effort, prior knowledge, skills, resources, means, network, behaviours</td>
<td>initiating, evaluating, enacting and shaping process, bearing uncertainty, leading</td>
</tr>
<tr>
<td><strong>Collaborating Agents</strong></td>
<td>individuals who enter or self-select into the process (Sarasvathy, 2001); micro-level influences on process</td>
<td>new means, skills, cognition, prior knowledge, motivation, effort</td>
<td>co-creating, idea adjustments, shaping, influencing venture success, leading specific tasks</td>
</tr>
</tbody>
</table>

### PROCESS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Definition</th>
<th>Key Events</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Venture Idea</strong></td>
<td>conceptual envisioning of a future market offering, business model and/or new organisation (Davidsson 2015)</td>
<td>initiation, conceptualisation and adjustments</td>
</tr>
<tr>
<td><strong>Opportunity Confidence</strong></td>
<td>evaluation that determines high-level favourability of pursuing new venture idea; articulates a business model (Amit &amp; Zott, 2001; Davidsson 2015)</td>
<td>idea evaluation, re-evaluation and adjustments</td>
</tr>
<tr>
<td><strong>New Venture Enactment</strong></td>
<td>a series of actions and gestational behaviours central to realising the new venture idea</td>
<td>market offering development &amp; related gestational activities</td>
</tr>
</tbody>
</table>

### OUTCOMES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adjustments</strong></td>
<td>continual adjustments coming from new knowledge in the process and the new means agents bring to the process (Sarasvathy, 2001; Garud &amp; Giuliani, 2013)</td>
<td>an iterative process of major or minor adjustments to idea, processes, offerings or business model</td>
</tr>
<tr>
<td><strong>New Market Offering</strong></td>
<td>products and services offered to users and customers, underpinned by a business model</td>
<td>usable offering as all or part of the value proposition</td>
</tr>
<tr>
<td><strong>Exit</strong></td>
<td>potential departure of focal agent(s) with or without venture disbanding</td>
<td>strategies are harvest, voluntary session and stewardship</td>
</tr>
</tbody>
</table>

*Source: Developed by the researcher using core constructs from Davidsson (2015)*

**Process Model:** From the vital building blocks, this chapter develops the following process model that depicts new venture creation – see Figure 2.10. Firstly, the model demarcates the area of analytical interest as being the lower hierarchy of new
venture creation (Selden & Fletcher, 2015). At the upper hierarchy, the venture has emerged and is beyond the scope of this research.

*Figure 2. Conceptual Model of New Venture Creation*

Secondly, it uses main constructs from Davidsson (2015) as crucial building blocks. The rationale for this choice stems from the need to enable the creation of a pragmatic process model while eschewing ontological quandaries of ‘opportunity discovery’ versus ‘opportunity creation’. External enablers, focal and collaborating agents are targets for examining the mechanisms that drive new venture creation in this research.

Meanwhile, the process initially follows in the order of new venture idea, opportunity confidence, enactment and outcomes. Enactment results in three types of outcomes – adjustments, new market offerings and a potential exit of focal agents. Adjustments are changes made to the original idea and value proposition based on new knowledge gained through enactment and customer or user feedback.
2.10 DISCUSSION & CONCLUSION

This chapter began by tracing the evolution of entrepreneurial thought, while highlighting developments which have led to current debates in the entrepreneurship discipline. It has illustrated that different economic climates have helped to shape contemporary entrepreneurship thought. The chapter has also discussed the distinctive domain of entrepreneurship as centring on an individual-opportunity nexus, with the pursuit of opportunity as its processual focus. It has illustrated that opportunity is a key construct in entrepreneurship that has proven to be controversial and difficult to unpack. Consequently, the rest of the chapter develops along Davidsson’s (2015) seminal work on re-conceptualising the opportunity construct and the entrepreneurship nexus. His deconstruction of the opportunity construct into the sub-constructs of new venture idea, external enablers and opportunity confidence has the benefit of eschewing the contentious paradigmatic debates. It focuses research on the phenomenon (Wiklund et al., 2011), with practical value. Accordingly, a traditional entrepreneurial process is defined as a process of new venture creation. In this process, external enablers are the sources of non-agentic mechanisms which have a role in driving the process of new venture emergence at a macro level of analysis. Meanwhile, entrepreneurial agents (focal & collaborative agents) provide the micro-level mechanisms that drive new venture creation and performance. The interrelationship between external enablers and entrepreneurial agency has been identified as a key knowledge gap. As Davidsson et al. (2017) point out,

…to reach deeper in theorising we need further insights into and conceptualisation of how enablers interrelate with each other, with other circumstances, and with agents in producing derived enabling mechanisms, as well as how enabling mechanisms combine in contributing to venture creation success. (p. 3)

This highlighted gap is partly the focus of this research, which seeks to identify and offer possible explanations for the mechanisms which explain how the entrepreneurial process develops in a digital entrepreneurial context. As a departure point
in this endeavour, this chapter has developed a process model from the literature that functions as an analytical tool for constructing the narrative of an entrepreneurial process. It serves as an instrument for comparing established assumptions of entrepreneurship with digital entrepreneurship in the next chapter. Consequently, the next chapter explores the digital entrepreneurial process literature with a focus on the differences compared to established notions of entrepreneurship and the mechanisms driving it.
3 \textit{Chapter Three. The Digital Entrepreneurial Process}
3.1 **INTRODUCTION**

This chapter extends the previous by focusing on key concepts, constructs and theories which identify the structures and mechanisms driving the digital entrepreneurial process. As the introductory chapter has hinted, digital entrepreneurship is a unique form of entrepreneurship under investigation in this study. Its uniqueness derives from its distinctive technological basis. Consequently, this chapter explores the key constructs of digitisation and digitalisation, as well as their implications for new venture creation. As the literature indicates, virtually all forms of entrepreneurship in the digital age are digitally enabled to some degree. Hence, there are challenges regarding the separation of digital entrepreneurship from other digitally enabled forms of entrepreneurship. However, attention is given to the distinctiveness of pure digital entrepreneurship (PDE) as an interesting, worthy subject matter, of particular relevance to the case in this research. In sum, digitised new venture ideas and market offerings are identified as critical sources of difference between digital and traditional assumptions of entrepreneurship. The reasoning being, they prompt distinctive behaviours arising from unique mechanisms which drive digital new venture creation. The chapter concludes by combining insights from the previous chapter with findings in the current chapter, to arrive at a comprehensive analytic process model. The model organises the categorisation of mechanisms which are assumed to shape the process of digital new venture emergence at various stages.

3.2 **DIGITAL ENTREPRENEURSHIP – EVOLUTION & DEFINITION**

Beginning with the evolution of digital entrepreneurship as a subject of scholarly interest is a foundational approach in contextualising the literature in this chapter. Consistent with the ‘potpourri’ nature of the entrepreneurship discipline (Low, 2001), digital entrepreneurship lies at the nexus between the Entrepreneurship and Management
of Information Systems (MIS) disciplines (Davidson & Vaast, 2010; Nambisan, 2016; Huang et al. 2017). It represents a highly distinctive form of technology entrepreneurship worthy of discrete examination (Giones & Brem, 2017). As the recent agenda-setting publications and special journal issues on the subject indicate (Nambisan, 2016; Kraus et al., 2019), the significance of digital entrepreneurship appears to have finally gained acceptance in the entrepreneurship literature. Prior research on technology entrepreneurship had, by and large, focused on entrepreneurship in technology-intensive industries (including digital), in which technology is often portrayed as a context for empirical work (Beckman, Eisenhardt, Kotha, Meyer & Rajagopalan, 2012).

3.2.1 Evolution of Digital Value Creation & Conceptualisation

To determine why digital entrepreneurship is only now attracting scholarly interest in the entrepreneurship discipline, a key debate is worth revisiting. Several scholars have debated and continue to question the necessity of a digital entrepreneurship category within entrepreneurship. Two main reasons might explain this. Firstly, some believe that digital forms of value creation are evolutionary rather than revolutionary (Coltman, Devinney, Latukefu & Midgley, 2001; Porter, 2001; Rosson, 2004; Porter & Heppelmann, 2014). As such, digital value creation is seen as nothing more than traditional business models gone online (Karagiannopoulos, Georgopoulos & Nikolopoulos, 2005). Secondly, in an age of pervasive digitisation, what is meant by digital entrepreneurship has become harder to define; since virtually all new venture creation processes are digitally enabled to varying degrees (von Briel, Recker & Davidsson, 2018). As Westerman, Bonnet and McAfee (2014) argue, ‘going digital’ is no longer the purview of digital technology firms but every firm - implying that all organisations will become digitally enabled to some degree.
The sceptics who refuse to give digital entrepreneurship any significance as a domain of scholarship may be justified when one considers the evolutionary history of the internet as a platform for value creation. In its turbulent early years, the infamous dot-com crash of early 2000 can help explain the excessive caution. The crash was partly the result of business models which were based on flawed business assumptions and an underdeveloped Web 1.0 architecture (Hawkins, 2004; O’Reilly, 2007). Given the exaggerated assumptions that digital businesses at the time were different, there was a temptation to ignore fundamental business principles. As O’Reilly (2007) explains, the problem partly lay with the architecture of Web 1.0, which was a static one. Thus, first-wave ‘digital’ businesses developed on Web 1.0 technology tended to be ‘mere equivalents of existing analogue functionality’, built and organised along the lines of existing social and technical infrastructures (Tilson, Lyttinen & Sørense, 2010). However, from around 2003, an interactive Web 2.0 architecture emerged with profound implications for value creation in the digital age. Eckman (2008) demonstrates the significant changes from Web 1.0 to Web 2.0 with Figure 3.1.

**Figure 3.1 Differences Between Web 1.0 & Web 2.0**

Source: Eckman (2008)
Not surprisingly, the emergence of today’s dominant social media platforms, as well as their counterparts in the digital sharing economy, coincided with the enabling technological development of Web 2.0. With the new architecture, several scholars began to draw attention to the different business models that were emerging (Amit & Zott, 2001; Afuah & Tucci, 2003; Walker, 2006). Thus, digital entrepreneurship in its current form is a very recent phenomenon.

A challenge always presents itself for digital entrepreneurship researchers. This challenge, according to von Briel, Recker and Davidsson (2018), lies in the fact that the rapid advances in digital technology endanger the timeliness and relevance of any academic pursuit of analysis and prediction. Thus, there is a need to re-evaluate continuously, existing knowledge in the wake of rapid change. Unsurprisingly, therefore, some earlier conceptualisations and nomenclatures of digital value creation, appear to have either come or gone or have been more popular at one point in time but are less in use today. Concepts such as cyber entrepreneurship (Carrier, Ramond & Eltaief, 2004), internet entrepreneurship (Tjargal, 2007) and e-entrepreneurship (Matlay, 2004; Matlay & Westhead, 2005; Kollmann, 2006) were earlier attempts at describing digital entrepreneurship.

Likewise, e-business and e-commerce, which are terminologies frequently occurring in earlier literature, often appear alongside e-entrepreneurship. As Chaffey (2015, pp. 13-14) explains, the term e-business was first coined by IBM in 1997 to refer to the transformation of key business processes through the use of internet and web technologies. Meanwhile, e-commerce was used more narrowly to refer to the buying and selling of goods online. However, Chaffey points out that digital business and digital commerce appear to be today’s preferred industry terminologies, which are superseding the use of the terms e-entrepreneurship, e-business and e-commerce. According to
Asghari and Gedeon (2010), digital entrepreneurship is more appropriate because it broadly describes the entrepreneurial process of creating digital businesses, as well as the way these businesses are managed.

3.2.2 Defining & Differentiating Digital Entrepreneurship

A definition of digital entrepreneurship at first appears elusive. Davidson and Vaast (2010) define digital entrepreneurship as ‘the pursuit of opportunities based on the use of digital media and other information and communication technologies’. This definition suggests that any use of digital media and information and communication technologies (ICTs) may constitute digital entrepreneurship. However, as Nzembayie et al. (2019) argue, in an age of pervasive digitisation, such a broad definition risks diluting digital entrepreneurship into a ‘catch-all meaninglessness’. An earlier definition, however, suggests differentiating digital from traditional entrepreneurship by the degree to which processes and outcomes are physical or digitised.

Accordingly, digital entrepreneurship has alternatively been defined as ‘entrepreneurship in which some or all of what would be physical in a traditional organisation has been digitised’ (Hull et al., 2007; Hair, Wetsch, Hull, Perotti & Hung, 2012). The authors of this definition go on to argue that digital entrepreneurship exists in mild, medium and extreme forms. One of the merits of this definition is its earlier recognition of the fact that not all digital ventures are created equal (von Briel et al., 2018). It also suggests that digital entrepreneurship is entrepreneurship – meaning, it shares fundamental similarities with traditional assumptions of entrepreneurship, with digitisation being its crucial differentiator. Thus, it is new venture creation in which digitisation plays a central role.
At this juncture, it is important to point out that the definition uses the term digitised, not digitalised. Since the two words are often mistaken for the same in most dictionary definitions, it is vital to clarify significant differences – since they are central in anchoring the distinctiveness of digital entrepreneurship. **Digitisation** is the technical process of converting or representing analogue information in digital format where it is stored as bits (Chandler & Munday, 2011). This means that, once information is digitised, it exists as lines of code. As noted in Chapter One, value creation based on ‘economics of bits’ is fundamentally different from those defined by physical manufacturing and distribution (McAfee & Brynjolfsson, 2014). A primitive example of digitisation of information is the scanning of a physical photo (analogue artifact) onto the computer, where it becomes a digitised artifact.

Meanwhile, **digitalisation** refers to a ‘sociotechnical process of applying digitising techniques to broader social and institutional contexts that render digital technologies infrastructural’ (Tilson et al., 2010). It involves the structuring of many and diverse areas of social life around digital communication and media infrastructures (Brennen & Kreiss, 2014). In the practical context of this research, it can be conceptualised as the use of digital technologies to change, enable or transform business models (Isaksson & Wennberg, 2016). The distinction between these concepts is key to differentiating digital entrepreneurship from traditional entrepreneurship since virtually all forms of entrepreneurship adopt digital technologies to varying degrees.

Pervasive digitisation has made it critical for digital entrepreneurship to be more accurately defined and differentiated. More recently, many scholars have pointed out that traditional value creation processes cannot be defined as digital entrepreneurship, just because of process digitalisation (Giones & Brem, 2017; von Briel et al., 2018; Nzembayie et al., 2019). Hence, they argue for reserving the term digital entrepreneurship
for purer forms of the phenomenon. The reason, they maintain, stems from the argument that although value-adding processes in most industries have been digitalised, one must never lose sight of the fact that physicality and tactility of processes and market offerings remain a significant defining feature of traditional entrepreneurship. Thus, traditional new venture ideas are metaphors for the enactment of physical and tactile new market offerings, as consistent with manufacturing models of value creation (Porter, 1985).

With this crucial distinction, digital entrepreneurship is more accurately defined as entrepreneurship in which digital artifacts and platforms are the new venture ideas and market offerings, while digital technologies in general, are external enablers of new venture creation (Nambisan, 2016; von Briel et al., 2018; Nzembayie et al., 2019). As such, it is imperative to begin examining digital new venture creation by the technologies that render possible, this form of entrepreneurship.

### 3.3 Describing Digital New Venture Emergence

To reiterate, digital entrepreneurship is differentiated by its unique technological basis. Therefore, digital technologies and their corresponding enabling mechanisms need to be critically examined in order to appreciate their role in driving the emergence of digital new ventures. Based on an understanding of their distinctive mechanisms, subsequent sub-sections examine the digital new venture idea, its influence on process, and agentic mechanisms that influence the process of emergence.

#### 3.3.1 Technologies Driving Digital Entrepreneurship

Three distinct but interrelated types of digital technologies have been identified as external enablers and triggers of digital entrepreneurship – see Table 3.1 subsequently. They are digital artifacts, digital platforms and digital infrastructure (Nambisan, 2016). Together, they drive entrepreneurial initiatives by providing digital technology
affordances and constraints (Gibson, 1977; Leonardi, 2011). Digital technology affordances are the ‘action potential’ of digital technologies (Majchrzak & Markus, 2012).

Table 3.1 Technological Drivers of Digital Entrepreneurship

<table>
<thead>
<tr>
<th>Technology</th>
<th>Definition</th>
<th>Defining Characteristics/Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digital Artifacts</strong></td>
<td>Components that form part of a new product or service</td>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td></td>
<td><em>Examples</em> - mobile apps, software, media content and more.</td>
<td>Reprogrammable, editable, interactive, distributable, incomplete and ambivalent (Yoo et al., 2012; Kallinikos et al., 2013)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Implications for new venture creation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boundaries of digital new venture ideas and outcomes remain fluid (Yoo et al., 2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Affords flexibility &amp; experimentation (Ries, 2011; von Briel et al., 2018)</td>
</tr>
<tr>
<td><strong>Digital Platforms</strong></td>
<td>Shared, standard set of services and architecture that serve to host complementary offerings and services including digital artifacts</td>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td></td>
<td>The extensible codebase of a software-based system</td>
<td>Characterised by generativity, interoperability, variability and agility (Zittrain, 2006; Tiwana et al., 2010)</td>
</tr>
<tr>
<td></td>
<td><em>Examples</em> – Apple &amp; Google app stores</td>
<td>Function as hub firm which assumes the role of value creation and appropriation</td>
</tr>
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<td></td>
<td></td>
<td>Platforms provide a network for other actors and firms to co-create value.</td>
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<td><strong>Implications for new venture creation</strong></td>
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<td></td>
<td></td>
<td>Platform generativity can result in unprompted &amp; unexpected change usually instigated by platform leader or uncoordinated audiences – hence, generativity adds a level of state uncertainty in the entrepreneurial process (Nambisan, 2016)</td>
</tr>
<tr>
<td><strong>Digital Infrastructures</strong></td>
<td>Digital technology tools &amp; systems</td>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td></td>
<td><em>Examples</em> - cloud computing, social media, online communities, data analytics, makerspaces etc.</td>
<td>Scalable and dynamic (Tilson et al., 2010)</td>
</tr>
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<td></td>
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<td>Socio-technical systems that facilitate communication and collaboration (Tilson et al., 2010)</td>
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<td><strong>Implications for new venture creation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foster hyper-connections and mutual dependencies among human actors, organisations, processes, and things (Yoo et al., 2012)</td>
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<td>Afford reduced transaction costs (Amit &amp; Zott, 2001)</td>
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<td>Lead to the democratisation of entrepreneurship (Aldrich, 2014)</td>
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<td></td>
<td>Affords piecemeal co-creation as activities become distributed across multiple actors and organisations (Von Hippel, 2005; Kallinikos et al., 2013)</td>
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Source: Adapted from Nambisan (2016) and Yoo et al. (2012)

An affordance is not the same as the technical features or characteristics of a technology. Thus, affordances may not be immediately observable, even to the creator of
the technology. For instance, when Google opened up its mapping APIs (Application Programmable Interface) to the public, it did not realise the hidden potentials for ride sharing and many location-based digital services such as Uber and Airbnb. Affordances are therefore best conceptualised as the potentiality of a technology (Autio, Nambisan, Thomas & Wright, 2018). Thus, they are often identified when a human actor realises the potential.

Since affordances are possibilities for action, the affordance construct offers a useful tool for identifying and analysing the mechanisms of digital technology that drive new venture creation (Bygstad, Munkvold & Volkoff, 2016; Davidsson et al., 2018). Digital technology affordances mainly arise from the enabling characteristics of digital artifacts and components, which together support an environment marked by openness, hyper-connectivity, convergence and generativity (Yoo et al., 2012; Lyytinen et al., 2016). The exploitation of digital technology affordances by digital entrepreneurs is central to understanding the digital entrepreneurial process (Autio, Nambisan, Thomas & Wright, 2018).

**Digital Artifacts:** Digital artifacts are applications, components or digital media content that form part of new market offerings and add value to end-users by offering a specific functionality. As such, Nambisan (2016) maintains that they form the core of digital new venture ideas. They are ‘quasi-objects’ (Ekbia, 2009), distinguished from physical and tactile objects that constitute traditional new venture ideas and offerings. Mobile apps, software, online videos and websites are good examples of digital artifacts and components. Kallinikos et al. (2013) identify four main characteristics of digital artifacts with implications for new venture creation.
Firstly, digital artifacts are repro programmable, which means they can be modified by other digital objects or by a skilled human actor. Their reprogrammability makes them interoperable with other digital artifacts and systems. As such, they are also re-combinable and subject to infinite expansibility by participating actors (Faulkner & Runde, 2009). For instance, code-editing software can be used to modify the code of a mobile app. Secondly, digital artifacts are editable. This characteristic also makes them pliable, modifiable and updatable by human and software agents. In one form, editability is defined by actions such as deleting or rearranging, in another, updating, which is done either manually or automatically. Editability is distinct from reprogrammability in terms of the simplicity in which modification occurs – such as deleting, updating and rearranging documents. Thirdly, digital artifacts are interactive – which means they offer pathways in which human agents can activate functions embedded in them or explore their underlying information items without changing them. Finally, digital artifacts are distributable. This feature makes them ‘transient assemblies of functions, information items, or components spread over information infrastructures and the internet’ (Kallinikos et al., 2013, p. 360).

The reprogrammable and editable characteristics of digital artifacts imply that they remain somewhat ‘incomplete by design’ (Garud, Jain & Tuertscher, 2009), and are therefore expandable by participating actors owing to their layered modular architecture (Yoo et al., 2012; Lyytinen et al., 2016). Hence, Kallinikos et al. describe them as having ‘ambivalent ontologies’. Together with their interactive and distributable characteristics, digital artifacts allow for the decoupling of form from function, enabling infusion into a wide range of products and services ecosystem (Lusch & Nambisan, 2015).

**Digital Platforms:** Meanwhile, a second technological enabler and trigger is the digital platform. It is defined as a ‘shared, common set of services and architecture that
serves to host complementary offerings’, including digital artifacts and their components (Parker, Van Alstyne, & Choudary, 2016). More technically, Tiwana, Konsynski and Bush (2010) define a digital platform as ‘the extensible codebase of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate’. Hence, interoperability and generativity are defining features of digital platforms which enable the capacity to recombine elements, assemble, extend and redistribute functionality (Yoo et al., 2010). Generativity is the ability of a technology to produce unprompted change, driven by large, varied and often uncoordinated audiences (Zittrain, 2006). It can be the result of the digital platform architecture or governance of the ecosystem (Förderer, Kude, Schütz & Heinzl, 2014). Digital platforms such as the Google and Apple app stores, instil a degree of generativity and unpredictability (Zittrain, 2006, p. 1980) in the entrepreneurial process. When digital artifacts are re-combined with the underlying generative attributes of a digital platform’s architecture, they result in fluid processes and the dynamic emergence and evolution of entrepreneurial opportunities (Yoo, 2010, 2012; Nambisan, 2016).

Digital platforms are equally marked by variability and agility - i.e. the ability to adapt to the changing needs of a business (Tiwana et al., 2010). The properties of digital platforms so outlined, assume the role of ‘shaping the fluid boundaries of entrepreneurial outcomes’ (Nambisan, 2016). Accordingly, dominant digital platforms are conceived as multi-sided digital ecosystems or value networks, with the role of coordinating value creation and appropriation in network-centric, as opposed to firm-centric innovation contexts (Nambisan & Sawhney, 2011; Gauer & Cusumano, 2014). The architecture of a digital platform is developed with a combination of digital artifact and components, thereby making digital artifacts central to all digital new venture ideas. They enable
entrepreneurship by allowing other actors to develop and offer complementary products and services for a ready market (Zahra & Nambisan, 2011).

Dominant digital platforms such as the Google Play and the Apple iOS stores, enable the hosting and distribution of complementary offerings such as mobile apps and e-books, as well as digitised music and video (digital artifacts/components). Such platforms offer entrepreneurs opportunities for value co-creation by allowing them to specialise while minimising the need to acquire in-house capabilities (Ceccagnoli, Forman, Huang & Wu, 2011; Wu, 2011; Srinivasan & Venkatraman, 2018). They are central to the low barriers to entry which is a crucial distinguishing feature of value creation in digital entrepreneurship (Amit & Zott, 2001).

**Digital Infrastructures:** Finally, digital infrastructures are digital technology tools and systems such as cloud computing, data analytics, online communities, social media tools and digital makerspaces or hackerspaces (Nambisan, 2016). They are scalable and dynamic, facilitate communication and collaboration, reduce marginal cost and provide capabilities for aiding innovation and entrepreneurship. Digital infrastructures democratise entrepreneurship (Von Hippel, 2005; Aldrich, 2014) by enabling a large and diverse cast of actors to engage in value co-creation. For instance, cloud computing, digital analytics and digital makerspaces allow entrepreneurs to nimbly and cost-effectively experiment with new venture ideas (Kerr, Nanda & Rhodes-Kropf, 2014) in collaboration with dynamic collectives of value co-creators (Hargadon & Bechky, 2006; Shah & Tripsas, 2007), while also measuring and learning from near-instant user feedback (Ries, 2011; Huang et al., 2017) involving a larger set of potential customers (Hatch, 2013).

Today’s digital infrastructures enable new organisational forms such as lean digital start-up organisations (Ries, 2011) which use digital tools and systems to leverage
the capabilities of a high-skilled talent pool, dispersed across geographic regions on an on-demand basis (Townsend, DeMarie & Hendrickson, 1998; Aldrich, 2014). Finally, by drawing on the affordances of digital infrastructures, new digital ventures can scale at previously unknown velocities (Huang, Henfridsson, Liu & Newell, 2017). In keeping with Davidsson’s (2015) re-conceptualisation of the entrepreneurship nexus, (see previous chapter), Nambisan (2016) argues that digital artifacts and digital platforms are metaphors for digital new venture ideas, while digital infrastructures represent the external enablers supporting new venture emergence.

The attributes of digital artifacts, platforms and infrastructures are ultimately the results of the complex system of digitisation, which supports modularity and granularity (Benner & Tushman, 2015). Modular systems are hard to act upon, manipulate or control since they are made up of distinct and self-sufficient blocks which allow for independence (expanded below under complexity). Unlike physical modularity, digital modularity is product agnostic, and interfaces can be designed to accommodate a broad spectrum of functions (Kallinikos et al., 2013). Hence, they are cross-platform compatible. Likewise, the granularity of digital artifacts and platforms derives from their numerical constitution, which allows for tracing composite units down to the tiniest detail. Consequently, modularity and granularity supply the generative combination of attributes of digital artifacts and platforms (Zittrain, 2006).

3.3.2 Digital New Venture Ideas – Pure & Hybrid

Nambisan (2013) makes a critical distinction between two roles of digital technologies in new venture creation - as an operant and operand resource. When digital technologies trigger action, they function as an operant resource; whereas, when they passively support new venture creation processes, they assume the role of an operand resource. By triggering action, they initiate new venture ideas which entrepreneurial
agents act on – an operant resource. Accordingly, Nambisan (2016, p.4) argues that digital artifacts and digital platforms are part of digital new venture ideas (operant resource), while digital infrastructures and dominant platforms are external enablers supporting new venture creation (operand resource). As operant resources, ideas based on digital artifacts and platforms exhibit material agentic qualities that drive the new venture creation process. These digital material agentic affordances are a distinguishing feature of digital entrepreneurship. Distinguishing digital from traditional entrepreneurship by the embodiment of the new venture idea is justified by the argument that ‘that on which they act’ is an essential source of variance in how entrepreneurial processes unfold (Shane & Venkataraman, 2000).

Consequently, von Briel et al. (2018) argue that ‘not all digital new venture ideas are born equal’. The reason being, the layered modular architecture of digital new venture ideas and offerings, have significant implications for how the digital entrepreneurial process unfolds (Lyytinen et al., 2016). Differences in the coupling and embodiment of digital artifacts offer unique mechanisms driving various manifestations of digital entrepreneurship. Accordingly, von Briel et al. identify two main types of digital new venture ideas. The first being digital new venture ideas characterised by loose coupling of digital artifacts and the second being those defined by tight coupling of digital and physical artifacts. Coupling determines the capacity of digital artifact and components to be re-combinable (Kallinokos et al., 2013). Components that are responsive to and distinct from each other are loosely coupled; whereas those that are responsive to but not distinct from each other are tightly coupled (Orton & Weick, 1990). Loose coupling is the result of data homogenisation – whereby, standardised protocols and interfaces enable digital artifacts to be decomposable, and their components product-agnostic (Yoo et al.,
The characteristic of loose or tight coupling drives distinct behaviours in new venture creation.

Regarding their composition, digital artifacts can have components made up of ephemeral or perpetual embodiment. Components made up of ephemeral embodiment, exist in a logical state, thereby making them *malleable* (von Briel et al., 2018). In this state, they provide the semiotic functional logic of digital artifacts such as software, firmware and digital content. Meanwhile, components with a perpetual embodiment exist in a physical state, which makes them rigid and stable – such as memory, microprocessor, wireless connectivity chip. In this state, their function usually entails the storage, transmission, processing and display of digital data. Whether digital artifacts are comprised of ephemeral or perpetual embodiment, or whether the components are loosely or tightly coupled, determines the capacity for *editability* and *distributability* (Kallinikos et al., 2013; Lyytinen et al., 2016). The ability to separate form from function and content from media can be achieved through loose coupling of ephemeral and perpetual artifacts. The capacity for distributability enables the artifact to overcome the ‘tyranny of space’ (Nambisan, 2013), and affords vertical integration as well as horizontal disintegration (Nambisan et al., 2017). Consequently, a distinction is made between two main typologies of digital new venture creation – pure and hybrid (Hull et al., 2007; Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013).

Pure Digital Entrepreneurship (PDE) is defined as entrepreneurship in which loosely coupled digital artifacts and digital platforms are the new venture ideas and market offerings (Nzembayie et al., 2019). Examples of PDE new market offerings are products such as antivirus software, gaming applications and social media platforms (Giones & Brem, 2017). Meanwhile, Hybrid Digital Entrepreneurship (HDE) is based on digital artifacts as new venture ideas and market offerings. Here however, new venture
ideas and offerings are extended or tightly coupled with a significant or independent physical or tactile component, process or service (Giones & Brem, 2017; Nzembayie et al., 2019).

Thus, HDE ventures can quickly revert to a PDE business model if the physical element is eliminated but not vice versa. For example, Fitbit is a wearable smartwatch technology which tightly couples digital artifacts and physical microprocessors in its market offering - HDE. Another example is Deliveroo, a digital platform which facilitates the order of take-out food from restaurants. It achieves this by combining the digital platform with physical delivery of food by the bikers, which it hires to pick up and deliver food from restaurants to customers. Coordination of the service between restaurants, bike deliveries and customers is made possible by the indispensable digital platform. It is reasonable to assume that HDE is more challenging to realise than PDE, and processes are bound to combine rigid manufacturing and tactile service models, with the fluidity and weightlessness of digital new venture creation. Nzembayie and Buckley (2018) construct Figure 3.2 to illustrate how typologies of digital and traditional entrepreneurship are differentiated based on the degree to which digitisation and digitalisation, as well physicality and tactility, are central or peripheral to the new venture idea and market offering.

Figure 3.2 Typologies of Entrepreneurship in the Digital Age

Source: Nzembayie & Buckley (2018)
However, given the case under study, the focus of this research is on PDE. Therefore, references to digital entrepreneurship are henceforth biased towards pure digital new venture ideas.

### 3.3.3 Digital Business Model Generation & Opportunity Confidence

The new venture idea (NVI), as Davidsson (2016, p.32) argues, is ‘less than a manifest business model’. Davidsson makes this distinction to emphasise the conceptual nature of the new venture idea and to distance it from the idea of favourability. Consequently, he proposes Opportunity Confidence (OC) as the next step in the development of the NVI (see previous chapter). To reiterate, OC is the result of an agent’s evaluation of the NVI and the degree to which it is deemed favourable or unfavourable prior to enactment (Davidsson, 2015).

Further, Davidsson explains that a NVI may begin as a very rudimentary hunch about a product or perception of an unsolved problem, for which the market would pay to have. Central to a business model (BM) is the value proposition, which indicates how a new venture plans to solve the problem for which a customer would pay for (Osterwalder & Pigneur, 2010). Hence, the process of articulating the business model can be interpreted as one mechanism through which the NVI is evaluated to gain OC.

**Business Model Definition:** The literature on business models remains fragmented, making it hard to differentiate from business strategy. Teece (2010, p.20) defines the BM as management’s hypothesis regarding ‘what customers want, how they want it and what they will pay, and how an enterprise can organise to best meet customer needs and get paid well for doing so’. The hypothesis represents the new venture idea or vision (Ries, 2011). Afuah and Tucci (2001, p.3) on the other hand, define the BM as ‘the
method by which a firm builds and uses its resources to offer its customer better value and to make money in doing so’.

Of relevance to the digital entrepreneurial context is the definition of the business model as ‘a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs’ (Chesbrough & Rosenbloom, 2002, p. 532). A common thread appears to run throughout the definitions. They identify resource structure, transactive structure and value structure as primary constituents of a BM (Amit & Zott, 2001, p. 493; George & Bock, 2011). One way in which digital entrepreneurs develop or capture the digital NVI is by making it explicit in a nine-section document called the Business Model Canvas (Osterwalder & Pigneur, 2010). The document articulates the hypothesis or NVI as a precursor to action (Ries, 2011). The value proposition, customer segments and relationships, revenue models, key value adding activities, partnerships and cost structures are among core aspects of the BM, which operationalises the NVI.

**Digital Business Models:** According to Hull et al. (2007), digital business models work in a very different way compared to their traditional counterparts. Maurya (2016, p.30) identifies three broad types of digital business models by the number of actors involved and the affordances of digital technologies – i.e., direct digital business models, multi-sided digital platform models and digital marketplace models. Firstly, *direct business models* are one-actor models where users are the customers – as is the case with visitors who subscribe to access a website for their own needs. Secondly, *multisided* or multi-actor digital platform models differentiate between users and customers as different segments of the market. With this model, firms create, deliver and capture value from users, but revenue is generated from customers who are often not the users. For example, Facebook’s BM is multisided because it does not directly charge end users for its services.
The derivative currency it gets is user attention, which is then traded on a secondary market to advertisers or other actors, who rent its data for their own purposes.

Finally, marketplace models are also multi-actor models but are differentiated by the concurrent bringing together of all actors (buyers and sellers), while charging a percentage for processing transactions and regulating the ecosystem. Multi-actor business models are made possible by digital artifacts and platform components. Digital artifacts and platforms are information goods and services, which follow the logic of ‘economics of bits’ (Wurster, 1999; Varian, Farrel & Shapiro, 2004; McAfee & Brynjolfsson, 2014). With economics of bits, digital artifacts and components may be expensive to create but can be reproduced at nearly ‘zero marginal cost’ (Shapiro & Varian, 1999; Brynjolfsson & McAfee, 2014). As such, digital ventures can afford to create new market offerings and give them away to users for ‘free’, while generating revenue through minimal transaction fees, advertising and rent-seeking from hoarded data. Thus, they enjoy the flexibility of experimentation with multiple revenue models, compared to traditional ventures.

**Digital Business Model Innovation:** Since NVIs captured in BMs are not static, they are themselves artifacts of innovation as the digital entrepreneurial process unfolds (Teece, 2010; Zott et al., 2011). Business model innovation (BMI) is an ongoing process of change which arises from the continual adjustments actors make during new venture creation (McGrath, 2010), which become new narratives (Garud & Giuliani, 2013). BMI can sometimes provide more value than the new market offering itself. This is especially true of digital value creation where BMI entails unlocking the hidden value potentials embedded in digital artifacts (Chesbrough & Rosenbloom, 2002). Unlocking value is not achieved solely through superior digital technology development or ownership. Hence Chesbrough (2007, 2010) comments that a mediocre digital technology pursued within a great business model may be more valuable than a great technology exploited via a
mediocre business model. Similarly, it is not the best designed digital products that succeed in the market, but those that are good enough and can spread (Ries, 2011; Moore, 1999).

Digital BMI may be more important than product innovation. Product is used in the digital context with the understanding that it follows a service-dominant (S-D) logic (Lusch & Nambisan, 2015). Whereby, an S-D logic views value creation not as the production and offer of tangible or intangible goods, but rather as the exchange of services which is the result of actors using skills and knowledge for the benefit of other actors. Consequently, product is but a metaphor for services rather than a finished item that is exchanged (Barrett, Davidson, Prabhu & Vargo, 2015). In the network-centric context of digital value co-creation, open innovation represents the path to designing superior business models and offerings (Chesbrough, 2006) – whereby, openness involves suppliers, partners, distribution channels, and coalitions in extending a new venture’s resources (Hamel & Ruben, 2000). As Amit and Han (2017) argue, generating superior digital business models centres on the organisation of access to resources controlled by value co-creators in a value network. Since digital platforms provide open ecosystems for sharing knowledge and co-creating value, open distributed innovation is fundamental to designing a superior digital business model (Gambardella & McGahan, 2010; Richter, Kraus, Brem, Durst & Giselbrecht, 2017).

For instance, when a big digital technology firm such as Google opens its data to other actors using APIs, it enables firms like Uber who can rent data from Google Maps for their location-based service offerings. Google, in turn, benefits by collecting digital economic rent from its digital assets.
3.3.4 Dynamic Process of Digital New Venture Enactment

As the previous chapter indicates, new venture ideas and their articulation in business models are of little value unless acted upon. Thus, action is central to understanding the entrepreneurial process. Nambisan (2016) argues that there are two ways in which digital technologies upend established assumptions of how new ventures are enacted. Firstly, digitisation renders entrepreneurial processes less-bounded in terms of their temporal and spatial structures. Secondly, it results in a diffused locus of entrepreneurial agency – whereby, dynamic collectives enter and exit the digital entrepreneurial process often on their terms. Consequently, the enactment or concrete actions to initiate and materialise digital artifacts, shifts focus away from linear and stable process assumptions to dynamic mechanisms (Lyytinen et al., 2016). Hence, digital new venture creation is conceived as dynamic problem-solution pairing (Nambisan & Sawhney, 2011), which may not necessarily start with a defined new venture idea; and it also departs from discrete and bounded innovation process and outcome assumptions (Von Hippel & Von Krogh, 2015).

The digital entrepreneurial process follows trajectories which are more sporadic and parallel, and involve ‘the constant initiation, forking, merging, and termination of diverse activities facilitated by digital technologies’ (Nambisan, 2016; Nambisan et al., 2017). Consequently, digital new venture process initiation, unlike traditional assumptions, ‘does not necessarily start with a new venture idea or single action to realise this idea but a set of actions that indicate commitment’ (von Briel et al., 2018, p.292). As such, it partly lends support to an effectual and bricolage decision making and behavioural model (Sarasvathy, 2001; Baker & Nelson, 2005), which propose that entrepreneurs begin the enactment of new ventures with available means, while staying open and responsive to new means that may emerge along the way.
As Benner and Tushman (2015) argue, many theories governing product innovation were developed for a pre-digital era. A pre-digital business era operated under relatively more stable and less complex environments (Child & McGrath, 2001; McGrath, 2013). Hence, dominant theories of product lifecycle (Utterback, 1994), architectural innovation (Henderson & Clark, 1990) and the product innovation process (Tidd & Bessant, 2013; Eppinger & Ulrich, 2015) have underlying assumptions of relative stability and well-defined boundaries of products and process. Recently, these models of innovation have been challenged in a pure digital entrepreneurial context (Barret et al., 2015). When digital artifacts are new venture ideas and market offerings, their agency shapes innovation in dynamic ways, allowing outcome boundaries to become porous and fluid. Given the loose coupling and ephemeral embodiment of pure digital new venture ideas and offerings (discussed above), von Briel et al. (2018) argue that they potentially result in ease of initiation, multiple iterative cycles of experimentation and shorter duration of processes (Shim & Davidsson, 2018). Indeed, the scope, features and value of digital market offerings continue to evolve long after the initial launch. Hence, digital new market offerings remain ‘incomplete by design’ (Garud et al., 2009) and subject to ‘infinite expansibility’ (von Briel et al., 2018) – thereby making it difficult to draw clear boundaries between the start and end phases of enactment processes.

Additionally, ‘nailed’ or validated business models (Furr & Ahlstrom, 2011; Ries, 2011) can be rapidly scaled at unprecedented velocities (Huang et al., 2017). Short and rapid processes stem from the fact that code can be tweaked, reprogrammed, re-combined and instantly released in a matter of seconds, by multiple actors (Conboy, 2009). Hence, agile and lean start-up process models (discussed below) may help explain behaviours and mechanisms driving digital new venture performance (Ries, 2011; Blank & Dorf, 2012). On the other hand, it implies that a causal decision-making model does not appear
workable, or of much use in a digital entrepreneurial process (Nambisan, 2016; Nambisan et al., 2017). The loose coupling and ephemeral embodiment of digital artifacts imply that they can be edited by participating actors across value networks (Lyytinen, Yoo & Boland, 2016). Accordingly, processes are defined by continual adjustments ( pivots) by actors in multiple, iterative feedback loops (Ries, 2011; Blank, 2013; Garud & Giuliani, 2013). Furthermore, processes often have an unclear beginning and ending phases.

Given the dynamic nature of the digital entrepreneurial process, driven by the affordances and constraints of digitisation, it raises questions regarding the quality of decision making that focal agents require to drive performance under uncertainty (McMullen & Shepherd, 2006).

3.3.5 Cognitive Mechanisms of Digital New Venture Creation

Given that ‘the locus of entrepreneurial agency has become less predefined and more diffused’ in a digital entrepreneurial context (Nambisan, 2016), distinctive cognitive mechanisms are needed to explain behaviours of focal agents leading the digital entrepreneurial process. As a reminder, the previous chapter examined cognitive and behavioural theories which purport to explain why some individuals formulate new venture ideas, why some actors choose to act on them and why some perform better than others (Baron, 2004). Together, cognitive models provide explanations at the human-agentic level of derived mechanisms needed to drive performance under uncertainty.

Prospect Theory, Perceptual Processes & Digital New Venture Ideas: To answer the question of why some focal agents formulate and act on new venture ideas, prospect and perceptual theories have been proposed to supplement self-efficacy models (see Chapter 2). Prospect theory deals with the positive framing of risk. It argues that entrepreneurs may frame a situation in terms of losses – whereby, loss refers to the
economic gains they will forfeit if they do not become entrepreneurs. The result of focusing on losses would translate into risk-seeking behaviours that prompt entrepreneurial initiatives (Baron, 2004). As the previous chapter notes, this risk-seeking tendency may, in turn, be plagued by cognitive biases such as optimistic bias (Shepperd, Ouellette & Fernandez, 1996), confirmation bias (Nickerson, 1998), planning fallacy and an illusion of control (Kahneman & Tversky, 1979). These biases result in a tendency to underestimate the risk of starting a new venture (Kahneman & Slovic, 1982). Hence, entrepreneurial agents may only be acting on delusional and irrational assumptions (Sternberg, 1999).

Further, prospect theory maintains that people ‘overweight’ small probabilities of success but ‘underweight’ moderate and high probabilities of failure. In the digital entrepreneurial context, it suggests that focal agents may overweight a slim chance of success and underweight moderate to high chances of failure (Baron, 1998; Simon, Houghton & Aquino, 2000). In sum, prospect theory suggests that entry and initiation of the digital entrepreneurial process is the result of focal digital entrepreneurial agents framing lack of entry as a loss, which in turn spurs them to act.

The previous chapter already highlights the role of prior knowledge in driving the formulation of new venture ideas (Shane, 2000). However, *perceptual processes* focus on pattern or object recognition, as mechanisms driving the formulation and reformulation of new venture ideas into new narratives that guide action. Baron (2002, 2004) describes pattern recognition as the identification of a complex array of stimuli, which collectively allow perceivers to recognise an object or a complex pattern. The model suggests that past experiences help entrepreneurs construct prototypes which represent patterns or categories of objects. Accordingly, Gaglio and Katz (2001) posit that entrepreneurs possess a schema or mental framework which add to their alertness to
external stimuli. Mental schemas facilitate the search and recognition of changes, as well as market disequilibria. They then match these changes with their mental framework and respond to information which does not match. Entrepreneurs with high alertness possess complex and adaptive reasoning, which Sternberg (2003) describes as successful intelligence.

However, Gregoire and Shepherd (2010) found that entrepreneurs do not use mental prototypes to recognise and formulate new venture ideas in technology markets but rather, cognitive alignment of new technologies and markets. With this finding, Gregoire and Shepherd (2012) suggest that digital new venture ideas are the result of superficial and structural similarities of digital technology-market combination; while differences in prior knowledge and motivation moderate these relationships. As such, mental prototypes are inadequate in explaining digital new venture idea formulation and the subsequent new venture creation process it instigates.

Counterfactual Thinking & Digital Entrepreneurial Performance: In relation to variance in digital entrepreneurial action and performance, counterfactual thinking has been suggested as an explanatory framework (Nambisan & Baron, 2013). Counterfactual thinking focuses on ‘what might have been’ (Kahneman & Lovallo, 1994) and presents mechanisms by which entrepreneurs deconstruct the past as a precursor to action in the face of future uncertainty (Baron, 2000). It involves comparing events to ‘alternatives that are constructed ad hoc rather than retrieved from past experience’ (Kahneman & Miller, 1986, p. 136). It has recently been expanded to include a future dimension which looks at what may yet be (Arora, Haynie & Laurence, 2013).

Baron (2000, 2004) suggests that entrepreneurs who employ counterfactual thinking may be better at formulating improved task strategies. This may owe much to
the fact that ‘thoughts of what might have been yield useful prescriptions for future behaviour, heightening success-facilitating intentions and corresponding behaviours’ (Roese, 1994, p. 815). High performing entrepreneurs are presumed to be skilled at using counterfactual reasoning to learn from the past (Johnson & Sherman, 1990). Whereby, deconstructing past events to make sense of the future is an experiential learning technique which helps to develop useful knowledge (Markman, Gavanski, Sherman, & McMullen, 1993). Thus, given the dynamic and uncertain nature of the digital entrepreneurial process (less bounded, diffused agency), it could be argued that counterfactual reasoning improves performance by contributing to the flexible reasoning that fickle digital environments demand.

**Self-regulatory Processes & Digital Entrepreneurial Performance:** Given that digital entrepreneurs often operate within hub-based innovation ecosystems, where a single dominant digital platform-based firm makes the rules, self-regulatory processes are seen as essential drivers of performance (Sawhney & Nambisan, 2007). New ventures which are built around dominant digital platform ecosystems such as the Google app store, result in high dependencies between the platform leader and a loosely connected network of ventures (Nambisan & Sawhney, 2011). While enormous benefits accrue in operating in such environments, they present unique challenges and risks which may affect venture performance - therefore, demanding a higher order strategic thinking (Zahra & Nambisan, 2012). As Zahra and Nambisan argue, firms retain less control in these ecosystems, as they must ensure their goals and objectives align with the rules of the digital platform leader. They must also ensure sufficient differentiation and independence as they pursue a unique value proposition. Furthermore, the success of the ecosystem may not always result in success for their ventures. Such digital ecosystems run contrary to an entrepreneur’s perceived self-efficacy or desire for autonomy. As such,
digital entrepreneurs need to strike a balance between an independent and ecosystem-dependent mindset (Nambisan & Baron, 2013).

Self-regulatory cognitive mechanisms may, therefore, explain how digital entrepreneurs maintain such a balance. Among the multimodal framework of self-regulatory processes, *self-control*, *grit* and *metacognition* appear to be sub-mechanisms that are most relevant to explaining digital entrepreneurial performance (Nambisan & Baron, 2013). These processes explore how individuals monitor, evaluate, direct and adjust their behaviour towards reaching their goals (Zimmerman, 2006). Indeed, research on cognitive fit suggests that digital entrepreneurs will experience better performance when they choose the self-regulatory model which closely matches the requirements of the ecosystem. In this vein, Hmieleski and Baron (2008) contend that a prevention focus (security & safety approach) is highly recommended in stable but risky environments; while a promotion focus (achievement & accomplishment approach) is positively linked to performance in dynamic and uncertain environments.

**Self-control:** With relation to self-control, it involves resisting strong impulses to engage in actions deemed harmful or out of line with significant goals (Baumeister & Alquist, 2009). Alternatively, it involves resisting impulses to stop performing actions that may be beneficial but not intrinsically enjoyable (Forgas, Scholar, Baumeister & Tice, 2011). Research on self-control indicates that individuals vary in their capacity to exercise self-control (Tangney, Baumeister & Boone, 2004). Additionally, self-control is an exhaustible (Baumeister & Alquist, 2009) but at the same time, a replenishable capability (Tice, 2009). Since digital entrepreneurs operate in environments marked by high-dependency between actors and leading ecosystems, they often encounter situations which may deplete their self-control. Therefore, focal agents with high self-control are
more likely to act in ways that drive performance, even if that means putting up with less enjoyable scenarios (Tice, 2009; Nambisan & Baron, 2013).

**Grit (Persistence):** While self-control is focused on current actions, grit is concerned with self-regulation of processes that extend over long periods. Baron and Henry (2010) maintain that ‘outstanding performance derives largely from participation in intense, prolonged, and highly focused efforts to improve current performance’ in new venture creation. Moreover, being persistent in the pursuit of long-term goals carries the added benefit of expanding domain-specific knowledge and skills. As such, persistent focal agents are likely to generate new knowledge in the process, as well as necessary cognitive resources such as memory, perception and metacognition which drive venture performance. For this reason, Duckworth and Quinn (2009) attribute performance under digital entrepreneurial circumstances to grit.

**Metacognition:** Finally, *metacognition*, which refers to an individual’s awareness and control over their cognitive capabilities (Flavell, 1979), presents another mechanism which explains digital entrepreneurial performance and leadership. Metacognitive capabilities include – *metacognitive awareness* and *metacognitive resources*. Metacognitive awareness refers to what an individual knows about themselves. It suggests that a digital entrepreneur may use this sort of awareness to focus on carrying out actions within their areas of strength, while ceding leadership of specific tasks to actors who complement their weaknesses. Meanwhile, metacognitive resources allow entrepreneurs to draw upon the most effective cognitive strategies to bring to bear on a situation (Haynie, Shepherd, Mosakowski & Eagerly, 2010). Since a significant feature of the digital technology environment is the high dependency between actors, focal agents will use strong metacognition to determine when collaborating agents are in a better position to lead specific tasks.
Strong metacognitive capabilities help focal agents to consciously control their cognitions using related mechanisms such as analogical reasoning, think-aloud protocols, and counterfactual reasoning (Nambisan & Baron, 2013). Consequently, metacognitive capabilities also provide explanations for how digital entrepreneurs might adopt a cognitively ambidextrous leadership strategy (Fixson & Rao, 2011) in leading dynamic collectives of actors who collaborate in digital new venture creation. Using strong metacognition, they are more likely to engage in ‘leaderful practices’—whereby, ‘leaderful practice is unrepentant in advocating distinctively democratic values’ when approaching specific tasks (Raelin, 2009).

In sum, the above explored cognitive models provide useful frameworks in explaining the mechanisms that drive decision making and action which result in digital new venture performance.

3.3.6 Digital New Venture Enactment: A Sociomateriality Perspective

In a marked departure from a tendency to overemphasise the role of focal human agents, Davidson and Vaast (2010) state that digital entrepreneurial performance is the result of the sociomaterial enactments between actors and digital material agencies. They contend that in an age of intelligent machine learning algorithms (Orlikowski & Scott, 2015), with their corresponding affordances of automation and standardisation (Michalski, Carbonell & Mitchell, 2013; Witten, Frank, Hall & Pal, 2016), the role of digital material agencies is highly significant when explaining digital new venture enactment and performance. Thus, the anthropocentrism of entrepreneurship theories such as effectuation and bricolage (see Chapter 2) give primacy to efficient causes (human agentic causes), which only offer partial insights in the explanation of the multiple contexts of new venture creation (Garud, Gehman & Giuliani, 2014).
However, when agency is simply defined as the ‘capacity for action’ (Giddens, 1984), digital artifacts have material agency because they can be assigned a functional capacity for action (Faulkner & Runde, 2009; Leonardi, 2011). That is not to suggest they are the same as human agency which acts with intentionality. Therefore, Sayes (2014) explains that to understand how non-human ‘beings’ act, it is important to first divorce agency from criteria of intentionality, subjectivity and free will. Accordingly, Latour (2005, p. 72) explains that non-human beings have agency in that ‘they might authorise, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid, and so on’. Against this understanding, digital material agencies can more comprehensively assist in explaining the interrelationships between social and material mechanisms shaping digital new venture emergence.

Accordingly, sociomateriality theory (Orlikowski, 2007, 2009; Orlikowski & Scott, 2008) offers a useful premise for examining the mechanisms which drive the digital entrepreneurial process. Sociomateriality theory derives from Agential Realism (Barad, 2003, 2007) the relational and performative (Garud, Gehman & Giuliani, 2018) argument that humans and objects are first and always a nexus of relations (Garud, Kumaraswamy & Karnoe, 2010). As Orlikowski (2007) asserts, ‘there is no social that is not also material and no material that is not also social’. Based on this assertion, reality is assumed to be performed through the intermingling of human actors and material agents (Slife, 2004; Pickering, 2010; Cecez-Kecmanovic, Galliers, Henfridsson, Newell & Vidgen, 2014). As Barad argues, agency emerges as human and material objects intra-act. Intra-action is a neologism coined to describe the entangled web of mutually constitutive agencies between the social and the material. These intra-actions produce ‘material-discursive practices’ (Orlikowski & Scott, 2015) – whereby, the materiality of digital technologies
offer mechanisms which are consciously or unconsciously interpreted and acted out by human agents (Majchrzak & Markus, 2012; von Briel, Davidsson & Recker, 2018).

Consequently, Davidson and Vaast (2010) maintain that sociomateriality in the digital entrepreneurial process ‘emerges from the mutual exploitation, adjustment and enactment of means-end relationships between human and non-human actors’. Furthermore, sociomaterial routines form the basis of knowledge creation and reduction in the level of task-specific uncertainty (McMullen & Shepherd, 2006), with the result being variations in digital new venture idea formation and enactment across collectives (Nambisan, 2016). For instance, the editable and distributable affordances of loosely coupled digital artifacts, offer new means (Sarasvathy, 2008) for inexpensive and collaborative experimentation (Kerr, Nanda & Rhodes-Kropf, 2014), instant release and rapid scaling of digital new ventures ideas and offerings (Huang et al., 2017). However, Fischer and Reuber (2011) found that in a social media context, while such material-discursive interactions between entrepreneurs and customers afford new effectual cognitions, extensive use of those platforms results in a constraint they termed ‘effectual churn’ – i.e., an action paralysis resulting from continuous looping and reassessment of means and effects without actually taking any action towards realisation. Therefore, action paralysis is the result of information overload.

While sociomateriality provides a useful lens for theorising the role of digital technologies in the digital new venture enactment, it has received its fair share of criticisms. Critics of the theory remain uneasy regarding its Agential Realist ontological stance and its strict symmetry between the material and the social (Mutch, 2013). Hence, they advocate a substantialist ontology which argues for the separation of material and human agencies (Faulkner & Runde, 2012; Leonardi, 2013). However, Orlikowski and Scott (2015, p. 2) acknowledge the counter arguments by stating that ‘re-framing
conceptual concerns away from human-centred approaches is a bold move and we recognise that doing so disrupts long-standing assumptions informing many areas of management research’.

Ultimately, the value of sociomateriality lies in its capacity to more accurately identify and theorise the complex ways in which mechanisms of digital material agencies intra-act with human agencies to produce derived mechanisms that shape digital new venture performance at proximal levels of the process.

3.3.7 Digital New Venture Performance – A Complexity Theory Perspective

Sociomateriality theory offers antireductionist explanations relating to how the complex web of human and material relationships jointly shape digital new venture emergence. It is, therefore, useful to examine the nature of complexity in a digital entrepreneurial context. To assist in this effort, complexity theory offers a useful lens. Complexity theory is generally concerned with ‘order creation’, which is consistent with the digital entrepreneurial process of emergence (Lichtenstein, Carter, Dooley & Gartner, 2007; Schindehutte & Morris, 2009). As Thrift (1999) notes, ‘the chief impulse behind complexity theory is an anti-reductionist one’. Complex Adaptive Systems (CASs) theory in particular, provides an antireductionist perspective of the behaviours which drive digital new venture performance under uncertainty. The theory describes the behaviour of large scale, highly dynamic systems which, although driven by the aggregate behaviour of individual elements, appear to function in coherent and motivated ways (Anderson, 1999; Tredinnick, 2009). CAS equally describes the ‘meshwork’ of interrelated agencies, motivations and forces that make up the complex system (DeLanda, 2006). It is deemed anti-reductionist because it considers all four Aristotelian causes of change in providing explanations of complex processes such as digital new venture creation – i.e. material, final, formal and efficient causes (McKelvey, 2004; Van de Ven, 2007).
Benbya and McKelvey (2006) identify the vital characteristics of CASs. Firstly, they are comprised of heterogeneous agents that interact with each other and their surroundings. These agents may adapt their behaviour in an unlimited number of ways (Holland, 1995). Diversity emerges, as each agent is different from the other and their actions get shaped by the system. The interaction between agents results in the flow of information and knowledge. Secondly, the system exhibits a capacity to anticipate the results of their actions, for which they develop shared schemas (Anderson, 1999; Tredinnick, 2009). Schemas are described as a set of rules that reflect patterns in experience (Stacey, 1996; Anderson, 1999). These schemas, when combined with individual agents’ schemas, enable a CAS to learn, adapt and evolve. Since current and future evolution are dependent on history, it makes their evolution equally path-dependent (Tredinnick, 2009).

Additionally, CASs are self-organised (Stacey, 1996; Anderson, 1999; Benbya & McKelvey, 2006) - which means new behavioural patterns emerge as agents interact, with no single agent being able to determine the system’s behaviour ultimately. These systems self-organise when they find themselves between the ‘edge of chaos’ and the ‘edge of order’ (Cramer, 1993; Kauffman, 1993; McKelvey, 1999; Benbya & McKelvey, 2006). Evidently, this description of a complex system appears highly consistent with the adaptive process of digital new venture creation and the dynamic environment in which it occurs. Complexity of the digital new venture creation environment is defined by hyper-connectivity and mutual dependencies between actors. As such, digital new venture creation processes are intertwined in complex webs of sociotechnical ecosystems (Leonardi, 2012). These ecosystems operate ‘far from equilibrium’ and exhibit non-linearity, self-organisation, emergence and co-evolution (McKelvey, Tanriverdi & Yoo,
Thus, digital new venture performance is determined by the ability of focal agents to remain flexible and adaptive in order to drive new venture performance.

Accordingly, three mechanisms provide explanations on how adaptive leadership shapes new venture performance in complex digital systems (Reeves, Levin & Ueda, 2016). Firstly, digital entrepreneurs need to be realistic regarding what they can control; what they can shape collaboratively and what goes beyond the reach of their influence (metacognition required). Furthermore, they need to expect that unpredictable and emergent outcomes will arise from actions at lower levels. This suggestion indicates that effectual logic, which advocates non-predictive control as opposed to causal logic (Sarasvathy, 2001, 2008), may present a preferable mindset for managing the innovation and entrepreneurial process in a digital context.

Secondly, agents need to look beyond what they own or control by monitoring and addressing complexity outside the confines of the organisation. The reason being, success derives from contributing positively to the system, while in turn reaping the rewards of being part of it. Thus, establishing mutually beneficial partnerships with other actors enables digital new venture performance. Failure to create value for other stakeholders will result in marginalisation and defections. Thirdly, surviving in CASs is to realise that attempts to directly control actors at lower echelons of the system are often unproductive and counterintuitive, possibly leading to the collapse of the venture. As such, new ventures must eschew simplistic causal models and avoid trying to manage individual behaviour directly. Instead, they must seek to shape the context of that behaviour by fostering collaborative, ‘leaderful practices’ (Raelin, 2009).

Consequently, Reeves et al. (2016) suggest three mechanisms by which digital entrepreneurial ventures can be developed as CASs. They also identify three actionable
mechanisms or managerial levers that should be adopted – summarised in Table 3.2 below.

<table>
<thead>
<tr>
<th>STRUCTURAL FEATURES</th>
<th>ADDRESSED THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Heterogeneity – There should be diversity in actors, ideas, innovations and aspirations.</td>
<td>Collapse risk – Change from within or outside industry renders venture’s business model obsolete</td>
</tr>
<tr>
<td>2) Modularity – There should be loose connections between components of the business system and between business systems.</td>
<td>Contagion risk – Shocks in one part of the business ecosystem spreads rapidly to other parts</td>
</tr>
<tr>
<td>3) Redundancy – There should be duplication that creates buffering capacity in the business system.</td>
<td>Fat-tail risk – Rare but involves large shocks to the system such as global financial crisis, natural disasters, terrorism &amp; political upheavals</td>
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<table>
<thead>
<tr>
<th>MANAGERIAL LEVERS</th>
<th>ADDRESSED THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4) Expect surprises, but reduce uncertainty – collect signals, detect patterns of change, imagine possible outcomes and take precautionary steps</td>
<td>Discontinuity risk – The business environment evolves abruptly in ways that are hard to predict.</td>
</tr>
<tr>
<td>5) Create feedback loops and adaptive mechanisms – monitor change, promote variation, experiment, iterate rapidly, innovate</td>
<td>Obsolescence risk – The venture fails to adapt to changing customer needs, competitive innovations or altered circumstances</td>
</tr>
<tr>
<td>6) Foster trust and reciprocity – act in ways that benefit other participants in the overall system &amp; establish mechanisms that ensure reciprocity</td>
<td>Rejection risk – Avoid risk of rejection by participants in the business ecosystem</td>
</tr>
</tbody>
</table>

Adapted from Reeves et al. (2016)

The mechanisms for navigating, as well as developing CASs offer practical guidance on behaviours which may drive digital new venture performance. However, they stop short of offering more prescriptive practitioner guidelines and actionable mechanisms at proximal levels of process.

### 3.4 Actionable Mechanisms of Digital New Venture Creation

Practitioners have lately developed new theories of practice that have gained popularity alongside academic models which appear abstract and far removed from their often messy, real-world experiences in the ‘swampy lowlands’ of new venture creation (Schon, 1987; Dimov, 2016; Berglund, Dimov & Wennberg, 2018). These practitioner mechanisms have broadly been described as hypothesis-driven approaches to new venture creation (Eisenmann, Ries & Dillard, 2013). The lean start-up methodology (Ries, 2011, Maurya, 2012, 2016), the customer development model (Blank & Dorf, 2012; Blank,
2013) and design thinking (Brown & Katz, 2011) embody actionable mechanisms of a hypothesis-driven approach to entrepreneurship.

Given that hypothesis-driven models mainly originated in the context of digital new venture creation (software industries), they provide useful insights when explaining behaviours which shape digital new venture performance. As Berglund and Wennberg (2016) maintain, the lean startup and similar theories such as effectuation (Sarasvathy, 2008) and bricolage (Baker & Nelson, 2005) are united by their experimental and pragmatic approach to new venture creation. Effectual and bricolage decision-making principles can be used to approach hypothesis-driven models of new venture creation. Given the relative novelty of most hypothesis-driven models, evidence to support their role in driving new venture performance is still unfolding. Additionally, Nambisan (2016) argues that they still do not go far enough in providing fine-grained details on mechanisms driving digital new venture creation.

3.4.1 The Lean Startup & Related Models

Ries (2011) establishes the basis of the Lean Start-up Methodology (LSM) by defining a start-up as ‘a human institution designed to create a new product or service under conditions of extreme uncertainty’ (Ries, 2011, p. 27). Besides, a start-up is not a scaled down version of a large company (Storey & Greene, 2010; Blank, 2013). Therefore, it cannot be managed in the same way as a large or established venture. Hence, proponents of the LSM argue that new ventures exist to learn how to build a sustainable business model, while established ones already have their business models ‘nailed’ (Furr & Ahlstrom, 2011). New ventures learn by running several experiments geared towards achieving ‘validated learning’ of multiple aspects of the business model (Blank & Dorf, 2012). As already noted, mechanisms driving the derived actionable mechanism of experimentation in digital entrepreneurship are the affordances (action potential) of
digital artifacts and components – i.e. reprogrammability, editability, re-combinability, distributability and so on (Kallinikos et al., 2013).

According to proponents of the LSM, a major reason for new venture failure is the ‘allure’ of a good business plan and thorough market research (Blank, 2013). They argue that sticking to business plans ignores the fact that new ventures often operate under conditions of extreme uncertainty. They do not know who their customers are or what their product should be (Ries, 2011). Therefore, sticking to business plans and forecasts is considered ill-suited to the less stable, uncertain and unpredictable contexts in which digital new ventures operate. Accordingly, Ries advances the following five principles of the LSM:

1. **Entrepreneurs are Everywhere**: Eric Ries claims that the LSM can work in any size company, sector and industry. This assertion is based on the combinatorial characteristics of the LSM which borrows principles of lean manufacturing developed by Japanese automakers, the customer development model (Blank & Dorf, 2012) and agile development principles developed in software industries.

2. **Entrepreneurship is Management**: Given the extreme nature of uncertainty in which new venture are created, entrepreneurship is a different kind of management.

3. **Validated Learning**: New ventures exist to learn how to build a sustainable business model under uncertainty. As such, learning is most effectively validated by running frequent experiments to test key business hypotheses, with the goal of reducing uncertainty.

4. **Build-Measure-Learn**: Experiments begin with the agile process of turning ideas into products and measuring how customers respond. Thus, digital entrepreneurs begin by developing a Minimum Viable Product (MVP) to elicit customer feedback. Feedback results in a decision to either pivot (make adjustments), persevere or perish (disband).
Thus, innovation processes need to be geared towards accelerating feedback loops of learning. Indeed, the juxtaposition of the experimental approach of the LSM bears an uncanny similarity with action design methodologies of constructing, planning, acting, and evaluating action – see Figure 3.3.

**Figure 3.3 The Lean Startup & Action Research Process**

![The Lean Startup & Action Research Process](image)

*Source: Ries (2011, p.75)  Source: Coghlan & Brannick (2014)*

The similarities between the lean startup and the action design process are a testament to the unavoidability of theoretical eclecticism in understanding the pragmatic nature of new venture creation (Sarasvathy, 2001; Davidsson, 2016, p.57).

5. **Innovation Accounting:** Finally, the principle of innovation accounting refers to determining how to measure progress by setting up milestones and prioritising tasks. It involves basing decisions on actionable metrics which emanate from experimentation – e.g. funnel metrics, cohort analysis and more. An *actionable metric* is distinguished from a *vanity metric* by its role in meeting key business goals (revisited below) – whereby, vanity metrics often refer to apparently impressive figures that do not contribute towards meeting new venture objectives.
3.4.2 The Lean Startup Process – Concrete Steps

Based on the above five principles, Eisenmann et al. (2013) develop a number of concrete steps which prescribe how the hypothesis-driven new venture creation process unfolds.

**Vision:** The process begins with a vision or destination in mind. This vision describes how a company intends to create and capture value for and from its customers. It is, therefore, another way of conceptualising the new venture idea and manifest business model (Davidsson, 2015).

**Falsifiable Hypotheses:** Next, the vision is translated into a series of falsifiable hypotheses, represented on a Business Model Canvas (Osterwalder & Pigneur, 2010). The Business Model Canvas (BMC) as mentioned above, is a one-page document with nine components for laying out the building blocks of how a new venture intends to create and capture value. These nine components begin with the *value proposition*, which is at the centre of what a new venture offers to its audiences. It is followed by *customer segment*, which identifies the target customers the value proposition is meant to appeal to. *Customer relationships* help to define the types of relationships which will be formed with audiences. Further, the canvas also indicates *channels*, which are methods by which a firm’s services will be delivered. Next, *key partners* represent individuals and organisations who will be instrumental in realising the vision. While the *cost structure* defines the fixed and variable costs of realising the vision, the *revenue stream* describes the model by which the venture captures value from customers. The BMC also describes the key firm *activities* required to deliver the value proposition, as well as the *resources* needed to realise it. As Blank and Dorf (2012) clarify, the BMC is not a static and finite artifact. Its real power lies in the ability to discard and develop a new one as new knowledge is fed back into the process. Indeed, the simplicity of the BMC stands in
contrast to a business plan document, which may involve months of planning and research, yet ‘rarely survives the first contact with customers’ (Blank & Dorf, 2012). In more recent years, Maurya (2012) has developed the *Lean Canvas*, which he argues, serves to make the BMC more actionable by focusing on critical aspects of the BMC at different stages in the process. The BMC and Lean Canvas are single page documents because they see business planning as an ongoing process.

**Specifying MVP Tests:** This step involves specifying the test of a series of hypotheses indicated in the BMC. To do this, the new venture rapidly puts together ideas for a minimum viable product (MVP), which it builds and uses to begin eliciting customer feedback on various aspects of the business model. The MVP is the usable but not full-featured version of a market offering which enables the *Build-Measure-Learn* feedback loop. The focus is on nimbleness and speed, by minimising the total time through the loop. This approach to new venture creation is considered useful for digital technology-based start-ups (Moogk, 2012).

**Prioritising Tests:** At this stage, the entrepreneur prioritises tests which may assist in reducing waste and speeding up the search for idea validation.

**Learning from MVP tests:** Next, the entrepreneur evaluates feedback from testing the MVP while watching out for false positives and false negatives.

**Pivot, Persevere or Perish:** After evaluating feedback from MVP tests, the entrepreneur must decide whether to pivot, persevere or perish. To pivot is to correct course or adjust based on feedback. If a test returns positive results, the entrepreneur perseveres on course. However, if feedback from customers points to a resounding negative, the entrepreneur may decide to perish by disbanding the new business venture, thereby eliminating further waste.
Scaling: When the entrepreneur validates all hypotheses, the new venture achieves product-market fit (Blank & Dorf, 2012). As the name suggests, the new market offering has found a receptive market. It is usually demonstrated by demand from early adopters or lead users. At this stage, the business model is ‘nailed’ and ripe for scaling (Furr & Ahlstrom, 2011; Maurya, 2016). Scaling is the mechanism by which the new market offering diffuses to larger audiences while remaining sustainable. In line with Diffusion of Innovation theory (Rogers, 1995), it is the customer acquisition process which assists new market offerings to ‘cross the chasm’ from early adopters to the early and late majorities (Moore, 1999).

3.4.3 Limits of the Lean Startup

While the LSM has gained popularity as a mechanism for driving the digital entrepreneurial process, it is not without its fair share of criticisms. Blank (2013), a key proponent of the LSM, states that ‘while some adherents claim that the lean process can make individual start-ups more successful, I believe that claim is too grandiose’. He cautiously states that using the methodology will result in fewer failures than with traditional models. This clarification is important as it acknowledges that the lean startup may not always work for every new venture or context. The problem may have to do with the fact that academics and practitioners appear to have uncritically accepted the LSM without much empirical evidence of its role in driving new venture performance (Berglund & Wennberg, 2016). Consequently, critics of the LMS have identified many scenarios where its core axioms may be ill-suited. These scenarios relate to the nature of uncertainty (Davidsson, 2012).

When mistakes must be limited: Firstly, Eisenmann et al. (2013) state that when start-ups operate in environments where mistakes are intolerable, the LSM may be ill-advised. For instance, an insecure banking keypad device delivered to customers could
expose their finances to security breaches. Circumstances in which a post-launch correction of mistakes may not be possible, also fall under this category. Similarly, in cases where mistakes would affect customers’ mission-critical activities and trigger a severe societal backlash, including legal consequences, the LSM may not be ideal. In the digital entrepreneurial context, the advent of new regulation which severely penalises digital companies for data breaches such as GDPR (expanded in the next chapter), implies that the LSM may have limited applicability to certain types of digital new ventures.

**When demand uncertainty is low:** Secondly, where there is substantial evidence of unmet demand for a new product, such as a breakthrough treatment for a disease, Eisenmann et al. (2013) maintain that there is less need for an early launch and feedback from customers. In other words, the perceived certainty of demand is high and therefore favours a causal approach.

**When demand uncertainty is high but development cycles are long:** In cases where long product development cycles and enormous upfront fixed costs are needed, it may be impossible to launch early and often. Furthermore, if demand uncertainty is high and development cycles are long, such as the case with disruptive new technology, a fully working product, as opposed to an MVP may be needed to elicit any meaningful feedback in gauging the level of demand. Furthermore, Furr and Dyer (2014) argue that a Minimum Awesome Product (MAP) may often present a better route to innovating without as much waste as a MVP.

**More validation is not better:** In a study involving 250 teams in an American accelerator programme, Ladd (2016) found that there was no linear relationship between validated hypotheses and the subsequent success of teams. He also found that teams which conducted more formalised experiments with customers, performed worse than
teams that either conducted one or the other during the early stages of new venture design. The reason may stem from erosion of confidence – wherein, too much feedback from customers might cause entrepreneurs and teams to change their idea and eventually become disheartened or exhausted. Furthermore, repeated cycles of MVPs may not only wear out the entrepreneur, but it may also increase overheads. Thus, digital entrepreneurs are advised to maintain a sharp focus on opportunities for scaling.

**False negatives & lack of clear stopping rules:** Ladd (2016) also warns about the danger of ‘false negatives’ - by which, good ideas are mistakenly rejected due to the absence of clear rules on when to declare victory, cease experimentation and begin scaling. He suggests that a ‘lean strategy’ may be more useful in setting clear constraints for which markets and methods are to be considered while testing and fine-tuning the business model. Furthermore, he argues that if fifty per cent of customers in the target segment pay for a prototype, the business model should be locked in place. However, this argument appears to fly in the face of digital new venture ideas built on multisided advertising-based models (Maurya, 2016). Ad-based multisided models may take longer to grow their audience to a sizeable network which can be monetised effectively. Only when a tipping point in user base is reached, can it determine how much advertisers will pay. Additionally, how much advertisers are willing to pay fluctuates. Thus, a percentage of customers is a difficult number to define.

**Not all aspects of the business model need prioritising:** As earlier noted, Maurya’s (2012) adapted Lean Canvas incrementally prioritises aspects of the Business Model Canvas as the new venture develops. Accordingly, Ladd (2016) found that teams that focused on their target customer segment, value proposition and channel, performed twice as well as teams that did not give these three components much attention. Therefore,
not all aspects of the business model are equally important at various stages of digital new venture creation.

*Hidden danger of assuming consumer sovereignty:* More recently, McMullen (2017) points out the hidden dangers of assuming consumer sovereignty in the new venture creation process. He states that new venture creation revolves around the needs of multiple stakeholders, of which the consumer is only one of. Thus, while pivoting to meet customers’ needs is essential, if it results in the loss of passion by the entrepreneur, there will be ‘no motive to start the entrepreneurial process, no action in need of a pivot, and no value for stakeholders to claim’ (McMullen, 2017, p.4). Indeed, the idea of the sovereign customer is challenged by examples such as the success of Apple’s iPad. At first, it was not evident why an iPad was needed when leaner laptops existed. To explain its success, Vargo and Akaka (2012) argue that interconnected value co-creation in service ecosystems requires a deeper understanding of the nature and role of technology as well as institutions which frame its multidimensional contexts. Hence, customer sovereignty may not always explain venture performance since multiple interconnected stakeholders interrelate in shaping venture success.

*Lean startup is a ‘code for unplanned’:* While most criticisms of the lean startup so far explored pick out an aspect of the methodology and moderately criticise it, Masters and Thiel (2014, p.213) are unequivocal in their stance against its core axioms. They start by arguing that ‘leanness’ is a mechanism, not a goal. As such, making small incremental changes using MVPs offers little help in finding the global maximum. They recommend that entrepreneurs focus on careful planning while forgetting MVPs and feedback from focus groups. A bad plan, they argue, is better than no plan; and it is better to risk boldness than triviality. Furthermore, a new venture is the most significant endeavour over which an entrepreneur can have absolute mastery.
3.4.4 The 24 Steps – A Disciplined Approach to the Lean Start-up

Given the weaknesses of the LSM, new models are emerging which claim to remedy them. Among the newer models, Aulet (2013) attempts to combine principles of the LSM with other structured innovation process theories to arrive at a 24-step ‘disciplined’ process of new venture creation. The 24 steps are split into six broad steps. Firstly, entrepreneurs need to know who their customer is. Secondly, they need to determine what they can do for the customer – i.e., identify a value proposition. Thirdly, they need to determine how the customer acquires the product – customer relations. Fourth, they must determine how to generate revenue – revenue streams. Fifth, they need to determine how to design and build the product. Finally, they need to figure out how to scale the business.

The six themes of the 24 steps are clearly drawn from the Business Model Canvas (Osterwalder & Pigneur, 2010), which the LSM equally adopts. The difference lies in the more prescriptive steps which the model advocates and the adaptation of traditional business planning into its framework. However, one cannot help but question the highly prescriptive steps against the complexity and uncertainty of a digital new venture creation process. For instance, the model assumes that a digital entrepreneurial agent can control most of the circumstances surrounding the digital entrepreneurial process through a systematic approach. There is only scant reference to how material agencies might interact to shape action.

Therefore, one can conclude that the 24 Steps is a useful tool for formulating new venture ideas and evaluating them, but its lack of systematic empirical evidence makes it necessary to view its claims with healthy scepticism. Thus, it may be useful as a brainstorming and planning tool. However, even as a planning tool, it is difficult to see how the 24 Steps adds more value compared to the LSM which has been observed in
practice for much longer. Perhaps, Design Thinking may represent a more differentiated mechanism that complements the LSM.

### 3.4.5 Design Thinking: Alternative to the Lean Startup

Design Thinking (DT), a method developed to solve problems for clients (Kelley & Littman, 2001), is a systematic, user-oriented approach in solving real-life problems (Plattner, Meiner & Weinberg, 2009). Its user-centred design, focuses on addressing the user’s needs and requirements, instead of how the problem can be solved technically. It adopts structured and iterative processes in solving user needs. Brown (2008, p.88) identifies three phases in the IDEO approach to design – inspiration, brainstorming and implementation. Inspiration is the purview of the new venture idea, while brainstorming is the acquisition, development and testing of ideas. It refers to the practicalities of opportunity confidence (Davidsson, 2015) and the iterative cycles of new venture enactment and adjustments. At the implementation stage, a definitive prototype is launched. However, Plattner et al. (2009, p. 113) develop a more comprehensive model of DT which includes six phases. The phases begin with understanding the problem, followed by observations that lead to a so-called point-of-view. Next, ideation, prototyping and testing follow. Figure 3.4 subsequently, is a representation of the steps in a DT process.

*Figure 3.4 The Design Thinking Process*

*Source: Plattner et al. (2009, p.113)*
The mission of DT, according to Brown and Katz (2011), is to translate observations into insights, and insights into products and services that improve lives. It is similar to the LSM in terms of its hypothesis-driven approach but retains distinguishing characteristics. Given that DT has experimentation at its core, the similarities between the LSM are striking. Thus, it may be more worthwhile examining the differences between DT and the LSM. Hence, Table 3.3 summarises the key differences between both methodologies as examined by Muller and Thoring (2012).

Table 3.3 Comparisons between Design Thinking & Lean Startup

<table>
<thead>
<tr>
<th>What</th>
<th>Design Thinking</th>
<th>Lean Startup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Innovations</td>
<td>Innovations</td>
</tr>
<tr>
<td>Scope/Focus</td>
<td>General innovations</td>
<td>Appears digital technology focused</td>
</tr>
<tr>
<td>Approach</td>
<td>User-centred</td>
<td>Customer-oriented</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>Solve wicked problems</td>
<td>Unclear customer problems</td>
</tr>
<tr>
<td>Testing</td>
<td>Fail early, succeed sooner</td>
<td>Accelerated feedback loops recommended</td>
</tr>
<tr>
<td>Iteration</td>
<td>Iterative</td>
<td>Iterative with pivoting</td>
</tr>
<tr>
<td>Ideation</td>
<td>Ideation is part of the process</td>
<td>Ideation is not part of the process;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Product vision originates from the founder</td>
</tr>
<tr>
<td>Qualitative</td>
<td>Ethnographic techniques</td>
<td>Not a focus</td>
</tr>
<tr>
<td>Quantitative</td>
<td>Not a focus</td>
<td>Emphasis on actionable metrics</td>
</tr>
<tr>
<td>Business model</td>
<td>Not a focus</td>
<td>Focus</td>
</tr>
<tr>
<td>Hypothesis testing</td>
<td>Not a focus</td>
<td>A prime focus</td>
</tr>
<tr>
<td>Prototype testing</td>
<td>Yes</td>
<td>Yes, called a MVP</td>
</tr>
<tr>
<td>Target group</td>
<td>Users (usually end users, sometimes stakeholders)</td>
<td>Various customer segments – end users, influencers, economic buyers, etc.</td>
</tr>
</tbody>
</table>

Source: Adapted from Muller & Thoring (2012)

The differences between the models reveal circumstances under which they may be complementary. To begin, the scope of both approaches is different. While the lean startup mainly focuses on new ventures, DT applies to more generic instances of product innovation. As such, while the LSM begins with a new venture idea, DT projects begin with a challenge or ‘wicked problems’ (Buchanan, 1992; Rittel, 1972). Under these circumstances, the problem is not defined until after extensive research has been conducted, from whence ideas are generated. The nature of research at the beginning of the project is mostly inductive qualitative studies that use ethnographic techniques (Kelley & Littman, 2005). Further, insights from qualitative studies are synthesised using
several sophisticated methods such as ‘Personas’, ‘User Journeys’ and ‘Causal Maps’ (Kolko, 2011) - with the goal of arriving at a so-called ‘Point of View’. The LSM, on the other hand, does not work with such synthetic methods.

Another significant difference between the two models can be seen in the distinction between customers, users and stakeholders. The LSM distinguishes between users, influencers, recommenders, economic buyers and decision-makers for segmenting markets. DT refers merely to users as end users and stakeholders. Solving end users’ needs in DT often entails an ideation stage which involves brainstorming and brain writing. However, since the LSM often begins with a business idea from the entrepreneur, idea generation is absent in the process (Muller & Thoring, 2012).

Given the distinction, one could conclude that DT is more generic to most innovation processes and less specific to digital new venture creation. Whereas, the LSM appears better suited to the context of digital entrepreneurship and offers a more comprehensive approach with actionable mechanisms which drive new venture realisation. As indicated, digital new venture creation is order-creation in a complex adaptive system. Experimentation is a recommended mechanism for navigating complex and uncertain environments. The LSM actively embraces experimentation as its core axiom. Consequently, despite its weaknesses, it arguably presents a more comprehensive approach to digital new venture creation compared to the alternatives.

3.5 **Digital New Venture Growth – Surviving & Scaling**

The above literature has underscored the fact that experimentation is a recurrent, actionable mechanism for driving the digital entrepreneurial process. As venture performance is determined by survival and success (Chrisman et al., 1998), the actions which drive venture survival can be described as a process of growth. It is no wonder that
growth is inextricably linked to entrepreneurial scholarship (Davidsson, Delmar & Wiklund, 2006). In fact, the statement ‘growth is the very essence of entrepreneurship’ is enshrined in the literature (Sexton, Upton, Wacholtz & McDougall, 1997). Growth has been described as the differential outcome between two points in time (Delmar, Davidsson & Gartner, 2003). However, the entrepreneurship and small firm growth literature has been described as ‘tilting at windmills’—an observation of the many years of fragmented and inconclusive research on growth (Leitch, Hill & Neergaard, 2010). Indeed, following a review of the growth literature, Storey and Greene (2010, pp. 215-216) conclude that only four ‘stylised facts’ can be trusted to explain new venture growth. Firstly, new ventures that have grown are more likely to survive subsequently. Secondly, fast business growth is highly unusual. Thirdly, growth is ‘spotty’—meaning, firms that grow at one point do not necessarily grow at another (Delmar, Davidsson & Gartner, 2003). Finally, with due consideration for survivor bias, Dunne and Hughes (1994) find that younger and smaller firms grow faster than older and larger businesses.

McKelvie and Wiklund (2010) blame the lack of progress on a premature concern with the question ‘how much’ firms grow, as opposed to ‘how’ they grow. Similarly, Dobbs and Hamilton (2007) note that research on venture growth has mostly indicated change in size, when in reality, growth is a process. As determined, growth as an outcome is the object of concern in much of the literature. However, Shepherd and Wiklund (2009) argue that simply observing increments in amounts over time only yields partial insights which ignore a host of factors such as differences in the willingness to grow or venture characteristics (Delmar & Wiklund, 2008). Meanwhile, the second group of research has been focused on the outcomes of growth. This group treats growth as an independent variable. It examines the changes which occur within an organisation as a result of growth by emphasising managerial challenges (Greiner, 1972). However, it has been heavily
criticised for being too deterministic because it assumes that all firms pass through biological phases of growth and decline. A substantial number of firms do not grow (Birley & Westhead, 1990); and those that survive never grow beyond a small size (Coad, 2007). Consequently, growth as a process has been deemed a more worthwhile pursuit for entrepreneurial scholarship. Growth as a process is the purview of entrepreneurship since it studies the process of new venture creation (Dimov, 2007). For this reason, it calls for longitudinal, real-time studies of firms using different modes of growth – i.e., organic, acquisition and hybrid modes.

However, Davidsson, Steffens and Fizsimmons (2009) argue that growth as a process does not simply happen for growth sake, but it is ultimately geared towards value creation and profitability as an outcome. Using a Resource-Based View of the firm, they contend that growth is not direct evidence of effective value creation and appropriation. Therefore, it is not always a measure of venture success – i.e., there is such a thing as unprofitable growth. Based on their research findings, Davidsson et al. (2009) hypothesise that ventures which show high profitability at low growth are more likely to attain a state of high growth in subsequent periods. On the contrary, ventures that show high growth at low profitability are more likely to reach a state of low growth and low profitability in subsequent periods. Thus, in examining the mechanisms which drive growth as a process, one cannot lose sight of the fact that the ultimate goal of growth is value creation and capture.

3.5.1 Growth as a Process in Networked Environments

Examining the mechanisms by which new ventures grow is traced back to Penrose’s (1959) Theory of the Growth of the Firm, in which growth is defined as an ‘internal process of development’ as well as ‘increase in amount’. While the ‘outcome’ literature has mainly focused on increase in amount, the process aspect has largely been
neglected. As Penrose argues, the ability of a business venture to grow is contingent on how well it can exercise judgment in applying its resources. This perspective is consistent with Casson’s (1982) definition of an entrepreneur as one who makes ‘judgmental decisions’ regarding the allocation of scarce resources. Furthermore, Penrose identifies organic growth and growth by acquisition as the two main modes of growth, with corresponding limitations. Organic growth comes about when a new venture expands. When it expands, its potential resource combination expands with it. Thus, organic growth will lead to the development of new resources which are similar, but not complementary. Yet, it is complementary resources, not similarities, which create value (Harrison, Hitt, Hoskisson & Ireland, 2001) – it therefore follows that firms cannot rely solely on organic growth. As such, acquisition presents an option as ‘a means of obtaining the productive services and knowledge that are necessary for a firm to establish itself in a new field’ (Penrose, p. 126). The problem with acquisition, however, is that it brings new managerial challenges in relation to integrating newly acquired resources. Also, acquiring other firms is arguably not a realistic scenario for a resource-constrained new start-up venture.

Given that over fifty years have passed since the inception of Penrose’s venture growth theory, it is understandable that new modes of firm growth may not have been accounted for. For this reason, McKelvie and Wiklund (2010) add a hybrid mode as third mode of growth. A hybrid mode of growth consists of ‘contractual relationships that bind external actors to the firm at the same time as the firm maintains a certain amount of ownership and control over how any assets are used’. It includes franchising, licensing, strategic alliances and joint ventures. Adding a hybrid mode of growth provides a useful conceptual basis for explaining how digital new ventures grow in a network-centric environment (Amit & Zott, 2001). However, theories on the mechanisms by which hybrid
modes of growth occur, have been heavily influenced by a traditional network approach to growth.

As Watson (2007) states, a traditional network approach to growth hinges on the ability of owners to cost-effectively gain access to resources which are not under their control. It entails three main approaches to analysing networking and venture growth. A network magnitude approach suggests that the greater the size of an entrepreneur’s network, the higher the opportunity for business growth. Meanwhile, a network closure approach (Coleman, 1988) argues that social capital is maximised when entrepreneurs make use of stronger ties (e.g. friends and family), as opposed to weaker ties such as acquaintances (Granovetter, 1973); the reason being that they can easily observe the actions of others and trust creates strong bonds.

There are five main criticisms of traditional variants of a network approach to growth. Firstly, measuring the linkages between networking and business growth has proven elusive (Storey & Greene, 2010, p. 227). Secondly, the network magnitude approach is criticised for emphasising trust as beneficial rather than market-based mechanisms. Thirdly, the evidence linking business growth to networking is weak (Havnes & Senneseth, 2001; Watson, 2007). Fourth, network closure was found to be less likely to lead to success than in firms that exploited structural holes (Zaheer & Bell, 2005) – the reason being network position helps identify opportunities. Fifth, Amit and Zott (2001) contend that such a traditional network view with a background in sociology and organisational theory is inadequate for explaining growth in a digital entrepreneurial context because it is based on an assumption of stable inter-organisational partnerships, which is not always the case in digital value creation. Thus, traditional network theories of growth are seen as an incomplete premise for explaining the meteoric rise of digital ventures such as Airbnb and Uber (Zervas, Proserpio & Byers, 2014).
Consequently, a *network position* approach appears more reliable in theorising the growth process of a digital entrepreneurial venture. It argues that growth is more likely to occur when networks are porous and open-ended – as it allows for easy transfer of knowledge regarding opportunities (Burt, 2000). Thus, successful entrepreneurs position themselves to locate ‘structural holes’ or influencers between networks. This view appears consistent with the digital entrepreneurial context where porousness is manifested in the distributed and dynamic nature of entrepreneurial agency with independent and democratic control of resources (Nambisan, 2016). Hence, successful leadership in a highly complex adaptive network of digital new venture creation has been described as ‘weaving’ (Raelin, 2016) – whereby, weaving describes the ability to create webs of interaction across existing and new networks with the goal of mobilising mutual activities and creating a sense of shared meaning.

3.5.2 **Digital New Venture Scaling – A Network Effects Perspective**

Unlike in traditional new venture creation where profitability, sales levels and market share of customers (McKelvie & Wiklund, 2010) are deemed important growth metrics, a network externalities or *user base* approach (Katz & Shapiro, 1986; Oliva, Sterman, & Giese, 2003; Prasad, Venkatesh & Mahajan, 2010; Maurya, 2016, pp. 29-30), based on Metcalfe’s Law (Metcalfe, 1995), provides a useful lens for understanding scaling and digital new venture growth. The basic premise of Metcalfe’s Law is that a network becomes more valuable as it reaches more users; and, once a network reaches a critical inflexion point, network effects activate and exponential growth follows. However, Hagiu and Rothman (2016) caution that while strong network effects are the path to value creation for digital new ventures if poorly executed it can have negative consequences. Hence, they caution that growing too fast without understanding optimal *supply-demand fit* can put stress on the business model. The supply-demand fit is
achieved when buyers are as happy to purchase the products or services as providers are to supply them. Similarly, growing too early, especially for multisided platform business models, amplifies problems in the business model, making them harder to fix.

Nevertheless, the value of achieving strong network effects is tangibly explained by Maurya’s (2016, p. 9) use of a factory metaphor which goes - user base is like raw materials that a factory converts to finished goods (customers). It involves attracting a large number of users from within which conversions can be made to generate revenue. Further, Amit and Han (2017) argue that the value of digital businesses reside in the network effects because it makes it harder for competitors to dislodge. Likewise, Rayport and Sviokla (1995) note that digital ventures may be able to harvest the value of network effects in an ‘infinite number of transactions’.

In line with Diffusion of Innovation Theory (Rogers, 1995), successful digital new ventures are those which can attract enough users to ‘cross the chasm’ between early adopters and early majority (Moore, 1999). As the theory argues, the characteristics of the new venture idea determine its potential for scalability. Digital new ventures often benefit from the distributable affordances of the internet platform, which overcomes the ‘tyranny of space’ (Nambisan, 2013). Hence, digital new venture ideas based on rapid internationalisation across borders stand a better chance of achieving strong network effects.

### 3.5.3 Rapid Internationalisation & Digital New Venture Scaling

As noted, rapid internationalisation is made feasible for digital new ventures by the reach of the internet and distributable digital artifacts (Evans & Wurster, 1999; Kallinikos et al., 2013), as well as the democratisation of digital resource access (Aldrich, 2014). Hence, a relatively new research stream has focused on growth by the
internationalisation of small new ventures – alternatively referred to as born globals (Knight & Cavusgil, 2004), international new ventures and micro-multinationals (Oviatt & McDougall, 2005). Whereas prior research suggested an incremental approach to growth by internationalisation, these new ventures are global from the very inception.

With the enabling power of internet connectivity and scalable affordances of digital infrastructures, rapid scaling of digital new ventures across geographical borders is central to explaining growth in a digital entrepreneurship context. As Blank (2014) asserts, countries with populations higher than 100 million can afford to look inward, serving local markets. However, since most countries have populations less than that, going global is necessary for venture performance and survival. However, whether digital firms choose to go global is defined by multiple factors, including the entrepreneur’s willingness to grow, the embodiment of the new venture idea and much more. Consequently, Hazarbassanova (2016) identifies both passive and active approaches to digital new venture internationalisation.

Digital-born global ventures are distinguished by the external enablement of the internet and digital infrastructures, as well as the diffusibility of the new venture idea and offering (Gabrielsson & Kirpalanu, 2004; Loane, McNaughton & Bell, 2004; Tanev, Rasmussen, Zijdemans, Lemminger & Svendsen, 2015). While digital new ventures ideas are not homogenous (pure/hybrid modes), Hennart (2014) argues that the new venture idea and offering, and its capacity for low-cost distribution is a key characteristic which explains how such ventures achieve strong network effects by internationalisation. The digitised, non-physical nature of digital artifacts enables high scalability (Zhang, Lichtenstein & Gander, 2015). Mahnke and Venzin (2003) explain that pure digital new market offerings do not perish or require transportation, have significant benefits for economies of scale, have no diminishing returns to scale and their interactivity produces
valuable data which enables instant adjustments or pivots geared towards satisfying customer needs. In addition, digital new market offerings can be developed by leveraging the capabilities of dynamic collectives dispersed across geographical regions - since loosely coupled and modifiable digital artifacts allow multiple actors to network and co-create value across value networks on a piecemeal basis (Kallinikos et al., 2013; Nambisan, 2016).

As Hamil and Gregory (1997) observe, digital infrastructures improve communication between customers and suppliers, helps identify new customers and distributors, as well as generate a wealth of information on market trends and customer behaviour across borders. Moreover, the cloud-based digital infrastructure of dominant players such as Amazon Web Services (AWS) and Google’s cloud services allow capital to be released from large digital projects for use by smaller actors on a ‘pay as you go’ basis (Bell & Loane, 2010). Resource sharing with large players is partly enabled by API (Application Programmable Interface) technologies which allow systems to share data and resources, resulting in layered modular architecture of digital market offerings (Yoo et al., 2010; Lyytinen et al., 2016). The result is the democratisation of digital infrastructure access, which allows small digital new ventures to make use of high quality and sizeable resources previously only available to large companies.

However, researchers have identified some challenges to growth by being a digital-born global (Manke & Venzin, 2003; Brouthers, Geisser & Rothlauf, 2018). Among them, the low barriers to entry imply that market offerings might be easy to imitate in foreign markets. Besides, the introduction of a new market offering may require educating customers and creating personalisable experiences, which all come with added costs. There are also issues relating to cultural differences when growing an international community. Further, differences in internet speed and ICT infrastructure across countries
demand further customisation. In extreme cases, internet regulation such as the so-called *Great Firewall* of China, curtail the ‘reach of the internet’ (Evans & Wurster, 1999) and increase the need to adapt offerings to meet the requirements of local markets. China’s Great Firewall and internet censorship result in network latency, with the consequence being the poor performance of foreign-hosted sites in China (Lowe, Winters & Marcus, 2007). Thus, digital entrepreneurs seeking to engage with Chinese internet users actively, adapt to the pressures for local responsiveness by hosting sites on local servers and customising their offerings to comply with local norms and regulations. As China has emerged as a giant in the internet market, adopting a passive approach to engaging with it can hardly unleash the potential of its enormous digital user base offers. Thus, digital entrepreneurs are called upon to weigh the cost-benefit of adapting to local barriers before choosing to adopt a passive or active approach to being born truly global.

### 3.5.4 Scaling Mechanisms of Digital New Ventures

While the potential for rapid internationalisation appears to be the result of externally driven, actor-independent mechanisms, digital new ventures can act to grow their user base at the meso and micro levels of the new venture creation process. The literature identifies many actionable mechanisms by which this can be accomplished. At the meso level, complementarities, novelty, lock-in and efficiency are mechanisms of the new venture idea that drive strong network effects (Amit & Zott, 2001). Meanwhile, at the micro levels of tactics, Huang et al. (2017) identify some generative mechanisms of digital new venture scaling.

*Complementarities, Lock-in, Efficiency & Novelty:* According to Amit and Zott (2001), growing the digital user base through complementarities involves offering a bundle of products and services which together provide more value than the total value of having them as separate. Digital businesses leverage this potential by offering bundles
of vertical complementarities such as after-sales services or horizontal complementarities through a one-stop shop for multiple related but not directly competing products. Complementarities can easily be integrated through APIs which allow for data sharing. For instance, an airline company such as Ryanair primarily uses its website to sell flight tickets but integrates horizontal complementarities such as hotel bookings, travel insurance and car rentals from partners. Such complementarities, in turn, increase customer efficiency and reduces transaction costs.

Meanwhile, lock-in is the extent to which customers are motivated to engage in repeat transactions, such as return visits to a website or digital platform. In a way, lock-in manifests through increased switching costs (Farrell & Klemperer, 2007). Hence, loyalty programmes which reward repeat customers with special offers not only helps retain them, but also drives advocacy. Other examples of lock-in include familiarity with use of a product or platform. Familiarity results in efficiency for the customer or user as they need not spend time learning how to use a new platform or interface. Furthermore, since the utility of digital goods derives from consumption with other agents (network effects), discussion boards and social media pages facilitate customer to customer interaction with the potential of influencers driving viral dissemination of new market offerings.

Finally, novelty drives the growth of the user base when it involves leveraging digital capabilities to bring new offers to existing markets. For instance, affiliate programmes allow digital entrepreneurs to offer novel products to their users while simultaneously increasing efficiency in terms of search. In cases of a first mover advantage, growth can be driven by digitisation and digitalisation of traditional products and services. For instance, Deliveroo and Just Eat are digital new venture ideas that brought digitisation and physical services together in powerful new combinations of
socio-technical systems in the restaurant industry. Per Diffusion of Innovation Theory, the above mechanisms appear to be guidelines on digital new venture ideas that have a high chance of successful diffusion.

**Generative Mechanisms of Digital New Venture Performance:** At micro levels, however, the performance of digital new ventures can be the result of specific actions which digital entrepreneurs take. The mechanisms by which these actions drive new venture performance have been described as a generative process of rapid user base scaling (Huang et al., 2017). The generative process is premised on the idea that with the initial success in growing the user base, there is an increased prospect that more users will follow (Song, Parry & Kawakami, 2009). Accordingly, Huang et al. identify three contingent mechanisms by which the generative process of rapid user base growth occurs in digital new ventures – namely, *data-driven operation, instant release* and *swift transformation*. These mechanisms together allow digital start-ups to stay lean, agile and flexible while growing at speeds not normally observed in more traditional business contexts – hence the expression ‘growing on steroids’ (Huang et al., 2017).

*Data-driven operation* is a mechanism found to be the starting point for growth. It involves the collection of vast amounts of user data, as well as data from other sources to inform growth-oriented initiatives. However, as the lean startup model prescribes, data-driven operations cannot become an obsession with ‘vanity metrics’ (Ries, 2011). Activities must include a combination of quantitative data, with qualitative insights, to guide sound decision making (Croll & Yoskovitz, 2013). Digital marketing activities such as user profiling help identify opportunities for growth by launching highly targeted marketing. Similarly, decision hedging, which involves analysing established and emerging data, was found to aid risk assessment. In addition, fine-grained monitoring of
the user base data for growth and decline affords flexible responses to positive or negative signals.

Meanwhile, the *instant release* mechanism allows digital new ventures to minimise the time between idea and deployment by simultaneously trialling and modifying innovations. Activities under this category include launching, trialling and reactive modification. It defines the nature of experimentation which drives user base growth. Finally, *swift transformation* is a mechanism that resembles the lean start-up notion of pivoting (Ries, 2011). It involves the occasional effort to generate a new wave of scaling by repositioning aspects of the business model in line with significant data-derived insights. These mechanisms appear to be operationalised through digital marketing activities at more granular levels.

### 3.5.5 Digital Growth Marketing

Digital marketing activities are behaviours which offer more fine-grained insights on scaling digital new ventures, with practical value. Digital marketing entails using digital technology to get closer to customers, thereby identifying, anticipating and satisfying their needs efficiently and effectively (Chaffey & Smith, 2017, p. 21; Huffman, 2018). Kannan and Li (2017) broadly define it as ‘an adaptive, technology-enabled process by which firms collaborate with customers and partners to jointly create, communicate, deliver, and sustain value for all stakeholders’. Thus, its deviation from traditional marketing arises from the realisation that in a multi-channel and networked environment, customers are not passive receivers of a company’s segmentation, targeting and positioning activities (Kotler, Kartajaya & Setiawan, 2016, p.20).

**Digital Marketing Mix:** Accordingly, Kotler et al. (p. 50) argue that with increased connectivity, digital business environments dictate a shift from vertical to
horizontal relationships between a venture and its customers. As such, they propose that the Marketing Mix or 4 Ps (Product, Price, Place & Promotion) in the digital context should be redefined as the 4 Cs (i.e., Co-creation, Currency, Communal Activation & Conversation). The 4 Cs represent the digital marketing mix in which, co-creation is contingent on delivering a superior value proposition by engaging customers in the product (i.e., service-dominant logic) innovation process. Meanwhile, currency involves using big data analytics for dynamic pricing based on market demand and capacity utilisation. Likewise, communal activation entails the peer-to-peer distribution of services as in the sharing economy where the dormant value of owned-products is activated through digital networking (Kannan & Li, 2017). Finally, conversation shifts focus from unidirectional promotion to the engagement of customers through social media.

**Digital Growth Marketing Overview:** Digital marketing activities that are geared towards driving new venture growth have alternatively been described as growth marketing (Huffman, 2018) and growth hacking (Holiday, 2014; Brown & Ellis, 2017). Growth hacking or marketing is defined as an approach to improving the performance of digital offerings through structured testing and optimisation (Chaffey, 2015 p. 477). While the word hacker may conjure up notions of digital criminality, growth hackers, on the contrary, are digital marketers who combine marketing expertise with coding and technical know-how to deliver targeted user base growth. They can more positively be thought of as data scientists whose knowledge and use of tools such as emails, Pay Per Click (PPC) – also Cost Per Click (CPC) - ads, analytics, platform APIs (Application Programming Interface) and blogs are crucial to growing the user base of a new digital venture at high velocities (Holiday, 2014). Similar in many way to principles of the Lean Startup (Ries, 2011; Blank & Dorf, 2013), digital growth marketing supposedly begins with a good product or content (‘Content is king’ remains a popularised digital marketing
maxim), which is developed and refined through iterative cycles of experimentation (Brown & Ellis, 2017). With a good product or content, the development of strong network effects can be realised through activities such as Search Engine Optimisation (SEO), PPC, social media marketing, permission or email marketing and viral marketing.

**Strategies, Tactics & Actions in Digital Growth Marketing:** According to Chaffey and Smith (2017. p. 368) SEO is one of the most critical paths to digital growth marketing. Successful SEO is a sociomaterial activity whereby digital marketers mutually exploit the means-end relationships afforded by the materiality of algorithmic search engine agencies. It begins with the basic understanding that search engines exist to help users find information which is specific to their requests. Furthermore, search engines are in a constant battle with web spammers, who seek to rank high while offering little or no added value to users. Thus, the main activities of SEO include keyword research and placement, as well as relevant link building which boosts digital product ranking. Search engines consider *inbound* links from relevant channels as a vote of confidence by ‘the crowd’.

Similarly, the strategic placement of keywords and keyphrases on web pages can give search engines signals which show their relevance. Without SEO skills, digital market offerings may never rank high in *Search Engine Results Pages* (SERPS). Since most digital consumers seldom scroll beyond the first page of SERPS (Höchstötter & Lewandowski, 2009), excellent digital products may become *lost in cyberspace*. Hence, Chaffey and Smith (2017) maintain that it is not always the most technologically superior digital market offerings which succeed, but those that are good enough and can be found. Thus, *findability* is the cornerstone of many SEO and Social Media Optimisation (SMO) goals. Digital entrepreneurial agents with good SEO and SMO skills can frugally
bootstrap a digital new venture to success by making its products more findable across the internet.

However, the challenge for the digital marketer, according to Chaffey and Smith (2017), lies in the fact that algorithmic agencies regularly update ranking rules in ways that are often not transparent – thus, continuous monitoring and experimentation is essential for SEO-driven growth strategies. While SEO is a valuable approach to growing an active user base, regular updates in search engine algorithms can adversely affect new ventures, leading to a loss of strong network effects. Further, if SEO is conducted by unskilled actors using so-called ‘Black Hat SEO’ techniques, the result can be highly detrimental (Aswani, Kar, Ilavarasan & Dwivedi, 2018). Generally, it would be ill-advised to rely solely on SEO for growth hacking. Combining SEO with other techniques such as PPC marketing is recommended for growing the user base. PPC marketing enables the accurate targeting of keywords and contextual ad placements on relevant websites and Search Engine Response Page (SERPS). As the name suggests, advertisers pay only when an ad is clicked. Its main disadvantage lies in the fact that if poorly executed, it can become a waste of valuable financial resources. Waste can be the result of poorly targeted placements. Since it is based on PPC advertising, it is an expensive but potentially rapid approach to reaching early adopters and early majority of users for digital ventures which are well-resourced. While growing the user base is essential, attracting a large number of poorly targeted users is an example of a ‘vanity metric’ (Ries, 2011). Hence, a growth hacker focuses on actionable metrics such as conversions, cohort analysis and bounce rates (i.e., typically visitors exiting after a single web page view) as well as growth in Page Rank & Domain Authority (Aswani et al., 2018) – i.e. prestige of a website based on its content quality, as judged by search engine algorithms. Thus, the combinatorial use of Google Ads (previously Adwords) with its Keyword Planner tool
and Google Analytics (analytics.google.com) is necessary for targeted experimentation which focuses on actionable metrics and conversions (Chaffey & Smith, 2017, p. 384).

CPC marketing can be carried out as part of SEO or SMO strategies. While social media networks such as Facebook attract an audience larger than the population of China at over 2 billion monthly users (McKinsey, 2016), success on these platforms often hinges on effective communication strategies as part of inbound marketing (Halligan & Shah, 2009). For this reason, growth hacking through SMO operates on the assumption that digital socialisation is about participating in online discussions, sharing ideas and content. Social media marketing is essential because it can support advocacy among users, prompting some to share content – thereby helping the growth hacker to achieve viral growth. Viral marketing is a clever SMO activity based on the creation and distribution of shocking or highly informative content which makes for compulsive viewing and sharing (Chaffey & Smith, 2017 p. 428). It may come in the form of a video, an image or social media message. It involves harnessing the network effects of social media platforms to reach large numbers of people rapidly. Viral marketing requires creative material, shared experience, seeding (identifying sites and social media platforms that act as influencers), promoting content, tracking and monitoring the effects of the message (Holiday, 2014; Brown & Ellis, 2017).

3.6 DISCUSSION & CONCLUSION

Having explored the literature on the digital entrepreneurial process and general background to entrepreneurship, many critical findings emerge which suggest answers to the research question stated in Chapter One. As a quick recap, this research seeks to describe the digital entrepreneurial process and identify the significant mechanisms driving new venture creation and performance at various phases. Findings from Chapter
Two have already suggested key building blocks of all entrepreneurial processes and developed a process model that helps organise narratives – see Figure 2.10 in Chapter Two.

3.6.1 Summary of Traditional Assumptions of Entrepreneurship

As a summary of Chapter Two findings, the entrepreneurial process begins when a focal agent generates a new venture idea (NVI) and evaluates it to gain opportunity confidence (OC) – or Idea Confidence for consistency (Davidsson, 2015). It is assumed that the traditional new venture idea is based on physical and tactile new market offerings – hence the dominance of process mechanisms that assume relative stability. Further, high or low levels of OC is the result of perceived levels of uncertainty (McMullen & Shepherd, 2006). The NVI is a consequence of external enablers, effectual means and entrepreneurial cognitions (Sarasvathy, 2001). External enablers offer mechanisms which influence decision-making and action of human agents. At the initial stages, the entrepreneurial process is mainly conceptual. Together with collaborating agents, focal agents offer human agentic mechanisms which result in the enactment of the NVI and venture performance. The interrelationship between external enablers and entrepreneurial decision-making mechanisms translates into actions which drive processes towards a variety of outcomes. Three types of outcomes emerge from taking action. Firstly, adjustments (Garud & Giuliani, 2013) are the changes human agents make to the NVI which in turn affects the levels of OC.

Meanwhile, towards end phases, enactment results in a new market offering. Upon user or customer feedback, more adjustments are made to the NVI, leading to new action which results in another iteration of the new market offering. Ideally, these adjustments end in venture scalability. Meanwhile, the third outcome of enactment is a decision to exit. Exit may occur after a successful new market offering as moderated by focal agents’
motivation. In this case, the entrepreneur exits while the venture continues under the leadership of new focal agents. If the NVI is not scalable, exit results in venture disbanding.

### 3.6.2 Summary of the Distinctiveness of Digital Entrepreneurship

Against the above summary of Chapter Two findings, fundamental similarities and differences between both traditional and digital entrepreneurship become evident. Indeed, digital entrepreneurship, like traditional entrepreneurship involves focal agents who initiate new venture ideas and take action resulting in a variety of outcomes. Hence, the process model depicted in Figure 2.10 (see Chapter 2) can be reworded as in Figure 3.5 subsequently. In narrative terms, the underlying story of all entrepreneurial processes is similar (Pentland, 1999). In Figure 3.5, dotted lines around external enablers represent the uncertain, indirect or unobservable ways in which they may causally influence process. Meanwhile, dotted lines around collaborating actors indicate uncertainty and unpredictability in terms of when, how and with what effects they enter the process.

*Figure 3. 5 Process Model of Pure Digital Entrepreneurship*

Source: Researcher
The rewording of the model assists in focusing the subject on the digital technological underpinnings of the digital entrepreneurial process. The characteristics of central human and non-human subjects lead to a narrative of the digital entrepreneurial process which makes this modality of entrepreneurship unique. Firstly, while the primary focus is on digital external enablers such as digital infrastructures, it is reasonable to assume that non-digital, yet related external enabling or constraining conditions such as regulation, may have very significant influences in terms of the generative mechanisms by which they drive process. Hence, the model does not affix digital to external enablers.

On the contrary, digital is affixed to central subjects such as the new venture idea and new market offering at meso levels of analysis to signify the distinctive technological basis of the pure digital entrepreneurship (PDE) process – which is the context of this research. This distinctive digital technology basis has implications for how human agents act to shape process at micro levels. Similarly, the digital is affixed to focal agents because distinctive cognitions, motivations, skills and prior knowledge are needed to produce derived actionable mechanisms that drive digital new venture creation and venture performance.

This chapter has crossed disciplines to incorporate theories from MIS. In so doing, it has revealed that traditional entrepreneurship theories such as effectuation and bricolage, take an anthropocentric view in theorising the role of agency and the mechanisms driving new venture emergence. In other words, they emphasise efficient or actor causality, which is important but incomplete for theorising a complex process of emergence (Van de Ven & Engleman, 2004) – hence, the criticisms by Moroz and Hindle (2012) and Arend et al. (2015). Consequently, Fletcher and Selden (2016) argue that a relational perspective is required if a comprehensive narrative of the real-time process of new venture emergence is to be arrived at. An actor-centric view of agency is therefore
inadequate, as it steers researchers towards one view of causality (efficient) – where events and outcomes of digital new venture creation are mainly attributed to acts of human volition, cognition, motivation, free will and decision-making. The result is the risk of incomplete assumptions in framing the narrative of new venture emergence. An anthropocentric view potentially results in social determinism, while an anthropomorphic perspective breeds technological determinism, neither of which is ideal. By combining both perspectives in theory-building, a more comprehensive and narrative-based explanation of digital new venture emergence can be arrived at.

Since the non-human agentic role of digitisation is significant, a sociomateriality lens is partly incorporated in theorising the mechanisms by which mute but important digital material agencies *intra-act* (Barad, 2003, 2007) to drive decision making and action. As this chapter reveals, the *material-discursive* practices of digital new venture creation, are partly a consequence of the affordances and constraints digital technologies provide (Majchrzak & Markus, 2012; von Briel et al., 2017). Digital material affordances and constraints work to ‘authorise, allow, afford, encourage, permit, suggest, influence, block, render possible’ (Latour, 2005, p.72) and forbid human agentic actions. Hence, the revised process model rewords human agents as actors in an attempt at making the distinction between human and non-human agencies more evident. With this distinction, the non-human agentic role of the digital new venture idea, external enablers and the resulting digital new market offering, can be examined as a different type of non-human agency which shapes the digital entrepreneurial process.

In more practical and superficial terms, digital entrepreneurship is ultimately differentiated from traditional entrepreneurship by the non-physical and less-tactile nature of the new venture idea, process and market offering. As noted, it is a continuum between the extremes of pure digital and pure traditional entrepreneurship with hybrid
variations in between. However, given the case under study, this research has a primary focus on pure digital entrepreneurship.

3.6.3 Process Mechanisms Driving Digital Entrepreneurship

The reworded digital entrepreneurial process model above offers a useful substructure for constructing a comprehensive narrative of process. The central subjects which inform the model’s structures help organise the digital entrepreneurial process narrative from whence mechanisms driving events can be retroductively and abductively theorised. As will be discussed in Chapter Five, this study takes a critical realist ontological stance. Thus, mechanisms are identified on the ontological assumption that reality exists in three strata – the empirical, the actual and the real (Bhaskar, 1989, 1997; Blom & Moren, 2011). The real is the realm of the generative structures which give rise to generative mechanisms that may or may not be observed, but it eventually results in events observable at the empirical level. Digital technologies are enablers which interrelate with other external enabling conditions to form the generative structures of digital new venture creation. These structures produce generative mechanisms at the actual strata that may never be observed. In other terms, they exist independent of human knowledge. Further, they are mainly possible to grasp indirectly through empirical observations and theory-building efforts.

As noted, digital technology mechanisms become more identifiable in theory by the use of the affordance construct (Bygstad, Munkvold & Volkoff, 2016). Their affordances represent the actor-independent mechanisms which exist at abstract, macro levels (Henfridsson & Bygstad, 2013). At micro and meso levels, psycho-social mechanisms such as intention, volition and knowledge interrelate with digital technology mechanisms to generate actionable mechanisms that are closer to process. Actionable mechanisms are derived mechanisms by actors which generate observable events at the
empirical level. Observable events are the effects or roles these mechanisms ultimately play in process. Thus, digital technology affordances in and of themselves do not drive process (Allen, 2019, p.1).

Actionable mechanisms ultimately provide the efficient causes that contribute in shaping events which are observed at proximal levels of digital new venture creation processes. Theories such as bricolage, effectuation and the lean startup methodology, reside in the spheres of actionable mechanisms.

*Figure 3.6 Framework of Process Mechanisms & Structures*

Figure 3.6 is a framework which represents the socio-technical process by which various mechanisms potentially interrelate to shape new venture creation. Figure 3.7 builds on Figure 3.6 to capture key mechanisms and causes identified in the literature. It shows the causal pathways by which mechanisms and generative structures come to drive digital new venture creation processes. Consequently, the literature has identified several mechanisms which may be useful in explaining the factors driving the digital entrepreneurial process.
Figure 3.7 Mechanisms & Causal Structures of Digital New Venture Creation

**Process Effects/Oles**
- triggering, shaping, outcome-enhancing

**Actionable Mechanisms**
- co-creation, data-driven operation, means-driven development, swift-transformation, currency, lock-in, business model innovation, communal activation, instant release, fluid processes, complementarities, efficiency, bootstrapping & bricolage

**Actor-independent Mechanisms**
- compression, combination, generation, conservation, resource expansion, resource substitution, uncertainty reduction, demand expansion, legitimation, enclosing, automation, reach

**Digital Technology Enablers**
- digital artifacts, platforms, infrastructures

**External Enabling Conditions**
- legislation, social-cultural, economic, political, natural, technological

**Actor Mechanisms**
- perceptual processes, self-efficacy, metacognition, self-regulatory processes, counterfactual thinking, ability models, attitude-based models, achievement context models

**Actor Enablers**
- knowledge, personal characteristics & means (resources)

**Source:** Researcher

Figure 3.7 provides a comprehensive list of mechanisms that the literature has suggested as being potentially consequential in driving the digital entrepreneurial process.

### 3.6.4 Concluding Statement

This chapter has explored the central theme of digital entrepreneurship. Accordingly, it has contrasted digital to traditional assumptions of entrepreneurship, thereby exposing fundamental similarities and significant differences. In sum, digital entrepreneurship is distinguished by the use of digital artifacts as new venture ideas, which renders processes and outcomes less physical and tactile. Consequently, different mechanisms are derived by actors from the enabling characteristics and actor-independent...
mechanisms of digital technologies to drive digital new venture creation in unique ways. Thus, by building on findings in Chapter Two, this chapter moves the research closer to finding preliminary answers to the research question at theoretical levels. However, for theoretical answers to be more comprehensive, a detailed examination of the context of research is the purview of the next chapter.
4  CHAPTER FOUR. DIGITAL ECONOMY, EdTECH & PreK-12 MARKETS
4.1 INTRODUCTION

This chapter examines the spatiotemporal contexts of digital new venture creation as it relates to the case under observation. In this respect, it identifies the digital technology enablers and other enabling conditions which drive digital entrepreneurship in the global EdTech (Education Technology) industry and the PreK-12 (pre-college education) sector. Given that the global EdTech industry is embedded in the global digital economy, this chapter begins by broadly exploring the distal but influential issues of relevance. It follows with a review of the Irish national context since it relates to the spatiotemporal context of the focal digital entrepreneurial agent. However, while it is often common practice for research to have a more bounded and narrow context such as a country or city, the network-centric nature of entrepreneurship in the digital economy challenges such an approach. Accordingly, Dicken (2015, p.50) states that studies must break out of the constraints of ‘national boxes’ as economies are no longer geographically contained.

4.2 GLOBAL DIGITAL ECONOMY – AN OVERVIEW

Accenture (2016) estimates that the global digital economy takes up 22.5 per cent of global GDP (Gross Domestic Product) at over $19 trillion. It projects an increase to 25.5 per cent, equivalent to $24 trillion by 2020. Leading this economy is the United States (US) where the national digital economy is even larger, taking up some 33 per cent of the country’s GDP. It is not surprising, therefore, that four US digital technology-based firms (Apple, Google, Facebook & Amazon) have a market capitalisation roughly the size of India’s GDP at over $2.3 trillion (Galloway, 2017, p. 1). As a widely referenced report by McKinsey (2016) indicates, soaring cross-border data flows now generate more economic value than traditional flows of traded goods. In 2014 alone, this resulted in a $2.8 trillion increase in global GDP. Remarkably, the current state of affairs represents
the first time in human history that information generation, processing and transmission have become primary commodities and sources of productivity and power (Dicken, 2015; Schwab, 2017). Indeed, the significance of this change is the reason the digital economy was a top policy agenda item at the 2016 Cancún (Mexico) Ministerial meeting of OECD leaders (OECD, 2017).

A policy agenda regarding the digital economy is partly necessitated by the realisation that in an age of networked intelligence, punishment is swift for societies that fall behind (Tapscott, 2014). As Storey and Greene (2010, p. 208) point out, policies that nurture the growth of gazelles (young fast-growth companies), should be an important element in enterprise policy development. Arguably, nurturing such firms has become even more urgent as thought leaders point to a future marked by the ‘digitisation of just about everything’ (McAfee & Brynjolfsson, 2014); including revolutionizing developments in technologies such as Artificial Intelligence (AI) which feeds off Big Data, Internet of Things (IoT) and possible applications of blockchain distributed ledger technology, beyond cryptocurrencies such as Bitcoin (Accenture, 2016). Accordingly, Schwab (2017) concludes that a Fourth Industrial Revolution or Second Machine Age has arrived in which crowds, platforms and physical machines combine to alter the dynamics of competition and value creation - disrupting entire industries as a consequence (Brynjolfsson & McAfee, 2017).

To gain a full appreciation for how the digital economy came to achieve such economic significance, it is vital to begin by tracing its technological roots.

4.2.1 Physical Infrastructure of Global Connectivity

As Chaffey (2015, pp. 89-103) explains, the virtualised environment in which today’s digital economy is founded, belies the physical infrastructure upon which it rests.
This physical infrastructure of the Internet and World Wide Web (W3) provides the underlying bases of a physically connected digital economy. The physical infrastructure of the internet is an international network of computers that use standardised internet protocols (IP) to exchange information. Meanwhile, the World Wide Web (W3) is another standardised, non-proprietary syntax technology termed HyperText Markup Language (HTML) for composing documents. W3 can be thought of as the operating system of the internet. With its later invention by Tim Berners Lee, digitised information in the form of text, videos, audio and others, could be accessed in the same way across the network of computers (internet) by users on a point and click interface.

As Chaffey further explains, the location of information residing on the internet is made possible by a uniform resource locator (URL). The URL ensures that every HTML document and its associated components can be uniquely and easily found in a vast network of computers. In other words, a URL is the combination of an internet computer’s address and file name. Indeed, by combining these technologies, a client-server exchange of information is possible, by which, the server is a host computer on the internet, and the client is the connected user and their computerised device. With the transition from a static Web 1.0 to an interactive Web 2.0 (O’Reilly, 2007), internet users went from passive consumers of content to active co-creators of value. Not surprisingly, this technological change has been the driving force behind the emergence of social media giants, whose multisided business models hinge on networking and participation. As Figure 4.1 suggests, the change from Web 1.0 to 2.0 began to emerge around 2005 and has morphed into today’s Web 3.0 – described as the semantic web. Meanwhile, the dawn of Web 4.0 is projected to be dominated by smart software agents from 2020 and beyond.
However, access to this underlying infrastructure of the internet is unequal, presenting barriers by regions. To understand why access is unequal, a closer examination of how the internet is connected is essential. Simply explained, undersea fibre-optic cables which are today designed to carry even more copious amounts of data are the basis of this physical infrastructure. These cables, mainly running along coastlines, form primary links between countries, continents and regions. Within countries, local internet service providers (ISPs), using fixed and mobile broadband technology relay this connection by linking client computers and devices within homes and businesses to major national and international infrastructure (see Figure 4.2). The amount of investment and corresponding quality of local telecommunications infrastructure determines the quality of access. Therefore, national boundaries and governmental policies act as critical determiners of the quality of access. In sum, geographical distance and governmental policies remain potent forces in enabling or constraining the level of internet access (Dicken, 2015).
Moreover, the fragility of the global network of computers was illustrated by the accidental cutting of an undersea cable by a ship’s anchor in the English Channel; which resulted in reduced broadband speeds across areas of the United Kingdom (BBC, 2016). Similar accidents have occurred previously, and it is not inconceivable that the importance of these cables could make them targets of sabotage by state and non-state actors. However, the critical nature of the undersea cable connections undoubtedly makes their protection a global endeavour. Hence, the threats to this global infrastructure cannot be over exaggerated.

*Figure 4.2 The Global Internet Infrastructure*

![Image of the Global Internet Infrastructure](source: Chaffey (2015, p. 89))

It is upon this somewhat fragile physical infrastructure of connected computers that an economy driven by bits of data transfer has come into existence. The digital economy indeed exists on its underlying physical infrastructure.
4.2.2 Growth Drivers of the Global Digital Economy

Growth in the digital economy is mainly driven by increased internet adoption, decreased cost of internet access and improved quality of broadband speeds across countries. With a Web 4.0 architecture coming into existence, it is projected that 25 billion devices have already been connected (McKinsey, 2016, p. 33). Accordingly, McKinsey (2016, p. 30) reports that cross-border internet capacity grew by 38 per cent each year from 2007 to 2014. The growth is a result of new submarine cables which are either being added or have replaced older ones, with the capacity to carry more copious amounts of data. Furthermore, emerging economies are becoming more integrated into the global network through the enabling capabilities of mobile broadband. Hence, McKinsey reports that the number of countries with one Gigabit per second (Gbps) of data transfer speed, increased from 75 in 2005 to 164 in 2014. In fact, with the anticipated increase in data flows driven by M2M (Machine-to-Machine) communication, new undersea cables capable of carrying up to 10 Gbps of data are being installed in some regions of the world to cope with the projected data surge. Consequently, certain communities in emerging markets are being brought out of the digital divide (Van Dijk, 2006; McKinsey, 2016; OECD, 2017, p. 114).

Moreover, while a little over 3 billion of the world’s 7 billion population had access to the internet as of 2016, Cisco’s (2017) Visual Networking Index (VNI) which tracks internet adoption, projected that by 2021, there will be over 4.2 billion internet users, mostly accessing the web through smartphones instead of personal computers (PC). However, by some more recent estimates, the internet passed 4.2 billion active users earlier in 2018 (Statistica, 2018), implying that internet adoption may be growing much faster than anticipated. This is made possible by increased adoption of fast mobile broadband (3G, 4G & 5G), which the World Bank reports, is assisting emerging
economies such as China, leapfrog themselves out of the digital divide (Welsum, 2016). Consequently, growth is leading to an expansion in demand for digital products and services.

4.2.3 Digital Platform & Digital Infrastructure Enablers

As the previous chapter has highlighted, digital platforms and digital infrastructures lower the barriers to digital entrepreneurship entry (Porter, 2001; Porter & Heppelmann, 2014). To briefly reiterate, the scalability of digital infrastructures such as rentable cloud storage, enable digital entrepreneurship by tremendously reducing communication, collaboration and transaction costs. Their scalability allows digital services to be accessed on an on-demand basis. The result is the elimination of waste and the conservation of resources, which in turn drives efficiency at proximal levels of digital new venture creation. To visualise the scenario, consider that social blogging platform, Tumblr, was able to dramatically reduce the cost of developing its platform (by an estimated $20 million), by renting Amazon’s scalable cloud infrastructure (Business Insider, 2013). Not surprisingly, therefore, one estimate reveals that some ventures that required $2 million to start with a prototype in 1995, can now be developed for as low as $50,000 due to scalable cloud-based digital infrastructure (World Economic Forum, 2016, p. 42). As such, digital new venture ideas can be developed rapidly and inexpensively using the digital infrastructure and platforms of large established firms. Indeed, in an economy of bits, traditional assumptions of cost are hard to sustain. Thus, while digital products may be expensive to create, digital infrastructures and platforms help bring down the cost of hosting and storage (McAfee & Brynjolfsson, 2014, p. 62).

Established hub firms such as Google, Apple and Amazon, have become central in enabling digital entrepreneurship and other forms of entrepreneurship (Kenney & Zysman, 2016). As McKinsey (2016) reports, e-commerce platforms such as Amazon,
Alibaba and eBay were responsible for 12 per cent of global goods trade, with in-built and third-party payment systems such as PayPal facilitating financial transactions. Meanwhile, operating systems and app distribution platforms such as Google’s Android and Apple’s iOS markets, are digital platform ecosystems around which other entrepreneurs can co-create value, as well as market complementary digital offerings. According to App Annie (2017), a firm which tracks global app sales, the global app ecosystem is poised to grow from $1.3 trillion in 2016 to reach $6 trillion by 2021. App Annie attributes the projected growth to the near doubling of device user base and increased time spent in mobile apps.

In relation to social media platforms, several reports indicate that platforms such as Facebook command a network size of over 2 billion monthly users, with 30 million messages sent every minute. Similarly, as of 2017, 1.5 billion users logged into YouTube every month, watching an hour of video on average (TechCrunch, 2017). Such platforms provide resource conservation opportunities in terms of bootstrapped scaling opportunities that may result in viral growth and strong network effects. Putting it into perspective, consider that in 2015, Adele’s song, ‘Hello’, reached 50 million views in just 48 hours during the first week of release, translating into No. 1 on downloads lists in the iTunes stores of 110 countries (McKinsey, 2016, p. 90). Accordingly, McKinsey reports that some 86 per cent of digital technology-based small ventures are becoming micro-multinationals and lean born-globals using digital platforms (Knight, 1996, Bell & Loane, 2010; Rasmussen & Tanev, 2015; McKinsey, 2016, p. 46).

Regarding collaboration in value co-creation, above-cited reports also indicate that talent platforms such as LinkedIn with some 500 million professional profiles, and digital labour platforms such as upwork.com and freelancer.com, afford efficiency in crowdsourcing (crowd + outsourcing), micro and major tasks in new venture creation.
For more open work-based platforms such as GitHub.com, digital entrepreneurs can co-create value with loose collectives of over 20 million talents, who contribute hours of work, creating and reviewing code, often freely and based on personal motivation. Thus, such piecemeal, micro co-creation affords speedier and efficient digital product development processes as one organisation need not own all the capabilities for new venture creation (von Briel et al., 2018). In more specialised digital talent marketplaces such as themeforest.net, entrepreneurs can very inexpensively purchase ready-made codes, coded web design templates, photos, audio and other digital artifacts developed by professionals for their creative combinatorial uses. The result is compression in terms of time needed to develop new products, as well as access to high-quality outputs by skilled actors.

Finally, Content Delivery Networks (CDN) are digital infrastructures which enable reliable internet access across regions. A CDN network overcomes the problem of unequal internet access by distributing and hosting content on many servers across the globe. Internet access becomes faster as users in a region are directed to geographically closer servers to access content. This reduces latency and improves the quality of access. Akamai Technologies is the largest providers of CDN infrastructure services. Nevertheless, CDN services can become expensive for resource-constraint new ventures (Nygren, Sitaraman & Sun, 2010).

4.2.4 Barriers to Digital Entrepreneurship

While change in the wider digital environment appears highly enabling, several barriers place restrictions on digital entrepreneurship and innovation initiatives. According to a World Bank (2016, p. 5) report (Digital Dividends), internet access remains unequal, unaffordable and unreliable in many countries, resulting in digital
divides along lines of gender, geography, age, levels of education and income dimensions (Van Dijk & Hacker, 2003; Van Dijk, 2006).

**Regulation:** In fact, a more potent threat to digital entrepreneurship appears to be a projected erosion in some of the perceived benefits of digital infrastructures and platforms originating from regulation. For instance, *uncertainty of state* arising from the *Net Neutrality* debates (Finley, 2019), regulatory uncertainty over data use and copyright regulations which favours powerful incumbents over start-ups, are among the big issues that may determine how the internet develops as a platform for innovation (Zittrain, 2008). As Internet Service Providers (ISPs) struggle to balance the cost of high traffic bandwidth vis-a-vis heavy digital content distribution such as videos, victors in *Net Neutrality* (NN) debates will ultimately determine whether the internet remains an open and equal access platform or a two-tier platform where high paying actors get access to faster connection lanes. Whether a two-tier internet or NN creates new threats to innovation or opportunities cannot be adequately assessed at the moment. However, given the potential for undesirable outcomes, the NN debates add a level of regulatory uncertainty in the digital business environment (Bourreau, Kourandi & Valletti, 2015).

Meanwhile, in the EU, the data localisation clause in the new General Data Protection Regulations (GDPR) has already curtailed the ability of some digital new ventures to exploit affordances of cost-reducing cloud storage. Data localisation requires that certain organisations processing sensitive data of EU citizens host their data locally. Granted, this form of internet regulation is not only happening in the EU, as countries like Russia and China have had even more stringent regulations in place. Critics of data localisation argue that it exhibits a misunderstanding of how a complex internet platform works. Hence, Chander and Le (2014) contend that the increased erection of digital
protectionist barriers around national borders is the most potent threat to digital entrepreneurship.

Likewise, proposed EU copyright laws (Article 13) threaten to impose the burden of copyright violations on digital platforms. However, since platforms are based on the bringing together of multiple actors, it can become difficult to monitor and take down user-generated content that infringes on copyrights – let alone know which uploaded content is infringing on another’s rights (Tannam, 2019). While the effects of the new regulation remain to be seen, critics argue that start-ups are at a particular disadvantage. It is presumed that the law discourages the pursuit of certain types of new venture ideas, instead favouring big digital companies that have the capacity to adapt (Fox, 2019).

Overall, a major challenge for regulators is that of striking a balance between legislation which safeguards privacy and security, while guarding against policies that stifle innovation, through unintended consequences (Welsum, 2016, p.7; OECD, 2017). Moreover, critics of the emerging regulatory policies across national boundaries argue that they amount to digital protectionism (Lund & Manyika, 2019). Such protectionists measures impose significant costs in serving users across geographical boundaries. While it has always been anticipated that authoritarian regimes would put such regulatory barriers in place, new digital regulations from democratic regimes arguably portend a future where the digital landscape becomes indistinguishable from pre-existing regulations in totalitarian regimes. The fact that GDPR was quickly followed by discussions around Article 13 in the EU may suggest that even more regulation can be expected down the line. Ultimately, regulatory uncertainty remains a significant cause for concern but also a potential source of opportunity.
**Digital Authoritarianism**: Relatedly, censorship by totalitarian regimes, represents a barrier to digital entrepreneurship. As the previous chapter has indicated, governments such as China’s, restrict internet access to foreign-hosted sites that do not comply with local regulation and the political orientation of the country. China’s so-called Great Firewall has proven effective at blocking the likes of Facebook, Google and YouTube in China, limiting direct access to its huge national internet user base from foreign actors. The researcher has experienced this first-hand, having lived as an expat in China for twelve years. Furthermore, Reuters (Dave, 2019) reports that China’s technologies for internet censorship are being exported across other totalitarian regimes in emerging markets as they help build the internet infrastructures of these countries. These regimes have been reported to switch off internet access in restive regions of the country during times of political upheavals leading to what has been described as ‘digital authoritarianism’. Consequently, digital ventures which depend heavily on access to censored markets are served with a higher level of uncertainty. In addition, censorship exacerbates the digital divide between emerging and developed economies.

**Security**: Additionally, trust and digital security pose a significant threat to digital entrepreneurship (OECD, 2015, 2017). This was well illustrated by hack attacks on credit rating firm, Equifax, which left the social security numbers and credit card details of some 143 million Americans in the hands of hackers (TechCrunch, 2017). Similarly, the infection of computers in 150 countries by the WannaCry ransomware (a malicious software blocking access to a victim’s computer until a ransom is paid), resulted in significant disruption of business operations worldwide (OECD, 2017, p. 246). Such malicious and criminal activities impact digital entrepreneurial initiatives because users and potential customers become wary of conducting online transactions. To make matters worse, some start-ups become discouraged from pursuing mission-critical digital new
venture ideas which are security related. Moreover, in the wake of new GDPR in Europe, the increased costs of compliance for security breaches is making it harder for smaller actors to participate. For this reason, McKinsey (2016) estimates that the negative effects of cybersecurity, results in the loss of around $400 billion annually in the global digital economy. Furthermore, the OECD (2017, p. 261) identifies a growing concern that M2M communication makes a perfect target for use by hackers in DDoS (Distributed Denial of Service) attacks. DDoS attacks work by overloading and crashing a server with hijacked internet traffic. Case in point, a sophisticated DDoS attack in 2016 was the reason major sites such as Google, Netflix, CNN, Spotify and Twitter were temporarily inaccessible (The Guardian, 2016). It was the result of hackers using bandwidth from connected IoT (Internet of Things) traffic for use in overloading the domain name servers (DNS) of major sites – temporarily taking them down as a consequence.

**Geographical Barriers:** Meanwhile, the ‘tyranny of space’ is still not entirely eliminated on the internet (Nambisan, 2013). As previously mentioned, while the internet infrastructure generally fosters global connectivity, geographical boundaries, national policies and institutional frameworks still matter greatly (Dicken, 2015). For instance, websites hosted in countries closer to the United States receive more visits by US visitors. Similarly, transactions decline when geographical distance between buyers and sellers increases (World Bank, 2016, p. 59). Accordingly, McKinsey (2016, p. 14) reports that more than half of global data flows is still within regions; with the top 1 million websites still being hosted in the US. This phenomenon is partly explained by the quality of internet infrastructure, latency issues resulting from distance and the reinforcement of similarities by geographical proximity (OECD, 2015).

**Digital Tax Policies:** Likewise, international conflict over digital taxation regulations is adding to more uncertainty at national levels. Several reports indicate that
OECD countries are currently grappling with sound measures for taxing digital business ventures (OECD, 2018). Existing tax regimes appear obsolete when juxtaposed with digital value creation. Since digital entrepreneurship is often based on multisided business models and the sale of intangibles, new ventures can often ‘scale without mass’ across geographical boundaries (Brynjolfsson, McAfee, Sorell & Zhu, 2008). As such, where value is created and appropriated may become incalculable from a taxation perspective. Furthermore, the growth of the on-demand economy has led to the rise of non-standard work, which often does not fit nicely into existing taxation frameworks. Hence, two broad proposals on digital business taxation have proven contentious in the EU. One suggestion is for pure digital businesses to be taxed by the location where most of their users reside, while another suggests imposing taxes in the country of business registration.

As countries are at different levels regarding the digital divide, those that have made previous investments in bridging the gap by positioning themselves favourably along the Networked Readiness Index (NRI) – discussed subsequently (World Economic Forum, 2016), are concerned that ill-conceived tax policies could rob them of their gains in these investments. With the lack of consensus, some EU countries are moving ahead with unilateral digital tax legislation on big digital technology companies (Keohane, 2019). There are concerns that such a move would result in double taxation of some pure digital business ventures across national borders. The consequence may be a digital taxation landscape which proves complicated to navigate, with added costs to digital entrepreneurial ventures. Although the current tax proposals are aimed at larger digital companies, its effects are expected to ripple across the digital ecosystem in unforeseeable ways.

**Access to Credit:** Beside tax policies, monetary policies may restrict the development of digital new ventures. Current credit systems are built on assumptions of
physical and tangible objects as collateral. Thus, access to credit and bankruptcy regulations tend to be biased towards traditional or large firms. As the World Bank (Welsum, 2016) observes, regulation appears to be a major obstacle for small innovative digital start-ups in countries with high administrative burdens. The reason being, several digital start-ups create value through experimentation with new knowledge-based business models and intangibles; yet the culture in many countries is one that does not accommodate such trial and error approaches of digital entrepreneurial ventures. For instance, the World Bank identifies debt finance policies as being notoriously misaligned with value creation in small innovative digital firms which have a higher risk-return profile; and depend on firm-specific capabilities and intangibles, deemed unsuited to collateral.

**Skills Divide:** A final barrier to digital entrepreneurship is a skills gap which exacerbates the digital divide across various segments of society. While a digital divide is often discussed in terms of unequal access to broadband infrastructure of the internet in developed versus developing economies, divides at skills level affect virtually every society. Digital skills required to unlock the economic potential of the digital economy, go beyond everyday computing. In the education context, the OECD (2016) cites a skills gap among teachers as one reason digital technologies have not been fully utilised in education. Indeed, all the major reports (McKinsey, OECD, World Economic Forum & World Bank) cited so far in this chapter, indicate that a general lack of critical digital entrepreneurial skills, prevents the adoption of these technologies for new business creation. Education systems are partly to blame for maintaining systems which do not prepare their labour force for a future defined by ubiquitous digitisation. For instance, Global Silicon Valley (2015, p. 318) reports that in the US, computer science related job openings are projected to grow to 1.4 million, yet 90 per cent of secondary schools failed
to provide any computer science courses at all. Consequently, the OECD (2017, p. 178) reports that ICT related positions continue to be among the hardest to fill in organisations across most countries. In the US, the demand for technical skills is resulting in an increase in digital start-up costs as competition for few talents drives up the cost of acquiring them (Welsum, 2016, p. 6).

While the barriers to digital entrepreneurship explored in this section are by no means exhaustive, they reflect some of the more significant factors which may influence the decision-making and actions of digital entrepreneurial actors. Further, these barriers may affect industries differently, thereby necessitating a more granular examination of the EdTech sector’s unique characteristics.

4.3 GLOBAL EdTech & PreK-12 MARKETS

Given that the global EdTech (Education Technology) industry and the PreK-12 education sector are of proximal relevance to the case under study, this section examines the state of that environment. While growth estimates vary slightly, Docebo (2017), a major EdTech organisation, reports that the global EdTech industry size is expected to exceed $240 billion by 2023. Its industry structure, according to IBIS Capital (2013, p. 13), a London financial advisory consultancy, is subdivided into content, learning management systems, distribution and customers.

Ambient Insight (2016), an organisation which uses quantitative predictive analytics to identify revenue opportunities, reports that the market for self-paced learning and learning management systems (LMS) is experiencing a sharp decline. The decline is due in part to the entry of internet giants, such as Google’s Classroom and Microsoft Classroom, whose free offerings make it difficult for smaller firms to compete.
Consequently, Pearson, a major player in the industry, announced its exit from the LMS market in early 2016.

However, the growing segment, according to Ambient Insight, is the digital content market, which is driving demand expansion for games-based learning and dematerialisation (OECD, 2015) – i.e., the digitisation of physical and static learning content. Growth in the serious gaming sub-segment is driven by new research findings which have helped to change negative attitudes towards games-based learning by highlighting the major benefits. Sitzmann (2011) published a seminal piece which indicates that simulation games positively improved cognitive and affective attitude towards learning. Meanwhile, research on serious gaming found them to be even more effective (Wouters, Van Nimwegen, Van Oostendorp & Van Der Spek, 2013; Erhel & Jamet, 2013). The new research has been particularly well-received in the PreK-12 sector, where keeping young learners motivated is a well-known challenge for educators. PreK-12 education (also K-12) is the US originated description of pre-college education. As such, it is the critical childhood to teenage years of formal schooling.

4.3.1 PreK-12 Education & Digital Technology

The PreK-12 sector takes up an estimated 50 per cent of the global EdTech industry due to its large user base (Docebo, 2014). In this sector, the commonly cited problem has been one of the burgeoning costs associated with catering to a large user base, yet the poor return on investment in terms of student performance (Global Silicon Valley, 2015, p. 318). The problem is further compounded by poor access to education and skill gaps that prevent uptake of digital technologies (Bailey, Henry, McBride & Puckett, 2011; Ambient Insight, 2016; Buckley & Nzembayie, 2016). Earlier attempts at solving access had mainly focused on hardware and connectivity, leaving out digitisation and skills. While the education sector, in general, has traditionally been slower than other
industries to embrace technology, the trend appears to be changing rapidly of recent. This is especially true in PreK-12 markets, where the World Economic Forum (2015) emphasises that digital technology use in learning has great potential to overcome challenges of increased cost and access to education. Indeed, as noted in the previous chapter, digital technologies such as digital platforms and digital infrastructures can host several users without the added cost (zero marginal cost) – hence the expression ‘scale without mass’ (Brynjolfsson, McAfee, Sorell & Zhu, 2008). Additionally, technology in the PreK-12 sector is seen as a path to building the skills required for success in the new economy. Most industry reports point to the urgency of incorporating ICT literacy in primary and secondary school education systems. Hence, a joint report by the Boston Consulting Group and World Economic Forum (2015, 2016) discusses a vision for education centred on unlocking the potential of digital technology in education through essential skills – see Figure 4.3 subsequently.

Figure 4.3 21st Century Skills by World Economic Forum

Source: World Economic Forum (2016, p.3)
The vision, which includes sixteen social and emotional learning skills (SEL), is classified under Foundational Literacies, Competencies and Character Qualities. They are considered ‘21st Century Skills’ for the new economy. Among them, ICT literacy is 4th place under Foundational Literacies as shown in Figure 4.3. Moreover, the report goes on to state that for digital technology to reach its full potential in PreK-12 education, it needs to be integrated into a ‘closed loop’ instructional system. Wherein, a closed loop learning system involves instructional delivery, continuous assessments, appropriate interventions and tracking outcomes of learning - see Fig. 4.4.

![Figure 4.4 Closed-Loop Learning](image)


Among the many benefits of digital technology in a closed loop learning system, is the increase in teacher productivity. Teacher productivity is the result of the freeing up of valuable time from tasks such as grading and testing. Freed up time is in turn used for more active student-centred learning activities, which deepen understanding of course materials – including the development of skills such as critical thinking, creativity and collaboration (World Economic Forum, 2015, p. 9). It is alternatively conceptualised as a blended learning strategy which combines in-class instructions with self-learning through digital technology outside of the classroom, for optimal results. For this to be possible, educational content needs to be digitised and combined with ubiquitous
computing power. Thus, given this need, firms such as Khan Academy, LearnZillion, Pearson and McGraw-Hill are among major players addressing this need. As evidenced by Figure 4.5, most companies addressing the needs of this segment are mainly in the foundational literacies space.

**Figure 4.5 Skills Type & Major PreK-12 Firms**

![Figure 4.5 Skills Type & Major PreK-12 Firms](source)


Meanwhile, teachers have long recognised the need for digitised content, as evidenced by the many grassroots actions of digital ‘teacherpreneurs’ in the PreK-12 sector (Buckley & Nzembayie, 2016). As an example, the digital platform marketplace, *Teachers Pay Teachers* (Teacherspayteachers.com) is an outcome of new venture ideas by teachers who double as entrepreneurs (teacherpreneurs), to solve problems of dematerialisation in the PreK-12 sector (Shelton & Archambault, 2019). TPT has allowed other teachers to connect and market their digitised learning content to other teachers while earning revenue to support themselves and their students.
4.3.2 PreK-12 Markets - Serious Games & Dematerialisation

Given the above-explored changes in the PreK-12 sector, it is not surprising that growth in the games-based learning segment is robust at a 22.4 per cent CAGR from 2016 to 2021 (Ambient Insight, 2016, p. 9). Moreover, in the early childhood sub-segments (P-3), CAGR is even stronger at 30.5 per cent. According to the World Economic Forum (2015, p. 11), it is now widely accepted that games allow learners to interact with instructional content engagingly. Moreover, games simultaneously develop multiple skills at once. This happens because while students work to improve their understanding of foundational concepts, they develop creativity, curiosity and persistence in the process. In academic research, these claims have been validated by several studies. Among them, the seminal publication in the Journal of Educational Psychology concludes that ‘serious games influences learning in two ways, by changing cognitive processes and by affecting motivation’ (Wouters et al., 2013).

Following the evidence, Ambient Insight (2016) reports that games-based products reached $2.6 billion in 2016 and are projected to surge to $7.8 billion by 2021. In the early childhood segment, all learning apps were games-based; and by July 2016, Ambient Insight (2016, p.17) reports that twelve of the top twenty best-selling apps in the US Apple store were early childhood learning apps. For this reason, this sub-segment of the PreK-12 market is growing much faster, with revenues projected to exceed $1.7 billion by 2021. The report also indicates that much of the spending in the dominant North American market, is related to language learning (29%), math (26%), science (17%) and social studies (11%) - which are in the foundational literacies category.

With reference to language learning, global digital English language learning including games-based learning continues to grow with significant revenue opportunities for suppliers (Ambient Insight). The segment reached $2.8 billion in 2015 and is poised
to reach $3.8 billion by 2020. Meanwhile, there has been an upsurge in demand for the Chinese language, especially in the US where a five-year CAGR stands at a healthy 14.8 per cent.

However, despite the OECD’s (2015) identification of enormous opportunities for digitisation (dematerialisation) of static learning materials, only 2 per cent of educational content has been dematerialised, according to EdTechXGlobal (2016) - a leading provider of EdTech conferences. However, the growing uptake of free educational content is creating a problem of commoditisation of digitised materials (Ambient Insight, 2016). Indeed, as reported in the World Economic Forum (2015), major firms such as McGraw-Hill who usually provide paid content, have been forced to adapt by providing low-priced and free open source digital education content. Thus, while consumer demand is high, price points are low, implying that revenue models for capturing value will have to be innovative. Accordingly, business model innovation represents a major value creation mechanism.

Regardless, the fundamentals of the PreK-12 market and games-based segment appear healthy. Moreover, its growth is occurring against a similarly enabling global EDTECH and digital economy. For instance, the fact that an estimated 1 billion people will add to the global internet population by 2023, with some 40 per cent of the world’s population still offline by then, reveals a latent potential for demand expansion. Secondly, despite the issue of commoditisation of digital learning content, it is revenue generation, not customer demand which is the problem. Thus, it is conceivable that business model innovation becomes a major source of competitive advantage. Accordingly, the overwhelming conclusion is that the timing is right for entry into the games-based segment of the PreK-12 market; with present and future projections
indicative of healthy external enabling conditions for digital new venture creation and venture performance.

4.4 **THE ENTREPRENEUR – PERSONAL CHARACTERISTICS & SPATIAL CONTEXT**

While this chapter has so far predominantly examined context as it relates to the new venture idea in this case, the spatiotemporal contexts of the digital entrepreneur under observation also require explanation (Welter, 2011). As such, this section explores the current and historical contexts of the digital entrepreneur, to identify the sources of actor enablers such as prior knowledge, and mechanisms of cognition and motivation which may explain entrepreneurial entry, decision making and action in the current case. Secondly, given that the entrepreneur is physically embedded within the Irish national economy as a non-EU resident, environmental factors which uniquely enable or constrain his actions demand an explanation.

4.4.1 **Digital Entrepreneurs & Personal Characteristics**

Since prior knowledge (Shane, 2000), cognition and other personal characteristics have been identified as micro-foundational sources of mechanisms of the entrepreneur (see Chapter 2), situating the entrepreneur in a historical and current context is an important explanatory variable of process theory. Thus, Storey and Greene (2010, pp. 244-264) organise extant research to suggest ‘pre-start-up’ characteristics of the entrepreneur which may influence new venture entry and venture performance. These characteristics, among others, include age, gender, education, sectoral experience, prior business ownership and ethnicity. The evidence presented by Storey and Greene on these factors, inform much of the subsequent discussion in this section.

*Age:* Beginning with age, the research appears to suggest that the prime age of the entrepreneur is between 35 to 50 years. The argument is that individuals in this age
As such, the prime age bracket has been positively correlated with fast-growing businesses. Also, the odds were found to be better if these entrepreneurs were male. Therefore, given that the entrepreneur in the current case is of this age bracket, the research suggests potentially favourable (but incomplete) micro foundational influence on decision-making and venture performance.

**Education:** Education also represents a key consideration for focal actors, since prior knowledge, cognition and motivation may derive from the entrepreneur’s educational level. Accordingly, Storey and Greene (p. 258) identify that higher levels of education were positively correlated to better performance. Among the reasons advanced for this finding was that education enhances the skills base of individuals, functions as a selection mechanism and increases their favourability to access finance. Given that the entrepreneur in the current case is educated to Master’s level and currently pursuing a doctoral degree, it would suggest a favourable influence on new venture performance. In addition, it could be argued that since digital entrepreneurial ventures tend to be knowledge-intensive, entrepreneurs with a higher level of education are better placed to exploit opportunities in a digital entrepreneurial context.

**Sectoral Experience:** With regards to specific prior sectoral experience, as well as prior managerial experience and prior business ownership, the evidence on their influence is inconclusive (Storey & Greene, pp. 258-260). In the current case, the entrepreneur is a portfolio digital entrepreneur in the PreK-12 digital language education market. As such, he combines specific sectoral experience, prior managerial and business ownership experience. Nevertheless, the influences of these experiences cannot be assumed to be positive; neither does the research rule it out. Reminiscent of McMullen and Shepherd’s (2006) suggestion that prior experience and knowledge reduce an
entrepreneur’s level of perceived uncertainty, the value of these experiences in the current research may hinge on how they explain decision making and action under the uncertainty (see Chapter 2). Further, sectoral experiences may subject the entrepreneur to cognitive biases and a misperception of the levels of uncertainty – see Chapter Two.

**Ethnicity:** Meanwhile, the evidence on ethnicity and immigration remains mixed. On the positive side, Storey and Greene (2010) note that,

…immigrant groups, especially when they bring human and financial capital, do establish some notably successful businesses if and when they break out of the narrow ‘ethnic’ market. (p. 256)

However, as studies in the US have found, blacks tend to perform less well. Among the reasons cited are institutional barriers and discrimination. Hence, research in the US context suggests that black-owned businesses were twice as likely to be denied credit as opposed to white-owned ventures. Meanwhile, across European cities, Krieger (2011) found that ethnic entrepreneurs, in general, had difficulty accessing credit. Similarly, Cooney and Flynn (2008) found that in Ireland, while both white Irish and ethnic immigrants faced difficulties accessing credit, ‘distrust of the individual applicant or the ethnic minority to which he/she belongs can militate against ethnic persons securing funding for their enterprise’ (p. 40).

However, these studies also point out that other factors beyond distrust and discrimination were at play. For instance, the type of ventures immigrants engage in, language barriers and more, were also to blame for refusal of credit. Given that the entrepreneur in the current case is a non-EU student of black African origin, embedded in an Irish national context, institutional factors which relate to his ethnicity and immigration status cannot be ignored in providing explanations for constraining mechanisms influencing decision making and action in the current case.
However, above-explored personal characteristics are generic and do not specifically focus on digital entrepreneurs. Thus, research is needed to determine the degree to which they apply to entrepreneurs in a digital entrepreneurial context. Regardless, there is the certainty that a relationship exists between the above-explored personal characteristics and venture performance, the same way environmental factors have been correlated to performance.

4.4.2 Irish Spatial Context

Environmental factors at the national level may have significant influences on digital new venture performance. In the case of this research, the Irish national (Republic of Ireland) context has implications for aspects of decision-making which influence action. As a background, Global Entrepreneurship Monitor (GEM, 2016, p. 68) reports that Ireland had a population of over 4.6 million inhabitants, with a GDP of $238 billion as of 2015. Its entrepreneurship ecosystem is considered healthy, with SMEs contributing 47 per cent of GDP.

According to the World Bank (2019), Ireland ranks at 23 out of 190 with relation to ease of doing business, which is less impressive than similar economies like New Zealand, Denmark, Singapore and Hong Kong which are among the top four. Additionally, in the World Economic Forum’s (2015) Global Competitiveness Rating, Ireland ranks at 23 out of 138. However, the Global Entrepreneurship Development Index (GEDI, 2017) gives Ireland’s entrepreneurship ecosystem a high rank of 9 out of 138. The GEDI report further identifies human capital as Ireland’s strength, while networking was seen as its weakness. Moreover, if it improved the conditions for entrepreneurship by 10 per cent, GEDI reports that Ireland could add another $33 billion to its GDP. As one of the 38 innovation-driven economies classified by the World Economic Forum, its
economy is mostly driven by Foreign Direct Investment (FDI) in knowledge, services and technology-based innovations that use sophisticated processes.

However, in terms of the country’s digital entrepreneurial environment, the World Economic Forum’s (2016) Networked Readiness Index (NRI) ranks Ireland at 25 out of 139 countries. While this ranking at first appears good enough on a global scale, when compared to similar innovation-driven economies in Europe such as Finland, Denmark and Norway, it suggests massive room for improvement.

**Ireland & Networked Readiness:** The NRI is a World Economic Forum framework developed in collaboration with INSEAD and Cornell University. It measures the propensity for a country to exploit opportunities using information and communication technologies (ICTs). NRI rests on four subcategories and their corresponding indicators. The first is the environment, which includes 9 political and regulatory indicators and 9 business and innovation environmental indicators. The second is readiness, which includes 4 infrastructure indicators, 3 affordability indicators and 4 skills indicators. The third is usage, which includes 7 individual usage indicators, 6 business usage indicators and 3 government usage indicators. The fourth is the impact, which includes 4 economic impact indicators and 4 social impact indicators.

Based on these categories, the World Economic Forum (2016, pp. xi-xii) generally concludes that across the globe, a new economy is taking shape, requiring important innovation in governance and regulation. It also notes that governments were missing out on a rapidly growing digital population. Figure 4.6 captures the essence of the NRI framework.
To reiterate, a fuller appreciation for Ireland’s performance on the NRI framework is best shown in comparison with other innovation-driven countries. Moreover, given that NRI is highly correlated to per capita income of a country, comparisons along these lines is arguably more useful and better justified. Hence, Table 4.1 below presents a comparative summary of numeric data indicating Ireland’s performance. To reiterate, all ranking figures are done on a scale of 139, which is the number of countries ranked.

**Table 4.1 Comparative Analysis of Ireland’s NRI to Similar Economies**

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<tr>
<td>Ireland - 4.6 million</td>
<td>$51,351</td>
<td>25</td>
<td>11</td>
<td>29</td>
<td>28</td>
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<tr>
<td>Norway - 5.3 million</td>
<td>$74,822</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Denmark - 5.7 million</td>
<td>$52,114</td>
<td>11</td>
<td>14</td>
<td>12</td>
<td>10</td>
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<tr>
<td>Finland - 5.4 million</td>
<td>$41,974</td>
<td>2</td>
<td>5</td>
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Sources: World Economic Forum NRI (2016) & GEM (2016)

Firstly, the World Economic Forum (2016) reports that top 10 performers in 2015 and 2016 remained unchanged - of which Finland, Sweden, Norway and Switzerland are European countries among them. While not a top 10 performer, Denmark was up close at 11th position. Denmark is particularly interesting because its GDP per capita and population size, make for the closest comparison with Ireland.
As seen in Table 4.1, Ireland is performing below developed countries of a similar economic and population characteristic. The situation is particularly ironic since Ireland hosts top digital technology giants such as Google, Facebook, Intel and Apple. Thus, given the digital economic stature of the country when compared to similar countries, its 25th global rank is arguably less impressive. A more in-depth analysis of the figures behind each indicator reveals a more nuanced finding. Ireland has a higher NRI ranking compared to Denmark under the environmental sub-index. However, readiness, usage and impact are the areas where it lags behind the other three countries. Under readiness, infrastructure ranks a lowly 27th, while the skills indicator ranks at an impressive 9th out of 139. Infrastructure is low because broadband access in Ireland has been described as ‘a tale of two Irelands’ - whereby some 1.8 million of its over 4 million population living in rural areas, is served by relatively slow broadband infrastructure (Kennedy, 2017, 2019). Furthermore, unlike Finland, Ireland still has not declared good broadband access a basic human right. There appears to be a political will to solving the issue as evidenced by the 2012 National Broadband Plan. However, recent reports note that it would take another seven years for 542,000 homes to have access to high-speed broadband in rural Ireland (Goodbody, 2019).

Comparatively, Norway and Denmark which are higher performers overall, yet they rank below Ireland on digital skills at 12th and 17th positions respectively. Meanwhile, under readiness, affordability sinks the environmental sub-index for Ireland, with a ‘poor’ 77th global ranking. Meanwhile, under the usage category, the rankings were 28th for individual usage, 23rd for business usage and 25th for government usage. Finally, under impact, Ireland ranks 17th under economic impact (Denmark is at 16th place) and 34th under social impact (Denmark is at 26th place). It appears Ireland selectively ranks highly only on those indicators which result in a higher economic impact. This might be
the reason IBEC (2016) observes that the economic impact of leveraging digital technology in Ireland was 12 per cent higher than the average of the high-income advanced economies. For instance, when the economic impact is further compared with other advanced innovation-driven economies such as France (20th), Austria (21st), Italy (31st), Spain (35th) and Belgium (19th), Ireland’s 17th position on digital economic impact appears relatively more impressive.

Therefore, despite lagging in specific NRI indicators, Ireland appears to be overall conducive for creating digital new ventures. The reason being, on the most consequential drivers such as the regulatory, political and business environment, it ranks reasonably high compared to other top performing innovation-driven economies. Moreover, since digital new ventures are mostly knowledge-based, it could be argued that ranking high on skills is more critical to exploiting economies in the digital economy (McKinsey, 2016). Thus, it may partly explain why, beyond the often-cited lower corporation tax advantage, top digital technology giants such as Google and Apple have set up key operations in Ireland to leverage its digital skills.

Irish Regulatory Environment & the Entrepreneurial Context: While a favourable environment may provide opportunities for individuals, Welter (2011, pp. 165-166) notes that individuals may experience an environmental context as an asset or liability. Thus, building on Welter’s argument, the enabling digital environment Ireland provides, may not be perceived by or accrue to all potential digital entrepreneurs embedded within. For instance, in the current case, the digital entrepreneur is embedded within the Irish digital economy as a non-EEA (European Economic Area) national on a PhD student residential status. The immigration regulations for non-EEA student residents represents a liability as it limits access to most of the external enablers of the Irish business environment. According to information sourced from Irish government
websites, non-EEA students in Ireland cannot be self-employed, and they only have few options for registering Irish limited liability companies. The most accessible of these programmes is the Start-up Entrepreneur Programme (STEP) which has traditionally favoured science and technology graduates (STEM). The programme also requires that the candidate has a starting capital of €75,000 among others. In addition, the new venture must be ‘innovative’ or ‘high-potential’ – restrictively defined as being capable of realising €1 million in sales and creating ten jobs in 3-4 years (citizensinformation.ie, 2017; inis.gov.ie, 2018). However, how a new venture can determine how much revenue it would generate in 3-4 years is anybody’s guess. The regulation exposes the proliferation of causal reasoning in policy circles. Further, the regulatory barrier ignores research, which indicates that it can take anywhere from 3 to 12 years for new ventures to become profitable (see Chapter 2). Perhaps, these factors explain Ireland’s lower ranking in terms of ease of doing business, compared to countries of similar characteristics.

While the current business regulatory barriers for non-EEA nationals in the Irish national context may appear steep, when put in a historical context, it is indicative of regulatory progress. For instance, the STEP programme is a more recent development initiated in 2012, which stems from a growing awareness among policymakers of the role immigrants play in the Irish economy. As Fitzsimons and O’Gorman, 2016) report for GEM Ireland, 15 out of every 100 people born overseas but living in Ireland were entrepreneurs in 2016; contrasted with 9 out of every 100 of those born in Ireland. However, the identified regulatory barriers cannot be overstated, especially when taking into consideration the assertion from Dicken (2015) that economies are no longer geographically contained. Indeed, digital new ventures can be legally incorporated in regions with lower barriers to doing business such as New Zealand, Singapore, Denmark
and Hong Kong, which rank 1st to 4th place accordingly on the ease of doing business index (World Bank, 2019).

4.5 Discussion & Conclusion

This chapter has explored possible mechanisms which may influence the digital entrepreneurial process in an EdTech context. In so doing, it has factored in enabling conditions which are the consequence of the socio-technical relationships between digital technologies and the wider environment. Technological and socio-cultural enabling conditions are key generative structures giving rise to actor-independent mechanisms.

**Technological**: Building on the mechanism framework developed in Chapter Three, Figure 4.7 subsequently depicts possible causal pathways which enabling technological mechanisms in EdTech follow. As shown, speed and affordability of internet broadband connection upon which digital technology enablers reside are a major source of change. Likewise, affordable and scalable cloud infrastructure of dominant firms creates enabling conditions for new venture creation at a generic level.

Figure 4. 7 Causal Pathways of Enabling Technological Conditions

Improved broadband infrastructure is a major source of change because it drives rapid growth in internet adoption, growth in dominant platform user base and reduction in
digital divides. Consequently, it generates overall demand expansion as a mechanism which may have significant influences on enhancing new venture outcomes. Meanwhile, the proliferation of mainly mobile connected digital devices enables ubiquitous content consumption. As such, it results in the mechanism of reach, which can, in turn, be translated into the actionable mechanisms of instant release, co-creation and agile experimentation.

Furthermore, the growth of internet penetration and broadband speed is also driving down the cost of scalable cloud infrastructure. Reduced cost of scalable cloud-based infrastructure potentially has the benefit of resource conservation and resource expansion. Presumably, actors translate these mechanisms into the actionable mechanisms of efficiency and business model innovation. Scalable and low-cost cloud infrastructure of dominant players produces efficiency because new ventures can eliminate the cost of owning these capabilities, thereby allowing resources to be channelled towards process shaping and outcome enhancement. Moreover, resource expansion from cheap cloud storage potentially results in multiple iterative cycles of experimentation, which in turn, shapes process and enhances outcomes by offering new possibilities. However, technological enabling conditions identified in this chapter appear generic and therefore, less specific to new venture creation in the current EdTech context. Thus, socio-cultural enabling conditions present more proximal and observable mechanisms driving digital new venture creation in an EdTech context.

Socio-cultural: The education sector is a socio-cultural industry. Figure 4.8 sums up the causal pathways of enabling socio-cultural conditions. In the current case, a favourable change in perception towards digitised learning is driving demand expansion for digitised materials and games-based learning.
Moreover, this chapter finds that increased demand is leading to more time spent on digital devices. Thus, an *enclosing* mechanism can be envisaged. As a reminder, enclosing increases a venture’s ability to capture value from its users. It may ultimately get translated by actors into actionable mechanisms such as *lock-in*, increased consumer *switching costs* and *business model innovation*. Thus, the effect could be outcome enhancement in the form of strong network externalities and venture survival.

**Regulatory Uncertainty:** Finally, regulation was seen as more of a barrier than an enabler. Regulatory policies appear to increase uncertainty of state in the global digital economy and EdTech. However, if the uncertainties are lifted in the future, regulation has the potential to unlock new opportunities that shape new venture creation. They may also reduce uncertainty as what is legally expected becomes clearer. Finally, based on the analyses and findings from the current and previous chapters, Figure 4.9 offers a comprehensive and contextualised framework of possible mechanisms and causal structures driving Pure Digital Entrepreneurship in an EdTech context. The theoretical findings offer several perspectives on explaining digital new venture creation and the mechanisms driving process. However, they remain only possible explanations pending empirical evidence. Furthermore, it is not evident from the literature, which mechanisms...
are consequential, and at which temporal phases of pure digital new venture emergence are their roles more evident. Hence, the primary research will ultimately seek to determine which mechanisms play a consequential role at various phases of an EdTech digital new venture creation process.

Figure 4.9 Mechanisms & Causal Structures of Digital New Venture Creation in EdTech

As noted in Chapter One, an Insider Action Research approach is deemed suitable for providing answers to the research question. Only through engaging with the phenomenon can ‘fine-grained’ explanations of causal mechanisms and structures be accurately explained (Nambisan, 2016). Accordingly, the next chapter offers details on the research design and justification for the choices made.
5 *CHAPTER FIVE. RESEARCH METHODOLOGY*
5.1 **INTRODUCTION**

This chapter identifies, examines and justifies the research design and methodologic choices made in order to answer the research question and meet the stated objectives in Chapter One. As earlier noted, the preferred approach of this study is an Insider Action Research design (Coghlan & Brannick, 2014; Coghlan, 2019; Nzembayie et al., 2019). To justify the use of this design choice, this chapter begins by restating the research question, aims and objectives, as a reminder of the research focus. Borrowing from and adapting the logic of the research process (Saunders, Lewis & Thornhill, 2016), it delves into the multiple layers which underlie good research design. Consequently, the chapter identifies the philosophical and inferential stance underpinning the current study, prior to an in-depth analysis of the suitability of using IAR in enactive studies of the digital entrepreneurial process. Subsequently, practicalities of design and implementation are discussed, followed by the appropriateness of a narrative approach to analysis and mechanism-based theorising. Finally, the chapter dissects the main quality guidelines by which this research should be judged.

5.2 **RESTATING THE RESEARCH QUESTION & OBJECTIVES**

To begin, this section re-introduces the research question and objectives outlined in Chapter One as the basis for analysing and justifying the research design choices. This research asks:

*How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process and the consequential mechanisms driving emergence and performance?*

To more concretely define the research, the following four main objectives have been deconstructed from the above question:

i. To enact and gain insights from a pure digital entrepreneurial process in an EdTech (Education Technology) context
This objective points to the narrative and descriptive dimensions of this research, as the basis for explanations. Given the scant theoretical attention which digital entrepreneurship has received (see Chapter Three), this objective is justified by the need to engage in practice, while asking open-ended questions which lead to an accurate profile of events on a digital entrepreneurial journey.

ii. To identify and critically evaluate the consequential mechanisms and their generative structures which causally interrelate to trigger and drive digital new venture emergence, as well as enhance new venture outcomes.

The second objective is rooted in an explanatory dimension. Accordingly, it seeks to deep-dive into the inner workings of digital new venture creation in order to causally theorise the structures and consequential mechanisms which give rise to events.

iii. To extrapolate and infer from the current case, key insights which are potentially generalisable to other contexts.

The third objective sets out to derive the theoretical relevance of this study beyond the immediate case and context, as consistent with sound research practice. Hence, the particular is related to what is already theoretically known as the basis for abstract and propositional explanations. Likewise, what is theoretically unknown becomes a new hypothesis which guides further research.

iv. To develop next practices and guidelines which may assist in nurturing the development of digital new ventures for entrepreneurs and policymakers.

Finally, the fourth objective is concerned with practice and policy relevance of the research findings and conclusions, as consistent with a pragmatic epistemology.

From a methodologic standpoint, the above objectives can be summed up as a combined study which begins with exploration and description, then proceeds to explanation and extrapolation (Saunders et al., 2016, p. 176).
5.3 **Philosophical Stance – Ontology & Epistemology**

Given the research objectives and an AR design choice, this research identifies with a critical realist ontology and epistemology. It also identifies with a pragmatist epistemological orientation as a suitable meta-theoretical basis for framing this research. Figure 5.1 summarises the philosophies and the roles they play in this study.

*Figure 5.1 Integrative Framework of Critical Realism & Pragmatism*

While other forms of research insist on a single worldview, Action Research (AR) is compatible with multiple philosophical positions such as positivism, realism, pragmatism and critical realism (Brannick & Coghlan, 2007; Coghlan, 2019, p. 60). As will be further discussed, a critical realist ontological stance is deemed appropriate in the context of this research because it reconciles the extremes of positivism with its objectivist view of reality, and interpretivism with its subjectivist stance. Furthermore,
mechanism-based theorising, which is the focus of this research, is greatly aided by a critical realist worldview. Pragmatist epistemology, which is paradigm agnostic and methodologically focused (Morgan, 2007), is compatible with multiple worldviews if the knowledge outcome is of practical consequence (Johnson & Duberley, 2000; Johansson & Lindhult, 2008). Figure 5.1 sums up both philosophies and highlights the benefits of their integration in this study, which ultimately hinges on balancing rigour and relevance.

The subsequent sections will offer an in-depth discussion on the role of both philosophies in this study. However, as a summary, this study is based on a three-voiced Insider Action Research approach, which requires that researchers both maintain closeness and distance from the phenomenon through critical reflection. Critical realism assists in achieving distance, while pragmatism requires closeness to acquire the kind of knowledge which makes human praxis workable (Johansson & Lindhult, 2008) – hence the rationale for combining both philosophies in this study.

5.3.1 Critical Realist Ontology & Epistemology

To reiterate, critical realism (CR) provides a middle ground between the extremes of positivism and interpretivism (Burgoyne, 2011). It holds that an objective reality exists, independent of human knowledge of it. Accordingly, Bhaskar (1989) argues that reality is stratified into the empirical, the actual and the real. The empirical represents events that are observed or experienced. The actual constitutes events and non-events which may come about as a result of the real but may never be observed. Meanwhile, the real represents the underlying causal structures and generative mechanisms with lasting properties which give rise to the actual (Saunders et al., 2016, p.139). Hence, Sayer (2000, p.15) offers a critical realist model of causation represented in Figure 5.2.
When the properties of different strata combine, new qualitative phenomena or objects emerge (Blundel, 2007, p. 53). Emergent objects are said to create new structures or have causal powers and mechanisms which depend on but are irreducible to their constituents (Sayer, 2000, pp. 12-13). Given the stance on emergence, CR aligns with the argument that entrepreneurship is a process of emergence leading to new economic activity (Wiklund et al., 2011; Selden & Fletcher, 2015). Theorising the process of entrepreneurial emergence demands that researchers deeply examine the mechanisms and causal structures which underlie emergence. Hence, multiple contextual factors need to be considered in developing a comprehensive narrative of the entrepreneurial process.

To discern the causal mechanisms driving the process, critical realist epistemology adopts a two-step process of first experiencing sensations and events. Whereby, experiencing is the departure point of inquiry. Following experiencing, researchers ‘reason backwards’ through a historical analysis to interrogate and discern the actual causes or generative mechanisms and causal structures giving rise to observed events. This process of reasoning backwards is described as *retroduction* (Sayer, 1992, p. 107; Danermark, Ekstrom & Jakobsen, 2005). In a retroductive approach, an in-depth, historically situated analysis of pre-existing structures and emerging agency is required to grasp the causal structures and mechanisms. Through retroduction, inquirers gain...
understanding and make judgments. Consequently, critical realist epistemology is value-
laden and researchers acknowledge biases but attempt to limit them through critical
reflection. Biases are assumed to be unavoidable owing to worldviews, cultural
experiences, prior knowledge and upbringing. As Johansson and Lindhult (2008) observe,
the critical realist orientation of AR,

…focuses on reflective activity, in order to articulate, develop and validate knowledge,
and support emancipation of minds. (p.112)

It emphasises rigour in AR projects. Accordingly, Blundel (2007) maintains that since
CR raises questions regarding the preconditions for social phenomena, it is well placed
to frame and investigate into contextual and process issues in entrepreneurship.
Moreover, given that mechanism-based theorising has been deemed appropriate for
process-oriented and phenomenon-driven field research in digital entrepreneurship, CR
and its focus on theorising causal mechanisms is a natural fit for this research
(Henfridsson & Bygstad, 2013; Bygstad, Munkvold and Volkoff, 2016; von Briel,
Davidsson & Recker, 2018).

5.3.2 Pragmatist Epistemology & Action Research

However, while CR emphasises rigour in AR, pragmatism emphasises relevance
to practice. Hence, Johansson and Lindhult (2008) state that pragmatism focuses on
improvements in the workability of human praxis. Pragmatism is closely related to
phenomenology, which builds on the Aristotelian notion of phronesis and praxis.
Whereby, phronesis refers to practical wisdom emanating from praxis (practical action).
While Aristotle suggests sophia (wisdom) to be a higher order of knowledge,
phenomenological philosophers like Heidegger (1997) have interpreted his work in a way
that places phronesis above sophia. Accordingly, Heidegger argues that phronesis in
Aristotle’s work suggests the proper way to be what he called Dasein – i.e., being-in-the-
world.
Pragmatism has built on ancient Greek philosophy and a phenomenological paradigm to develop its four basic premises. The first premise holds that all human concepts are defined by their consequences (Peirce, 1905). The second premise contends that truth is embodied in practical outcomes (James, 2013). Meanwhile, the third assumption maintains that rational thought is interspersed with action (Dewey, 1938). Thus, concepts are only relevant where they support action (Kelemen & Rumens, 2008) and understanding arises from the very act of applying (Schon, 1995) as thought is intertwined with action. Finally, the fourth premise is rooted in the assertion that human action is contextualised socially, and human conceptualisation is equally social reflection (Mead, 1913).

Consequently, pragmatist epistemology does not only assume research to be value-laden as in CR but also value-driven – meaning, research can be initiated and sustained by a researcher’s doubts and beliefs (Saunders et al., 2016, p.137). More precisely, its emphasis on researcher reflexivity provides the epistemological basis for framing AR with insider positionality of researchers (Coghlan & Brannick, 2014). It is against these assumptions that the philosophical justification for ‘action’ as a focus of action research (AR) is founded (Baskerville & Myers, 2004). Accordingly, IAR derives from pragmatism, a radical and ‘extended epistemology’ (Heron & Reason, 2008) that integrates experiential, presentational, propositional and practical knowing.

Given its epistemology, pragmatism assists in combining theory and practice by employing experimentation in practice and conceptualisation as a desirable approach to developing new knowledge and improving practice (Johansson & Lindhult, 2008). Berglund and Wennberg (2016) argue that entrepreneurship researchers can benefit from using the same pragmatic philosophy in research which real-world entrepreneurs are known to adopt in the creation of new ventures. Accordingly, Dimov (2016) alludes to
Schon (1987) in arguing that pragmatic ‘research in the swampy lowlands’ of new venture creation, presents a suitable path in gaining a fine-grained understanding of the messy world of entrepreneurial practice.

However, while critical realism emphasises actor-independent mechanisms, pragmatism favours social or actionable mechanisms. As Gross (2009) explains, pragmatic mechanisms are grounded in human action. Likewise, Berglund and Korsgaard (2017) argue for emphasising pragmatic mechanisms in entrepreneurship because they are more empirically tractable, as well as offer practical value.

5.3.3 Abductive & Retroductive Reasoning

To develop inferences in the theorising of mechanisms, pragmatism and critical realism adopt abductive reasoning by using known premises to generate testable conclusions (Saunders et al., 2016, p. 145). Accordingly, Peirce (1905) argues that discovery rests on abductive inference. However, Peirce’s use of abduction and retroduction as synonyms in earlier works, and his later attempts to differentiate the two have made it a source of confusion. Retroduction and abduction are believed to be complementary modes of inference (Danermark, Ekstrom & Jacobsen, 2005, p.1). However, retroduction is closely associated with critical realism, while abduction is closely related to pragmatism. Chiasson (2005) interprets Peirce’s later works to conclude that abduction is an aspect of retroduction, which is based on a historical context. Whereby, retroduction presents an overarching search for the necessary conditions, structures, causal powers and mechanisms which make a phenomenon possible. Meanwhile, abduction is more concerned with the re-description and application of theoretical frameworks in providing new explanations and insights on causes and mechanisms. This argument reinforces the view that pragmatism is more concerned with practical and methodological workability of concepts in research, while critical realism
presents a generic ontological and epistemological canvas, against which pragmatic research can be designed.

Unlike the widely adopted induction and deduction in social sciences, abduction combines both deductive and inductive reasoning to arrive at the best possible explanation (Lipton, 2003; Suddaby, 2006; Walton, 2014) from competing explanations (Mantere & Ketokivi, 2013). Best explanations for events, according to Peirce, are simple and cannot be a hypothesis more extraordinary that the events themselves.

With a deductive approach, the research starts with theory and seeks to test it. As Hofer and Bygrave (1992, p. 92) argue, the excessive complexity of entrepreneurial processes detracts from the explanatory power of a single theory, thereby making a solely deductive and theory testing approach, unsuitable in this context. Further, among the most noteworthy weaknesses of a theory-testing and hypothesis falsification approach of deductive reasoning, is the lack of clarity on how to select theories for testing (Bryman & Bell, 2015, p. 27). Consequently, Davidsson (2016) argues against a theory-testing, deductive approach to entrepreneurship process research because:

…it may gear research toward filling lesser and lesser gaps concerning increasingly uninteresting or unimportant details without really contributing much to understanding the main forces that give shape to the phenomena at hand. (p. 55).

Similarly, Kilduff (2006) argues that good theory does not come from finding gaps in the literature but from engagement with problems in the world.

Meanwhile, inductive reasoning, which is on the other extreme, is equally limited by the realisation that no amount of empirical data will necessarily enable theory-building (Bryman & Bell, 2015, p. 27). Hence, Davidsson (2016, p. 59) argues that good entrepreneurship research ‘is often a matter of abductive wrestling between theory and data’. The result of an abductive approach can be theory generation or theory modification, including the incorporation of existing theory where appropriate (Saunders
et al., 2016). By showing how something might be, rather than providing that it must be a certain way (McEvoy & Richards, 2006), an abductive approach to inference serves to broaden knowledge and stimulate the research process on an ongoing basis (Habermas, 1978).

Van Maanen, Sørensen and Mitchell (2007) identify three broad implications of abduction in research. Firstly, abduction implies that, the data researchers work with has to be detailed, rich and complex such that causal conjectures can be explained in a plausible manner. Since AR projects tend to produce more data not less, this implication makes abduction native to AR. Secondly, generating explanations requires that researchers link their results to a conceptual model or framework that they can move back and forth in substantiating interpretations. This argument lends support to the broader exploration of an eclectic mix of theories in the previous chapters. Thirdly, a principle of opposites needs to be followed whereby qualitative data is counted and classified during analysis, while quantitative data needs to be qualitatively analysed for patterns that do not fit the general picture.

Given the above implications, an abductive mode of inference is deemed suitable for providing explanations for causal mechanisms driving the complex process of digital entrepreneurship. Moreover, owing to the nascent stage of research on the digital entrepreneurship phenomenon, it remains unclear how extant theories inform the current context. Thus, it is recommended that under such circumstances, scholarship adopts an open-ended, phenomena-driven approach to inquiry, marked by abductive reasoning (Edmondson & McManus, 2007; Benner & Tushman, 2015). As Meyer and Lunnay (2013) conclude:

…the use of abductive and retroductive inference is beneficial for the interpretation of qualitative data, providing a more nuanced analysis than solely deductive inference permits.
These benefits ultimately accrue to developing fine-grained insights on digital new venture creation.

5.4 Action Research Design & Insider Action Research

Action Research (AR) is the epitome of pragmatist epistemology in operation (Pasmore, 2006; Greenwood and Levin 2006; Brannick & Coghlan, 2007). Interest in AR has resurfaced against the realisation that findings from academic research seldom percolated down to real-world practitioners. As Susman and Evered (1978, p. 585) observed, findings in scholarly management journals hardly reflected the real world of practising managers and suggested action research (AR) as a possible solution for creating ‘actionable knowledge’. Moreover, the feminist movement drew attention to the fact that collaboration between practitioners and university researchers bordered on exploitation. Whereby, practitioners were seen as mere data sources to be harvested, used and discarded when needed by researchers in the high grounds of academia (Schon, 1987). However, the works of Schon (1984), as well as Argyris and Schon (1996) have contributed towards the changing views of practitioners as passive objects of research, to generators and holders of valuable tacit knowledge which is only gained through immersion in the ‘swampy lowlands’ of messy real-world practice (Schon, 1987). Accordingly, Insider Action Research (Coghlan & Brannick, 2014) has developed as a valuable mode of inquiry for aiding practitioners to translate the tacit experiential knowledge of practice into valid academic knowledge.

5.4.1 Action Research – Definition & Knowing

However, before progressing any further, a definition of AR is necessary. AR is a broad classification for a ‘family of practices’ (Reason & Bradbury, 2008), which derive
from the work of Lewin (1946). Thus, it features multiple methods, with each having its distinctive emphasis (Raelin, 2009; Coghlan, 2010, 2011; Bradbury, 2015).

**Definition:** While definitions of AR tend to be varied and discipline-specific, within organisational studies, Shani and Pasmore (1985) define AR as:

…an emergent inquiry process in which applied behavioural science knowledge is integrated with existing organizational knowledge and applied to solve real organizational problems. It is simultaneously concerned with bringing about change in organizations, in developing self-help competencies in organizational members and adding to scientific knowledge. Finally, it is an evolving process that is undertaken in a spirit of collaboration and co-inquiry. (p. 439)

Key themes of AR are alluded to in the definition. Firstly, with relation to purpose, AR seeks to promote learning which solves real organisation problems (Shani and Pasmore, 1985), alternatively described as ‘practical worthwhile purposes’ (Bradbury & Reason, 2003; Reason, 2006, p.188). Wherein, such purposes should ultimately lead to actionable knowledge (Argyris, 1996) – i.e., knowledge which is robust for scholars and relevant to practitioners. Secondly, the AR process is both emergent and iterative – meaning, it is a sequence of developing events. Thirdly, it is collaborative – meaning, it is a relational social process in which the action researcher interacts with members of an organisation as a facilitator (Greenwood & Levin, 2006). Hence, Heron and Reason (2006) describe it as research ‘with people’ rather than ‘on people’. Fourth, it incorporates different forms of knowledge – behavioural science knowledge and practitioner knowledge. Finally, the knowledge will have implications for participants and others beyond the completion of the research.

**Knowing in Action:** As consistent with its pragmatist epistemology, knowing in AR is based on an ‘extended epistemology’ which includes experiential, presentational, propositional and practical knowing (Heron & Reason, 2006, 2008, p. 367). Wherein, experiential knowing is a fundamental form of knowing which is usually tacit, pre-
linguistic and based on a direct encounter in the world (Reason, 2001). It forms the basis for all other forms of knowing and supports Dewey’s (1938) assertion that experience is the ultimate test and represents what needs to be explained. However, it can be elusive to express both to oneself and to others (Polanyi, 2009). As such, its quality is judged on openness.

Accordingly, presentational knowing is artful knowing that serves to articulate experiential knowing through stories, images, poetry, music, drama, visual arts and more. It shapes what is rudimentary into a communicable form but can have its cognitive power constrained by the conceptual power of language. Hence, Heron and Reason (2008) state that it derives its quality from creative expressions that make the tacit explicit. Meanwhile, propositional knowing is knowing about something in intellectual terms (as in concepts, constructs and theories). It presents evidence to assert facts about the world and findings which are generalisable. As such, quality in propositional knowing arises from the abstraction of presentational knowing into conceptual schemas. Besides, it must not be constrained by a dominant paradigm or the uncritical acceptance of assumptions taken for granted. Finally, Heron and Reason explain that practical knowing is knowing ‘how-to’ do something that solves problems of real-world practice. It is made manifest in the skills and competencies the inquirers develop in knowing how to do those transformative actions in the world they engage in. Its quality is judged on the merits of individuals, organisations and communities being able to accomplish worthwhile desirable social and ecological ends. Together, the four ways of knowing can be linked to a process of human knowing which includes experiencing, understanding, judgement and action (Lonergan, 1992; Flanagan, 1997).

The above definition of AR and examination of its pragmatic epistemology, forms the basis of most traditions of AR. However, different modalities of AR are better suited
to different cases and contexts, often determined by the nature of research positionality and interest (Herr & Anderson, 2014, p.12). Hence, this research finds an Insider Action Research (IAR) approach suitable to answering the research question and meeting the objectives of this study (Coghlan & Brannick, 2014; Nzembayie et al., 2019).

5.4.2 Insider Action Research & Digital Entrepreneurship

In his agenda-setting article on digital entrepreneurship, Nambisan (2016) recommends the use of methodologies which reflect the incremental and non-linear paths that digital artifacts and platforms facilitate in entrepreneurial initiatives. AR, as noted, is an incremental, iterative and non-linear multimethod family of practices. Mingers and Brocklesby (1997) argue that multi-methodological approaches to inquiry allow for the combination of parts or all of two methodologies into a robust framework, for scientific investigation into cases and contexts defined by complexity. Insider Action Research (IAR) builds on this argument (Coghlan & Brannick, 2014) to combine tenets of first-person reflective practice (Schon, 1984) with second person cooperative (also collaborative) inquiry (Heron, 1986; Bray, Lee, Yorks & Smith, 2000, p.6; Heron & Reason, 2006), for third-person knowledge production (Reason & Torbert, 2001) to achieve doctorateness (Coghlan, Coughlan & Shani, 2019). It represents a multi-methodological approach which enables insider practitioners to study the organisation or community in which they are also members.

Given that the researcher is an insider in the organisation and community of digital entrepreneurial practice (see Chapter One), this design choice provides the necessary methodologic toolbox for use in this research. Moreover, IAR is deemed even more appropriate because its research design architecture is modular. This modularity allows for flexibility in adoption and adaptation in particular cases. Hence, to complement its multi-methodological approach in this context, this research subsumes design research
into traditional IAR, as necessitated by the digital entrepreneurial phenomenon – see Figure 5.1 subsequently.

**Collaborative Inquiry:** Since, second person inquiry is central to IAR (Coghlan & Brannick, 2014), Collaborative Inquiry (CI), is a stream of AR which aligns with this research. It is an AR modality where all participants work together in an inquiry group as co-researchers and co-subjects (Reason & Heron, 1986; Bray et al., 2000; Heron & Reason, 2006, 2008). It, therefore, deviates from ethnographic studies by researching ‘with’ people not ‘on’ people (Heron, 1996). CI ultimately removes the barrier between researchers and the researched owing to its democratic emphasis. As Heron and Reason (2006) explain, CI can be initiated by one or two researchers, familiar with the method, who choose an inquiry topic and invite others to join into the inquiry procedures. They further explain that CI, although democratic, does not suggest parity of influence; neither is it necessary to try and achieve it. As such, researchers focus on examining their own experience and action in collaboration with people with similar interest. Given that the process of new venture creation is inherently collaborative (Cooney, 2005), CI makes for a natural fit with the phenomenon.

**Reflective Practice:** While CI mainly focuses on second person inquiry, Reflective Practice (RP) is an AR modality which emphasises first-person inquiry. It is especially useful in cases involving insider researchers studying their practice. RP, which is associated with the works of Schon (1984) and Argyris (1991), emphasises how practitioners engage in critical reflection on their actions. As Schon (1984, p. 243) observes, practitioners reflect-in-action, but seldom reflect on their reflection-in-action; as such, their knowledge remains largely tacit and difficult to transfer. However, through critical reflection, what would otherwise be tacit experiential knowledge can be translated into a communicable form for dissemination. Further, Schon (1984, p. 280) takes a
pragmatist stance in stating that thinking and doing are interwoven in complex ways. He explains that doing extends thinking in experimental action, and reflection follows from doing. Thus, the first-person nature of RP forms a critical dimension of an IAR design. It enables practitioners to double as scholars in studying their contexts. As the researcher in the current case is a digital entrepreneur, he is a practitioner seeking to deepen and make explicit, his knowledge of his industry and embedded context as scholar. RP provides the mechanisms by which such insider scholarship can be achieved.

**Design Research:** Of relevance to digital entrepreneurship is the addition of design research (DR). Scholars in the Management Information Systems (MIS) discipline have long appreciated the use of AR for studies in digital technology contexts (Baskerville & Wood-Harper, 1996; Baskerville & Myers, 2004; Sein, Henfridsson, Purao, Rossi & Lindgren, 2011). As previous chapters have indicated, digital entrepreneurship lies at the nexus between the entrepreneurship and MIS disciplines. However, while the latter has appreciated the value of AR, the former has paid scant attention to it.

Consequently, Nzembayie et al. (2019) argue and demonstrate the practicalities of combining IAR and DR to form a multimethod approach for use in process-oriented studies of digital entrepreneurship. As the researcher has experienced, scholars who may be sympathetic to AR in entrepreneurship, often subscribe to one modality of AR, believing it to be the only approach. Thus, the emphasis on *Multimethod* is a deliberate attempt at highlighting the multimodal nature of the ‘family of practices’ called AR (Reason & Bradbury, 2008). In the AR family, DR has arguably remained an obscure member until recently (Coghlan, 2019, pp. 71-72). The integration of DR in an IAR framework is premised on the observation that:

…action research and the action of designing are so close that it would require only a few words to be substituted for the theoretical frameworks of action research to make it applicable to design. (Swann, 2002, p. 56)
Indeed, design science and its corresponding DR approach are described as ‘expressions of action research’ which are ‘not mutually exclusive’ but can be adapted to suit different research needs and contexts (Coghlan, 2019, pp. 71-72). Consequently, MIS scholars have drawn attention to the striking similarities between IAR and DR, eventually arguing that the cross-fertilisation of both in a digital technology context is rather intuitive (Cole, Purao, Rossi, & Sein, 2005; Järvinen, 2007; Jrad, Ahmed & Sundaram, 2014). DR focuses on building and evaluating artifacts, while AR focuses on solving organisational problems. The products of DR are constructs, models and frameworks which are accessed against criteria of value and practical utility (March & Smith, 1995). In an Information Systems (IS) context, DR has traditionally emphasised technological rigour in designing artifacts. However, in the organisational context of MIS, Sein et al. (2011) point out that the action of artifact design and the needs of the organisation are entwined. Design is driven by the needs of the organisation. Similarly, the process of new venture creation does not merely happen for its own technical sake but is ultimately driven by value creation and capture for stakeholders.

Hence, Dimov (2016) argues that a design science approach to entrepreneurship research is justified because entrepreneurship is both a natural and an artificial phenomenon. Thus, it needs to combine rigour, relevance and the production of prescriptive practitioner knowledge through action and design-based inquiry (Berglund, Dimov & Wennberg, 2018). Indeed, entrepreneurship has rightly been described as an artifact-creating process (Selden & Fletcher, 2015). Accordingly, new venture ideas, business models, new market offerings and new organisations, can become design artifacts, enacted and studied through the generative power of recursive action (Dimov, 2016). Thus, entrepreneurship process research requires DR, which places a dual focus on the actions of artifact designs and solving the needs of the organisation.
Nzembayie et al. (2019) adapt and develop the above framework (see Figure 5.2) which visualises how IAR can be combined in a core project of digital new venture creation to produce knowledge as the academic project (Zuber-Skerritt & Perry, 2002).

5.4.3 Why use IAR in Digital Entrepreneurship

The previous section has offered justifications for the use of IAR in this study. However, this section serves to augment the arguments already presented. IAR has multiple known benefits for knowledge production in entrepreneurship. Entrepreneurship is a process of emergence (Wiklund et al., 2011). Hence, it requires a ‘shift in inquiry from entrepreneurship as an act to entrepreneurship as a journey’ (McMullen & Dimov, 2013). Studying this journey necessitates methodological pluralism and diversity (Leitch, Hill & Harrison, 2010). Yet, several scholars bemoan the dominance of a functionalist paradigm (Landström, Parhankangas, Fayolle & Riot, 2016) and the corresponding dearth
of event-driven process inquiry (Aldrich, 2001) - which follows the journey from inception, and captures events as they happen (Davidsson et al., 2011; Davidsson, 2016, p.92). Bygrave laments the state of entrepreneurship research by stating that:

...in our craving for the respect of our academic colleagues we are squandering the opportunity to build a new paradigm with imaginative research methods that are appropriate to a profession instead of pure science.' (2007, p. 24)

Bygrave is alluding to scholars like Drucker (1985) who argue that entrepreneurship is neither science nor art, but practice. Without consideration for practical knowledge, Davidsson (2002) cautions that the field risks producing knowledge that is either misleading or harmful to the community of entrepreneurial practice. Following this viewpoint, the rationale and benefits of using IAR in a digital entrepreneurial process is argued.

**Rationale:** Three central assumptions anchor the rationale for using IAR in this research. Firstly, all good organisational research should demonstrate phenomenon-methodology fit, as well as produce knowledge that balances rigour and relevance (Tranfield & Starkey, 1998). IAR achieves fit by its inclusiveness of relevance, and its emergent and non-linear approach to inquiry - which is similar in many respects to most entrepreneurial processes. Its inquiry method of *plan*, *act* and *evaluate*, bears semblance to pragmatic digital entrepreneurship theories such as the lean start-up model (Ries, 2011) of *build* (act), *measure*, *learn* (evaluate). Thus, its use allows researchers to ‘live life as inquiry’ (Marshall, 1999). Accordingly, Berglund (2007) recommends that entrepreneurship be studied as ‘lived experience’ involving insider action by researchers. Indeed, the methodologic fit between real-world digital entrepreneurial methods and IAR, is the basis for the somewhat intriguing question by Rasmussen and Nielsen (2004) – ‘Is entrepreneurship action research in disguise?’ The question arises from the similarities between IAR and entrepreneurial processes. Likewise, the call for an ‘Entrepreneurial
Method’ by Sarasvathy and Venkataraman (2011) involving ‘action, reaction, transformation and explicit co-creation’ is well operationalised in a IAR approach.

Meanwhile, a second rationale for using IAR derives from the argument that when studying a phenomenon at a nascent stage of theory development, scholarship needs to return to an open-ended and phenomena-driven approach to inquiry, using inductive and abductive inferences (Edmondson & McManus, 2007). Given its very recent entry in journals, the digital entrepreneurship theme is at a nascent stage of theory development, thereby making an open-ended IAR approach suitable (Benner & Tushman, 2015; Nambisan, 2016).

A third rationale builds on the argument that entrepreneurship is a science of the artificial (Simon, 1996; Sarasvathy, 2003; Venkataraman et al., 2012) – meaning, it studies worlds that can be created. Hence, the entrepreneurial journey has alternatively been conceptualised as an emergent hierarchical system of artifact-creating processes (Selden & Fletcher, 2015). This argument lends support to the action design research approach to IAR, involving the enactment and creation of new ventures as the vehicle for real-time experiential knowing.

**Benefits:** IAR allows for an enactive approach to entrepreneurship research, which Johannisson (2011) and others have repeatedly called for. It has the advantage of offering entrepreneurial practitioners the opportunity to enact and study their practice in real-time. Its use also results in self-development of the researcher both as practitioner and scholar. Thus, it supports the assertion that ‘all good research is for me, for us and for them’ (Reason & Marshall, 1987, p. 112). Given its epistemological underpinnings, IAR emphasises critical subjectivity (Reason, 1994) as opposed to objectivity – i.e., exposing and acknowledging one’s biases and taking steps to address them, rather than believing they do not exist. In so doing, it helps readers see where researchers fit in the
bigger story. Thus, audiences of research findings are not misled into assuming total impartiality where such is unattainable.

Additionally, since the bigger story is understood in context, the goal of generalisation is not law-like or statistical as in conventional forms of research, but *naturalistic generalisation* (Stake & Trumbull, 1982). Whereby, the responsibility for generalising rests not with the researcher but on they who seek to generalise elsewhere. Thus, the researcher’s responsibility hinges on the provision of rich and detailed descriptions of the case and context under study, to aid readers find similarities that are extrapolatable to theirs. Ultimately, the use of IAR contributes towards the ‘interestingness’ of entrepreneurship as a domain of scholarship (Frank & Landström, 2016).

### 5.4.4 Challenges of Doing Insider Action Research

While adopting IAR is suitable and beneficial to digital entrepreneurial process research, it is not without its challenges and limitations. Indeed, the difficulties of doing IAR is the reason Schon (1987, 1995) describes it as research in ‘the swampy lowlands’, where problems are messy, confusing and incapable of being addressed through simple technical solutions. Its challenges are the same reasons why longitudinal *process* research in entrepreneurship has been called for but mostly gone unanswered (McMullen & Dimov, 2013). However, given that digital new venture creation is less burdened by physicality and tactility of process and products, IAR appears less challenging in this context than in traditional entrepreneurship (Guthrie, 2014; Nzembayie et al., 2019). Coghlan (2007) identifies preunderstanding, role duality and access as being the primary challenges researchers face in carrying out IAR.

**Preunderstanding:** Preunderstanding, as Gummesson (2000, p. 67) notes, refers to a person’s knowledge, insights and experiences before they engage in a programme. It
includes both explicit and tacit knowledge, which can be beneficial, as well as detrimental to the study (Coghlan & Brannick, 2014, pp. 133-134). It presents a risk to the quality of IAR. Insider researchers must guard against assuming too much, which tends to prevent critical examination. Ferguson and Ferguson (2001) warn against the danger of believing they fully know their contexts when in fact their perspectives might only be partial. Thus, epistemic reflexivity is recommended as a means of challenging one’s assumptions and self-awareness. Techniques such as reflective journaling, thought experiments, counterfactual thinking and abductive analysis are recommended tools and methods for achieving critical reflexivity (Danermark, Ekström, Jakobsen & Karlsson, 1997).

**Role Duality:** Meanwhile, *role duality*, which Williander and Styhre (2006) describe as being between academia and practice, can equally complicate the IAR process. This dual role can become overwhelming and confusing as the researcher is bound to experience ‘competing commitments’ (Kegan & Lahey, 2001) from the core project and the academic project. Role conflict may lead to role detachment as the researcher may feel like an outsider in both roles (Adler & Adler, 1987). While this may be the case, it could be argued that the challenge of role duality is not entirely inconsistent with the flexibility, self-regulatory cognitive and meta-cognitive processes required to drive digital entrepreneurial performance (Nambisan & Baron, 2013). Role duality, therefore, is among the many similarities between the role of an entrepreneur and that of an insider action researcher.

**Access & Dissemination:** Additionally, problems of access can present challenges to insider action researchers. Accordingly, Coghlan (2007) states that gaining access, using data, disseminating and publishing findings of IAR can be highly political acts, with major ethical implications. As such, researchers need to be reasonable, intelligent, self-critical and responsible. Thus, transparency with collaborators and consent seeking are
vital to addressing ethical issues that may arise from data access and dissemination (Brydon-Miller, 2008, pp. 201-207). For researchers with higher levels of access, there is also a danger of self-harm through the dissemination of what may be business secrets. However, issues of access may be less of a concern in this study as the researcher is creating a new venture from scratch. The venture is removed from his existing businesses, thereby offering more leverage in terms of access and mitigating against risk of self-harm. Nevertheless, dissemination remains an issue with relation to independent collaborators. Thus, consultancy and permission is sought before sensitive information is included or published.

5.4.5 Ethics & IAR

Besides access, ethical concerns are a central issue in IAR because they arise at various stages in the research process (Bryman & Bell, 2015, p. 129). Although conducting IAR raises unique ethical challenges, it also shares many similarities with ethical concerns in other forms of interpretivist research (Brydon-Miller, 2009). The principles of democracy and justice demanded by IAR, have in-built mechanisms for guarding against ethical violations. However, as Boser (2006) comments:

…democratic intentions do not obviate the need for thoughtful examination of the ethical implications of the research in the individuals and other stakeholder groups. (p. 14)

Similarly, Hilsen (2006) argues that ethics in AR hangs on a tripod of - human interdependency, co-generation of knowledge and fairer power relations. While ethics in business research is an old and seemingly never-ending subject of debate (Bryman & Bell, 2015), focusing on core principles helps guide researchers through understanding what ethically sound research is. According to Diener and Grandall (1978), ethical principles can be summed up under four main concerns – harm to participants, lack of informed consent, invasion of privacy and deception. While harming participants is morally unacceptable, what constitutes harm is never so clear-cut. Thus, the onus is on
the researcher to carefully assess the possibility of harm to participants. As indicated above, the collaborative and democratic nature of IAR involves regular consultation with stakeholders at all stages of the research process, in order to ensure that their concerns are taken into consideration.

**AR Ethical Challenges:** Williamson and Prosser (2002) identify three ethical questions which present a dilemma for AR researchers. First, if researchers and participants collaborate closely, how can confidentiality and anonymity be guaranteed? Second, if action research is an emergent journey, how can informed consent be meaningful? Third, as action research can have political consequences, how can action researchers avoid harming participants? The problem with AR, according to Boser (2006), lies in the fact that confidentiality and consent cannot be assured in advance - reason being, the full scope of the process cannot be pre-determined by one individual (Williamson, 2002).

To resolve these challenges, four ethical principles are suggested for AR researchers (Gellerman, Frankel & Ladenson, 1990). Firstly, research should serve the good of the whole. Secondly, researchers should follow the golden rule of treating others as they would like to be treated. Thirdly, participants should be treated as ends, not only as means, implying they need respect as people, not objects to be exploited and discarded. Fourth, influential stakeholders cannot be allowed to trample upon the less powerful. These basic moral principles appear intuitive enough but arguably remain vague.

In the specific case of this research, ethical issues relating to reporting findings arguably cause the most concern. As Holian and Coghlan (2013) observe, research outcomes may include commercial secrets, confidential or potentially embarrassing information about other stakeholders, the organisation and the researcher. Thus, when publishing results, it may be necessary to go beyond anonymity to remove any details that
identify the organisation or collaborators. Therefore, at the level of submission of the
thesis to external examiners, and presentation of research papers and reports for
publication, these measures are carefully considered.

**Ethics Committees:** Finally, submitting IAR projects to ethics committees for
approval has been known to be notoriously challenging. As Coghlan and Brannick (2014,
p. 150) point out, the notion of researching one’s own organisation can appear strange to
ethics committees. Hence, Brydon-Miller and Greenwood (2006) comment that a
distinction needs to be made between engaging in AR and reporting on AR. As the AR
activities form an integral part of a researcher’s real-world practice, it does not require
ethical approval. What requires approval is taking the actions and transforming it into
academic research - implying that dissemination of findings represents a focal point of
ethical concerns. Thus, researchers need to keep in mind that achieving ethical approval
is only one step in the process. Ethics in IAR remains an ongoing dialogue at each stage
of the AR cycle (Boser, 2006; Brydon-Miller, Greenwood & Eikeland, 2006). This study
considers the above factors in asking for ethical approval and ensuring that the research
does not ultimately cause harm to participants. In this study, key participants who are
independent owners of their enterprise have ethical concerns such as trade secrets. Hence,
issues of potential harm are reasonably considered in design and implementation, as well
as reviewed throughout the process.

### 5.5 Design & Implementation

As noted, the practicalities of IAR design involve a core project and an academic
project (Zuber-Skerrit & Perry, 2002). The core project is the vehicle for generating data
towards the academic or thesis project – see Figure 5.4 below. The figure illustrates that
two projects run concurrently in an IAR doctoral study – a core and thesis project.
Figure 5.4 Relationship Between Core Project vs. Thesis Project in IAR

The core project is collaborative and takes place within the realms of first- and second-person practice. Meanwhile, the thesis project involves two phases of independent writing throughout the entire process. This section focuses on the planning and implementation of the core IAR project in the current case. The case is a process of digital new venture emergence in the global EdTech industry.

5.5.1 Cycles of Action & Reflection

The process of generating actionable knowledge is based on an organisational change logic. Organisational change is a difference in form, quality or state over time in an organisational entity (Van de Ven & Poole, 1995). Change can be limited, focused or holistic (Mitki, Rami Shani & Stjernberg, 2000). Holistic change programmes are
designed to address all aspects of an organisation, and are marked by guided change – i.e., change which is directed but loosely defined. Holistic change is best suited to this study because the entirety of digital new venture creation and organisational emergence is under observation.

Consequently, holistic change programmes are recommended for doctoral studies since they last longer (Coghlan & Brannick, 2014, p. 78). Using the metaphor of actor-directors, researchers are inconspicuous observers, engaged in the active intervention and enactment of everyday activities in their organisations or communities of practice. To capture and reflect on the constant stream of data being generated, the IAR cycles provide a useful structuring framework. The core project begins with a pre-step, followed by main steps, which are the IAR cycles. The pre-step clarifies the purpose and multiple contexts affecting change, while main steps are centred on enactment and intervention.

**Pre-step:** Chapter One has provided a background of the case that offers the rationale for undertaking this study. Meanwhile, Chapter Four has examined the multiple external contexts affecting change and change agents involved in this research. At the internal level, the cultural and structural dynamics of the new venture have also been briefly delimited in Chapter One. Equally critical in the pre-step is the establishment of collaborative partnerships with potential stakeholders. Accordingly, this research established collaborative partnerships with a team of Dutch game developers. These developers are independent digital entrepreneurial agents who perform the critical role of product development (game coding in this case). From the researcher’s network, an India-based web programmer formed an equally critical collaborator in the project. Meanwhile, the researcher doubles as focal digital entrepreneurial actor providing leadership, as well as the organising vision of the core project. Ultimately, the pre-step seeks to determine
readiness to engage, the desirability of the project and the definition of a desired future state (Coghlan & Brannick, 2014, p. 10; Nzembayie, 2017).

Main Steps: Following the pre-step, are main steps involving the enactment of the IAR cycles – see Figure 5.5.

![Spiral of IAR Cycles](image)

Figure 5. 5 Spiral of IAR Cycles

Main steps begin with constructing the problem. It collaboratively identifies and discusses plans for enactment. Subsequently, planning action follows with the identification of concrete next steps. Next, taking action involves collaborative implementation and interventions. Finally, evaluating action involves examining both the intended and unintended outcomes of actions. It focuses on assessing if the original construction fitted, and if the actions taken matched the constructing. In addition, evaluation determines whether the action was undertaken appropriately, and what feedback is directed into the next cycle. Nevertheless, it is worth noting that IAR cycles are adaptive and therefore it is not recommended they be rigid. Furthermore, multiple cycles can run concurrently as opposed to linear. They are, therefore, loose guidelines that must not be strictly adhered to at the expense of the spontaneity and fluidity that processes of change tend to follow (Heron, 1996).
In adopting the cycles in a digital entrepreneurship context, Nzembayie et al. (2019) observe that the pre-step is consistent with the initial stages of formulating the digital new venture idea and subsequently articulating it to gain opportunity confidence (Davidsson, 2015). Meanwhile, the main steps wrap around key events in digital new venture enactment (Nzembayie et al., 2019). Hence, they conclude that IAR and digital new venture creation co-exist in symbiotic relations of new venture co-creation and new knowledge co-production.

5.5.2 Data Capture Techniques

As Coghlan and Brannick (2014, pp. 89-91) indicate, enacting the AR cycles discussed above, is best conceptualised as a process of data generation rather than just data collection. Given that multiple sources and types of data are generated as the IAR process develops, capturing both quantitative and qualitative data, experiential and dialogic insights, is necessary for building a complete narrative of an emergent process. Since first-person experiential knowing must be represented as presentational knowing; field notes, reflective journaling, data analytics, videos, interviews, screen grabs and more, are recorded either during or immediately after events occur (Nzembayie, 2017). The reason for this stems from psychology knowledge that human memory is short-lived and retrieval is constructive (Anderson, 1990) and further plagued by ‘retrieval-induced forgetting’ (Anderson, Bjork & Bjork, 2000).

Thus, capturing rich data in real-time or near real-time ensures that reflections and final analysis of process are based on a reliving of moments experienced. Techniques for data capture include inconspicuous note-taking and reflective journaling to ensure that participants do not alter their behaviour in what has been described as the Hawthorne effect (Bryman & Bell, 2015, p. 58). Even in more formal settings, interviews are preferably unstructured and conversational. Further, depending on the level of access, the
research may use firm documentation for data triangulation, within the boundaries of ethical considerations. In the current case, access may be less of an issue given that the researcher assumes a central leadership role.

In a pure digital entrepreneurial context, the fluid boundaries of firm and innovation processes afford the capture and storage of rich data. Hence, Dymek (2008) observes that digital technologies are changing the context of AR projects. Likewise, Embury (2015) notes that digital technologies afford networked co-creation of value by eliminating time and spatial boundaries. The concept of an organisation is therefore no longer based on traditional assumptions of physicality and tactility. Hence, leaderful practices of collaboration (Raelin, 2009) take place across digital networks. Indeed, as Chapter Three notes, digital technologies are traceable and therefore place a time stamp on meta-data emanating from most digitised activities. As digital technologies become indispensable placeholders of human memory (Fitzpatrick, 2013), researchers are armed with digital trails which can be followed to relive moments experienced. Consequently, Nzembayie et al. (2019) conclude that the same tools used in digital new venture creation prove invaluable in IAR data generation and capture.

5.6 Data Analysis & Interpretation

During and after data capture various forms of data analysis occur. Reflection in and on action and reflexivity are forms of analyses taking place throughout the IAR process (Herr & Anderson, 2014, p. 91) at first and second-person levels (Coghlan & Brannick, 2014, pp. 102-5). Final data analysis pulls together data on the entire project, to arrive at overall research findings.
5.6.1 Reflective Analysis & the General Enquiry Method

As first-person inquiry, IAR calls for reflection and reflexivity throughout the cycles. Following Mezirow (1991), reflection takes the form of content, process and premise. Content reflection involves thinking about what is happening; while process reflection focuses on strategies, procedures and how things are being done. Meanwhile, premise reflection critiques underlying assumptions and perspectives. Together, content, process and premise reflection complete a meta-learning cycle (Coghlan & Brannick, 2014, pp. 12-13). The meta-learning tripod underpins the General Empirical Method of IAR, represented in Figure 5.6 subsequently.

*Figure 5.6 General Empirical Method of IAR*

![Diagram of the General Empirical Method of IAR](Coghlan & Brannick (2014, p. 30))

As Figure 5.5 indicates, every step in an IAR cycle calls for a reflective process of experiencing, understanding, judging and taking action. Thus, it requires that researchers be attentive to data, be intelligent in inquiry or understanding, be reasonable in making judgment and be responsible in making decisions and taking actions. Accordingly, authenticity and a strong sense of integrity are essential.

More concretely, the General Empirical Method can be operationalised through techniques such as Kolb’s (1984) reflective learning cycle or Gibb’s (1988) model of
reflection. Kolb’s experiential learning cycle involves a meta-learning technique which begins with concrete experience, reflective observation, abstract conceptualisation and active experimentation. Concrete experience involves engaging in activities and describing what happened in neutral terms. Next, reflective observation includes looking back to identify feelings, reactions and observations. Then, abstract conceptualisation relates relevant concepts to the experience and formulates tentative conclusions, generalisations or hypotheses – abductive inference implied. Finally, active experimentation features specific implications for applying and testing or extending what was reflected on (Coghlan & Brannick, 2014, p. 41).

Likewise, Gibbs’ (1988) reflective cycle, provides a six-point framework to guide documenting reflections in journals. It begins with description, which entails narrating what happened in neutral terms, without analysis. It is followed by feelings which involve identifying how one felt, or the reactions one had to the events that occurred, usually without analysis. Evaluation involves making value judgements on the experience regarding what was good or bad. Analysis constitutes the sensemaking on the experience. It involves using multiple perspectives to understand the experience. Conclusions involve combining the experiences with analyses to arrive at more abstract and general summations. Finally, action plans involve concrete next steps to translate learning into a practical outcome.

5.6.2 Data Analysis – a Narrative Approach

At the end of data capture and reflection, a final analysis is conducted. As second- and third-person inquiry, IAR requires that findings have relevance ‘for us and for them’ (Reason & Marshall, 1987, p. 112). In this endeavour, narrative analysis is deemed suitable for AR projects due to its first-person dimensions (Toledano & Anderson, 2017). Regardless, Miles, Huberman and Saldana (2014, p.10) point out that all forms of
interpretivist analysis include the following activities – i) assigning codes or themes to a set of field notes or interviews, ii) sorting and sifting through codes to find similar phrases, relationships, patterns, themes and common sequences, iii) isolating patterns and processes, iv) and identifying commonalities and differences for more data collection. During the process of analysing, researchers note reflections or remarks in jottings and analytic memos. Finally, they compare findings with a formalised body of knowledge for generalisation.

**Narrative Analysis:** In the current case, the unit of analysis or primary entity being studied (Bryman & Bell, 2015) is the *process* of digital new venture creation and the identification of causal mechanisms driving the process. As process theorising, it involves organising analysis by events (Poole et al., 2000; Miles et al., 2014, p. 30). Events are natural units of social processes and represent what key actors do or what happens to them (Van de Ven, 2007, p. 155). Hence, narrative analysis presents a suitable method for data analysis as it preserves the chronology of events. In the entrepreneurial context, Gartner (2007) argues that the methods of narrative analysis are consistent with the nature of the entrepreneurial process. He notes that:

…narrative approaches not only uncover the models we currently use to talk about entrepreneurship, they give us new ways to talk this phenomenon, as well. (p. 614)

However, the term *narrative analysis* may belie that fact that it ‘is no longer the province of literary study alone’ (Riessman, 2005, p. 5). In organisational research, it has emerged as a valuable form of sensemaking (Weick, 1995). Its use in an entrepreneurship context is justified by the assertion that the entrepreneurial process is the ongoing construction of narratives (Garud & Giuliani, 2013), in a dynamic journey of new venture emergence – see Chapter Two. This conceptualisation provides the premise for using narrative analysis to analyse real-time narratives of digital new venture emergence. As narrative analysis preserves the order of events, it addresses the dearth of *temporality* in studies of the
entrepreneurial journey (Moroz & Hindle, 2012; McMullen & Dimov, 2013). However, before diving any deeper into the subject, it is essential to step back and more clearly define key terminologies relating to narrative analysis.

**Narrative**: Firstly, a narrative is a story which interprets an event or sequence of events. Process narrative is an account of how and why a sequence of events develop (Poole et al., 2000). Hence, IAR is interrelated to narrative research from the perspective that its extended epistemology of presentational knowing, tells the story of first-person and second person collaborative experiences. Thus, narratives represent a suitable tool for ongoing and retrospective sense-making (Weick, Sutcliffe & Obstfeld, 2005). In IAR, they are constructed from cycles of action and reflection captured in reflective journals and other data sources. Chase (2011) describes narrative inquiry as connecting events, actions and consequences over time into a ‘meaningful whole’. Therefore, it is unlike a *Grounded Theory Method* (Strauss & Corbin, 1994; Charmaz, 2008) of analysis which fragments stories into discrete themes to extract variables (Mohr, 1982). As Van de Ven (2007) explains:

…the temporal development of a new business may entail qualitative changes…during the course of the study. These processes cannot be represented adequately in a set of variables.’ (p.155)

However, while themes, categories and aspects of content are still analysed separately in narrative analysis, it occurs within a narrative. Hence, analysis involves the researcher constructing a narrative from the cycles of data generated throughout the research process. Following this activity is thematic narrative analysis which develops codes and categories to help analyse narratives. The codes and themes are derived from a conceptual model or framework developed from existing theory for use in an abductive inference (Bryman & Bell, 2015, pp. 541-543; Saunders et al., 2016, pp. 197-200). The previous chapters have
developed analytical frameworks for an abductive back and forth analysis between narratives and theory.

**Constructing the Narrative:** Analysing the IAR narrative begins with writing out stories and outcomes of the core project (Coghlan & Brannick, 2014, pp. 168-169). Accordingly, Abbot (1990) states that description is the first step towards narrative theory development. The narrative text is simply the story that is told (Bal & Boheemen, 2009, p. 90). As data is bound to be astronomical, selecting events of significance to include in the narrative text is an essential first step towards data reduction. Writing the narrative from the notes captured in reflective journals allows researchers to relive moments they have experienced. The keys to a successful narrative are comprehensiveness, transparency and synthesis. Langley (1999) also recommends the use of visual mapping and temporal bracketing as useful techniques for distilling the narrative into a compact form.

The process model developed in Chapters Two and Three help organise the basic structure or sequence of the narrative of new venture creation. In narrative terms, this basic sequence of events is known as *fabula* (Bal & Boheemen, 2009, p.9). With this structure, the narrative text of *what happened* can be written comprehensively and transparently (McTaggart, 1998), allowing the reader to judge for themselves the ‘validity’ of the research, its claims to knowledge and extrapolation to inform broader contexts. The IAR narrative text is a factual and neutral account of events which do not contain the researcher’s (narrator’s) reflections or sensemaking. It is not recommended that sensemaking be mixed with the narrative text. Separating the story from the reflection serves to demonstrate methodological rigour. However, researchers may use the reflective pause technique to indicate sensemaking in public - that way, the reader separates the
story from the reflection which seeks to determine underlying narrative causes (Coghlan & Brannick, 2014, p. 169).

**Narrative Thematic Analysis:** After writing down the story, the researcher further reflects on it and tests insights in order to find emergent themes against theoretical frameworks. This activity is the sphere of narrative thematic analysis (NTA). As Braun and Clarke (2006, p. 78) point out, *thematic analysis* is a foundational approach in analysing interpretivist data. Accordingly, Riessman (2008) defines NTA as the identification and analysis of themes within a narrative by focusing on the content rather than its structure (Maitlis, 2012). It is unlike other forms of thematic analysis, only in the sense that it preserves the sequence of the narrative while incorporating multiple contexts, and multiple levels of analyses to arrive at a full and rich explanation of process mechanisms (as in this case).

According to Saldana (2015, p. 14), interpretivist coding is a hierarchical system which typically begins with raw data (narrative) which is organised into codes. A code is a unit of analysis such as a case. Since events are the units of analysis in a narrative, codes refer to events. Codes are then organised into categories. From categories, themes and concepts are developed at a more general and abstract level.

Narrative coding is the initial stage of extracting themes from narratives. Codes are labels researchers develop as the basis for rearranging data into categories. A common technique for coding entails searching for related events and narratives and colour-coding them. Alternatively, researchers may make multiple copies of the core project narrative and colour-code for particular themes on each copy. In NTA, colour-coding allows for the identification of themes without fragmenting the data. Themes and codes may be drawn from theory (Miles et al., 2014, p.20). The research question and objectives, as
well as literature review findings, assist in focusing coding efforts. Thus, the conceptual process model and framework of mechanisms developed from the literature present analytical tools for an abductive engaging with theory and data (Saunders et al., 2016, p. 602).

5.6.3 Theorising Mechanisms & Generative Structures in Narratives

Writing and coding the story are mechanical steps towards developing theory and explanations. Process theory stories are abstract constructs and process models which explain relationships between events in a process or a narrative. Hence, process explanations are event-driven, as opposed to outcome-driven and adopt narrative causality which is ‘loose’ (Van de Ven & Engleman, 2004). Events are units within process, and process is itself an unfolding unit of analysis.

Consistent with the critical realist orientation of this study, good process theory must go beyond accounts of events to encompass the generative mechanisms giving rise to them. Hence, Van de Ven (2007, p. 154) maintains that narrative explanations occur by specifying generative mechanisms. Further, the plot in a narrative is itself a generative mechanism. To reiterate, written narratives of events arising from the IAR cycles are limited to the surface and provide no direct access to the underlying structures or generative mechanisms driving empirically observed phenomena. Hence, critical reflection explored above is one method for moving from the surface description of events towards deep structures and causal mechanisms.

However, Simon (1992) observes that reflecting and developing narrative theory of underlying mechanisms remains a challenging task. To assist, mechanism-based theorising provides a useful framework for uncovering the ‘generating mechanisms’ which drive process (Abbot, 1992, p. 428) because its focus is on causal pathways
(Hedström & Ylikoski, 2010; Ylikoski, 2016) as opposed to simple X to Y causes. The causal pathways are discerned from events in a retroductive and an abductive approach.

Pentland (1999) argues that searching and explaining generating mechanisms and deep structures in organisational process theory is analogous to searching for deep structures in narratives. Consequently, he develops a framework for developing process theories based on the concept of levels of narrative structure – see Figure 5.7.

**Figure 5.7 Levels of Structure in Narrative**

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>Particular telling of a story by a specific narrator</td>
<td>Actual text of his or her story: “When I showed up at the interview...”</td>
</tr>
<tr>
<td>Story</td>
<td>Version of a fabula from a specific point of view</td>
<td>A new employee’s own version of how he or she was hired</td>
</tr>
<tr>
<td>Fabula</td>
<td>Generic description of a particular set of events and their relationships</td>
<td>How a particular person was hired: what happened, who did what</td>
</tr>
<tr>
<td>Generating mechanisms</td>
<td>Underlying structures that enable or constrain the fabula</td>
<td>Overall recruiting process: how people in general are hired</td>
</tr>
</tbody>
</table>

*Source: Pentland (1999, p.719)*

**Generating Mechanisms:** From the very bottom, the generating mechanisms are the underlying structures which enable or constrain fabula (generic sequence of events). They are generative because they can produce an infinite number of possibilities. In the previous chapters, digital technologies and other external enabling conditions are suggested as generating structures which produce actor-independent mechanisms or affordances that drive process. Likewise, cognition and motivation are generating mechanisms at the actor level which interact with actor-independent mechanisms to derive actionable mechanisms that drive process narratives. However, Pentland (1999) notes that even though the deep level is usually outside the scope of standard narrative theory, it must be incorporated to build better narrative theory due to its underlying
importance in driving process. The main issue, however, is that generative mechanisms are not directly observable, thereby making explanations best guesses.

**Fabula:** The next level of *fabula* is where narrative theory traditionally begins (Pentland, 1999; Bal & Van Boheemen, 2009, p.9). At this level, a particular set of events, actors and their relationships encode aspects of a story that are preserved irrespective of translation across languages, change in media format or narrator. Thus, *fabula* is an objective version of basic events and characters required to identify a particular story. Interpreted in the context of this research, *fabula* is well represented by the digital entrepreneurial process model developed in Chapter Two. As *fabula*, it describes in a generic way, the process by which new ventures may be created. Further, *fabula* is also generative – meaning, one underlying event structure can be reproduced in many different texts. Accordingly, the process model was redeveloped in Chapter Three to reflect the story and text of digital entrepreneurship.

**Story & Text:** Meanwhile, up next is the *story* level, which is the point of view from which *fabula* is perceived – also known as the narrator’s point of view of *fabula*. Thus, the story level is a subjective and value-laden version of *fabula*. In this case, the insider researcher’s written story of the digital entrepreneurial process operates in the level of the subjective. And finally, the surface includes a particular *text* of the story. It is where participants make sense of the story and their own actions.

Robust process theory development represents a consideration of all four levels of structure. To make the challenge of theorising mechanisms less daunting, Van de Ven (2007, p. 150) sums up a few key guidelines which are needed in generating narrative explanations by contrasting them with theory building through a variance approach – see Table 5.1 subsequently.
Table 5.1 Distinguishing a Variance & Narrative Approach to Theory Building

<table>
<thead>
<tr>
<th>Variance Approach</th>
<th>Narrative Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed entities with varying attributes</td>
<td>Entities participate in events and may change over time</td>
</tr>
<tr>
<td>Explanations based on efficient causality</td>
<td>Explanations based on final, formal and efficient causality</td>
</tr>
<tr>
<td>Generality depends on uniformity across contexts</td>
<td>Generality depends on versatility across cases</td>
</tr>
<tr>
<td>Time ordering among independent variables is immaterial</td>
<td>Time ordering of independent events is critical</td>
</tr>
<tr>
<td>Emphasis on immediate causation</td>
<td>Explanations are layered and incorporate the distal and proximal causation</td>
</tr>
<tr>
<td>Attributes have a single meaning over time</td>
<td>Entities, attributes, events may change in meaning over time</td>
</tr>
</tbody>
</table>

Source: Adapted from Poole et al. (2000, p. 36) & Van de Ven (2007, p. 150)

What is evident from Table 5.1 is that a variance approach is a ‘causally shallow’ approach to theorising mechanisms driving process (Van de Ven & Engleman, 2004). A narrative approach embraces all four Aristotelian causes of change – material, formal, efficient and final causality. As Aristotle argued, that from which something was made represents a *material cause*, while the pattern by which it is made is the *formal cause*. Further, that from which arises the immediate origin of movement is an *efficient cause*, while the end for which it is made is a *final cause* (McKeon, 2009).

By embracing four Aristotelian causes of change, narratives are causally deep and complex. Hence, there is a need to combine a critical realist and pragmatist orientation of mechanism theorising to explain the complex causes driving the entrepreneurial process. Necessary causality is employed in the explanation of change and development. It emphasises critical events which are necessary for driving process towards an outcome. Using this premise, this study focuses on key events which drive the digital entrepreneurial process towards an outcome. Meanwhile, to explain the influence imparted by particular events, efficient causality is adopted. However, to arrive at final and formal causality, what Mohr (1982, p.59) describes as pull-type causality is adopted. With pull-type causality, X (the precursor) does not imply Y (the outcome), but rather, Y
implies X. Thus, to arrive at a final narrative explanation of process, the outcome is used to suggest explanations for factors that pulled the process towards it.

5.7 **ENSURING QUALITY & RIGOUR**

While producing actionable knowledge through IAR is the goal of this study, what constitutes a good quality study is an essential consideration. However, what constitutes quality AR is the subject of ongoing debate (Bryman & Bell, 2015). To make sense of this debate, examining critical differences between AR and conventional research may be a useful departure point – see Table 5.2 subsequently.

### Table 5.2 Differences between Conventional Research & AR

<table>
<thead>
<tr>
<th>Basis</th>
<th>Conventional Research (Mode 1)</th>
<th>Action Research (Mode 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose; Power</strong></td>
<td>To understand; Researches on people for 3rd persons</td>
<td>To understand &amp; improve; Research with people not on people – IAR combines three voices</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>External to context; detached observer</td>
<td>Embedded with research; a participant &amp; observer; in IAR and insider participant</td>
</tr>
<tr>
<td><strong>Evidence</strong></td>
<td>Qualitative &amp; quantitative</td>
<td>Experiential, emergent, partial, dialogic, intuitive, qualitative &amp; quantitative etc.</td>
</tr>
<tr>
<td><strong>Strengths</strong></td>
<td>Weights variables into deterministic sets &amp; seeks law-like generalisations – external validity a quality criterion</td>
<td>Addresses complex contexts where political-pragmatic realities govern systems (Herr &amp; Anderson, 2014, pp.74-76) and transportability (Lincoln &amp; Guba, 1985)</td>
</tr>
<tr>
<td><strong>Weaknesses</strong></td>
<td>Objectivity is assumed to be external to the individual – may result in inactionable &amp; potentially misleading findings</td>
<td>Emphasizes critical subjectivity (Reason, 1994) and does not believe that objectivity can be achieved without subjectivity (Coghlan, 2019)</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Serves academic community – however, may exploit participants as objects, with ethical implications</td>
<td>Builds problem-solving and learning competencies in communities of practice, groups and organisations</td>
</tr>
</tbody>
</table>

*Source: Adapted from Bradbury (2015, p. 2)*

Traditional research is used in its broadest sense to refer to design choices that lean towards a positivist tradition; or are based on more traditional qualitative design choices such as cross-case studies (Yin, 2014). As noted, the term qualitative, which broadly refers to interpretivist research, is alternatively used in this research to remain consistent with the larger body of literature (Leitch et al., 2010). AR is a form of interpretivist research which has been termed **Mode 2** research. Mode 2 research, unlike Mode 1, seeks
to balance rigour and relevance (Gibbons, Limoges, Nowotny, Schwartzman, Scott & Trow, 1994; Transfield & Starkey, 1998). *Mode 1* research is the province of conventional research, which tends to seek rigour at the expense of relevance and context. *Table 5.2* adapts and summarises major differences between Mode 2 AR and conventional Mode 1 research, as discussed by Bradbury (2015, p.2).

### 5.7.1 Quality in Interpretivist Research

Given the differences, there are unique characteristics of AR and conventional research which demand a distinct set of quality criteria (Coghlan & Brannick, 2014, p. 15). Quality in interpretivist research tends to be grounded in trustworthiness and authenticity, as espoused by Lincoln and Guba (1985) – who argue that a single absolute account of social reality is infeasible. Therefore, reliability and validity, which assume that a single absolute account is possible, appear ill-suited to judging social reality. Yet, qualitative researchers bemoan the embedded tendency to continuously assess their work against positivist quality criteria such as validity and reliability (Bryman & Bell, 2015, p. 404). As such, to fully appreciate quality through trustworthiness, Lincoln and Guba proceed to deconstruct it into four sub-constructs that parallel reliability and validity (Bryman & Bell, 2015, pp. 401-403):

- **Credibility**: It is one element of quality which mirrors internal validity in realism. Internal validity is concerned with ensuring that a finding that incorporates a causal relationship between variables is sound. However, in a social world were multiple causal variables are possible, focus shifts to the credibility of the researcher’s account. Moreover, in the context of event-driven research, the focus is on events, not variables. Thus, triangulation with multiple sources of data helps to ensure credibility.
Transferability: Given that contextual uniqueness of each case in most qualitative studies, transferability replaces external validity in quantitative research. As Lincoln and Guba (1985) comment:

…whether or not findings hold in some other context, or even in the same context at some other time, is an empirical issue. (p.316)

They further contend that the burden for generalisation rests not with the original investigator but on the person seeking to make an application elsewhere. Similarly, Stake & Trumbull (1982) refer to transferability as naturalistic generalisation –wherein, similarities with the next context being studied, determines the degree to which findings are generalisable. To help future researchers generalise to other contexts, ‘thick’ descriptions (Geertz, 1973) of the case and theoretical context under study, assist in providing rich data for making judgments about the transferability of findings to inform other contexts.

Dependability: Analogous to reliability in quantitative research, Lincoln and Guba advance dependability as an ‘auditing’ approach to establishing trustworthiness. It involves ensuring that complete records are kept at all phases of the research process from formulation, selection of participants, to reflective journalling, interview transcripts and more. This record of the research process allows peers to establish how well proper procedures were followed. Thus, the focus is on validation as a process as opposed to validity as policing of research (Leitch et al., 2010).

Confirmability: Finally, under trustworthiness, confirmability recognises that while objectivity is impossible in business research, the researcher’s values do not tilt the conduct of the research and findings. Additionally, Lincoln and Guba proceed to unpack the authenticity construct into multiple sub-constructs such as fairness, educative, catalytic and tactical authenticity, which address issues relating to the broader political impact of research.
5.7.2 Quality in Insider Action Research

While the trustworthiness and authenticity criteria advanced by Lincoln and Guba appear well established and ground-breaking for qualitative (interpretivist) research, AR proponents argue for even more unique quality criteria for their practices. Reason (2006) encapsulates the sentiment by stating that:

…the movement in qualitative research has moved away from the validity criteria that mimic or parallel those of empiricist research toward a greater variety of validity considerations that include the practical, political and moral; and away from validity as policing and legitimation toward validity as asking questions, stimulating dialogue, making us think about just what our research practices are grounded in, and thus what are the significant claims concerning quality we wish to make. (p. 191)

Indeed, while quality assessment criteria in AR itself may appear fragmented, they remain primarily similar, with only nuances in various interpretations. However, emphasis on one criterion over the other tends to be context derived. Thus, drawing from the works of several seminal AR scholars (Reason, 1994, 2006; Coghlan & Brannick, 2014, pp. 15-16; Herr & Anderson, 2014; Coghlan & Shani, 2014; Bradbury, 2015), quality and rigour in IAR can be distilled down to the following criteria:

**Process Validity:** All AR scholars seem to agree that process validity is a critical quality criterion. As described by Herr and Anderson (2014, p. 68), it refers to how well an AR process involves iterative cycles of reflection that problematises practices under study as part of organisational change or improvement. The use of the term ‘validity’ is only meant to maintain consistency with extant literature. Likewise, triangulation must be built into processes to demonstrate how multiple perspectives are taken into consideration; and how assumptions were challenged at various steps of the process. Further, recording events diligently using various sources of rich data, guards against accusations of merely writing fiction, or providing a simplistic narrative. Consequently, Jacobson (1998, p. 130) argues that the integrity of good AR rests on ‘the quality of action which emerges from it, and the quality of data on which the action is based’.
Democratic Validity: Quality in IAR is also judged by the degree to which it reflects participative values, such as consultation and cooperation with stakeholders in an organisation (Bradbury, 2015, p. 8). Thus, multiple perspectives and material interests of collaborators are considered in the study. Democratic validity relates to ecological validity in the sense that findings should have relevance for the participants and communities of practice concerned (Bryman & Bell, 2015, p. 51). Herr and Anderson alternatively conceptualise it as the social and ethical justice criteria for assessing AR projects. Thus, analyses need to include the voices of participants.

Actionability: Given that AR is geared towards the production of actionable knowledge (Argyris, 1996), the actionability criteria hinges on how action-oriented the findings are. As Bradbury (2015, p. 8) maintains, AR should be judged by the extent to which it provides new ideas that guide action in response to need. Greenwood and Levin (2006) alternatively refer to this criterion as workability. Likewise, March and Smith (1995) describe it as the value and practical utility criteria.

Reflexivity: Given that the action researcher is not a detached observer as in conventional forms of research, AR quality also rests on reflexivity – i.e., the degree to which the researcher acknowledges self-location as a change agent. Thus, an involved, personal and self-critical stance is required. Alternatively, Reason (1994) describes it as ‘critical subjectivity’ involving the articulation and acknowledgement of one’s own biases but building critical reflexivity into the process to address them. Thus, action researchers must identify their role in the process, the context in which the research takes place and the factors that led to their involvement in the study (Coghlan & Brannick, 2014, p. 15; Bradbury, 2015, p. 8). Hence, Chapter One opens by identifying the researcher’s positionality in this study.
**Theoretical Grounding:** AR, like other forms of research, gains its rigour by grounding interpretations and judgments of outcomes in scholarly theory through abductive inferences. The study must, therefore, connect to, and contribute to a wider body of knowledge on relevant themes (Coghlan & Brannick, 2014, p. 16). Theoretical grounding of outcomes answers the ‘so what’ question. In Chapter One, this study identifies the researcher’s concern but grounds the main research question in a broader theoretical context of the entrepreneurial process and mechanisms.

**Plurality of Knowing:** As the pragmatic epistemology of AR emphasises experiential, presentation, propositional and practical knowing, quality is also judged by the degree to which it reflects a plurality of knowing (Heron & Reason, 2006).

**Significance:** Quality in AR is also based on significance – i.e., the extent to which findings are significant regarding content and process.

Coghlan and Brannick (2014, pp. 16-17) argue that the above quality criteria have three elements, which assist in simplifying the quality criteria - a good story, rigorous reflection on the story and extrapolation of useful knowledge or theory from the reflection. A good story answers the question – What happened? Answering this question demands that the AR process narrative is presented factually and neutrally so that peers can make their own judgement. Also, it requires evidence and documentation to support narratives. Hence, appendices are used to supplement distilled narratives. The second quality element is – How did you make sense of what happened? It entails a researcher articulating their sense-making by making the tacit explicit – experiential to presentational knowing. Moreover, it is not merely an analysis of what is going on, but also how the researcher makes sense of the story as it develops. Sense-making is both retrospective and collaborative (Weick et al., 2005). Finally, the third quality question is – so what? This question focuses attention on how the AR project is contributing to theory
or useful knowledge. The above quality guidelines are taken into consideration in ensuring that this IAR study mainly stays within the boundaries of good AR practice.

5.8 CONCLUSION

This chapter has examined, critiqued and justified the approach to inquiry adopted in answering the research question and meeting the objectives of this study. As such, it began by identifying critical realism and pragmatism as suitable ontological and epistemological platforms upon which this research is built. Accordingly, critical realism, with its search for generative causal mechanisms, was deemed ideal for framing inquiry into the process-oriented nature of this study. It, therefore, provides a philosophical backdrop for mechanism-based theorising of the digital entrepreneurial process. Meanwhile, pragmatism, which is paradigm agnostic, is identified as appropriate and consistent with the action-oriented nature of a Insider Action Research (IAR) design. Consequently, the rationale for using IAR as a strategy for data generation, collection and analysis is discussed and justified. Further, the chapter has examined the narrative mode of data analysis and theory building adopted. It has also focused on key quality criteria by which this study must be judged. As such, the basis has been established for presenting and deconstructing the IAR stories and outcomes in subsequent chapters.
CHAPTER SIX. NARRATIVE & REFLECTIONS ON DIGITAL NEW VENTURE CREATION
6.1 **INTRODUCTION**

This chapter presents the narrative of the digital new venture creation process in this case, punctuated by critical reflection on events. Thus, it answers the first part of the research question which seeks to determine how a digital entrepreneurial process develops over time. As consistent with the pragmatist epistemology stipulated in Chapter Five, it translates enacted experiences into a communicable narrative and meets the first objective of this research. Since the temporal order in which events occur assists in explaining their efficient causes (Van de Ven, 2007), the stories and outcomes are presented in chronological order from the pre-step through to the completion of the fourth IAR cycle. They answer the question - *What happened?* This question seeks a neutral account of events and experiences. Accordingly, the narrative describes the process which ultimately led to the birth of a digital new venture in EdTech. Meanwhile, reflective pauses answer the question - *How did you make sense of what happened?* A combination of the narrative and reflective sense-making provide the basis of thematic analysis in the next chapter in an effort towards answering the critical second part of the research question – What mechanisms are consequential in driving new venture emergence and performance?

6.2 **CORE PROJECT NARRATIVE OVERVIEW**

This section begins with the narrative of the pre-step and four IAR cycles in the narrative voice of the researcher, in his dual role as insider participant and researcher. As participant, the researcher (see Chapter One) led, observed and recorded events in real-time. Van de Ven (2007) notes that narratives are usually woven around central subjects (human & artifacts) that make events happen and to whom events happen. Thus, the central human subjects in the narrative are the entrepreneur (researcher) who is based in Ireland, a game coding team based in the Netherlands and a web developer based in India.
As the founder, the entrepreneur is in charge of providing the organising vision, as well as leadership which integrates the skills of multiple collaborators towards new venture idea realisation. The game coding team is founded and led by the founder of the Dutch company (henceforth Dutch coder). As the leader of his team, he negotiates contractual agreements with the entrepreneur on game development. Following agreements, he appoints and introduces to the entrepreneur, Project Managers (PM) from his team to head game coding milestones. Figure 6.1 visualises the nexus of collaborators and their geographical locations.

Meanwhile, the central non-human subject driving events is the New Venture Idea (NVI) or vision, which is being transformed through collaborative action into a new market offering. The NVI is based on the coding of editable serious game templates which can be used to custom create multiple learning activities to support the primary (PreK-12) math, English and science curriculum. Customised educational games are embedded on the new venture’s web platform with the goal of meeting the needs of end users and
customers in the primary EdTech sector. Through this process, the entrepreneur and collaborators attempt to search for and validate a scalable business model. Consequently, key events in the narrative revolve around game coding and customisation, web development and digital growth marketing, contractual negotiations and agreements. After four cycles, these events resulted in the validation of several key business hypotheses based on a Minimum Viable Product (MVP) and a plan for venture scaling. Appendix 2 is a visual collage of the action research cycles.

6.3 PRE-STEP NARRATIVE – CONTEXT & PURPOSE

As entrepreneur, I had begun to conceptualise the NVI of this project as far back as 2014. Thus, the core project of this study is centred on the realisation of the idea, which has its roots in my perception of a changing industry environment. Using my prior sectoral knowledge as an English language educator and digital entrepreneur in the PreK-12 content market segment of the EdTech industry, I had observed that the proliferation of mobile devices created enormous potential for on-demand and ubiquitous learning. However, with this change came challenges, which if surmounted, could result in the creation of a sustainable new venture. Box 6.1 is a summary of events which defined the pre-step.

<table>
<thead>
<tr>
<th>Box 6.1. Summary of Pre-step Events – From March 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Articulating the need for change &amp; feasibility of research</td>
</tr>
<tr>
<td>• Idea conceptualisation &amp; refinement – problem &amp; solution definition (technology &amp; change)</td>
</tr>
<tr>
<td>• Requirement articulation – specifying technical &amp; knowledge requirements, material, financial and durational requirements</td>
</tr>
<tr>
<td>• Feasibility assessment – founder’s means evaluation (knowledge, skills, network, financial resources, cognition &amp; motivation)</td>
</tr>
<tr>
<td>• Rapport building &amp; strategic partnership formation – rapport building, negotiating key collaborator commitment &amp; roles</td>
</tr>
<tr>
<td>• Outcome – New means &amp; high-level new venture idea confidence</td>
</tr>
</tbody>
</table>

6.3.1 The Challenges

The problem, however, lay in the fact that change rendered obsolete, some of the technologies which my industry had relied on for rapid, rich digital education content
creation. In its heydays, Adobe’s Flash was the dominant technology design which
educators and developers at varying levels of coding skills used in creating highly
interactive, serious games which could be accessed through any web browser. Its
dominance had created a loose and enormous ecosystem of developers and coders, with
the added benefit of cost reductions in programming. Content that could be consumed
directly on a web browser meant that there was also little third-party control over the
distribution of online learning content.

However, when the late Steve Jobs decided not to support Adobe Flash on Apple’s
hugely popular iPhone and iPad back in 2010, content developed using the technology
could not be consumed on these devices. Moreover, it set off an ecosystem-wide trend
wherein Google followed suit in blocking Flash content from its Android ecosystem –
although it had supported it in the past. In short, virtually all mobile device manufacturers
would eventually not support Flash-developed content on their mobile devices. I saw the
trend moving towards mobile apps which were distributed through app stores, largely
controlled by Google and Apple. Beyond the politics of it, a new reality had emerged in
which Apple and Google inserted themselves as dominant gatekeepers of rich media
content distribution with new rules for digital content creation aimed at their app stores.

To make matters worse, Google’s dominant Chrome and Apple’s Safari browsers
routinely make it difficult for users to consume legacy Flash content on any device
(mobile or desktop), under the guise of protecting user security. Consequently, a large
chunk of rich educational gaming material risks becoming unusable across all devices in
the near future. Despite the popularity of mobile learning devices, as a teacher, I had
learned that beyond the hype, PCs were far from dead in the school environment. They
were often connected to projectors which teachers used in classrooms. Additionally,
teachers spent office hours planning lessons on desktops as it made them more productive
compared to lesson planning on mobile devices. As data from my existing websites reveal, visitors that enter the site using a mobile device only account for less than fifteen per cent on average.

During my years as a foreign English teacher in China, I learned that new educational technologies, when wrongly implemented, can make a teacher’s life more difficult. I still remember the frustration a new Learning Management System (LMS) introduced in an education organisation I worked for. These experiences led me to conclude that when technologies introduce complexity rather than simplicity, it makes the teacher’s job more frustrating. Worse still, the increased complexity leads to abandonment of the technology by some teachers, which does not solve problems of access which it was designed for (see Chapter 4). Moreover, the digital skills divide often leads to a situation where some teachers end up sticking to tried and trusted methods of teaching instead of making complex technologies work in the classroom. Part of the problem, as I see it, stems from my observation that teachers who are targets of learning technologies are often not involved in its development.

On several occasions, I have had to manage the emotions of unhappy educators on my existing web platforms because such a thing as a web browser update, breaks the functionality of games built using older, and occasionally newer technologies. These educators may have been planning on using the games in their classrooms, only to be disappointed. They then channel their frustration at my organisation with the belief that it is the fault of our web platform. Indeed, creating seamless learning experiences across devices has become a major challenge. Given the problem, I began to envisage a new venture idea that would solve it. If I could leverage new technologies to create seamless and cross-platform compatible serious games, it could result in a successful venture.
6.3.2 Technologies Driving the New Venture Idea

Four combinable technologies act as external enablers which shape my new venture idea. HTML5 and Responsive Web Design are the two new complementary technologies that enable cross-platform compatibility of digital content distribution and consumption. Meanwhile, the Learning Management System (LMS) and digital commerce management technologies, are established designs used for tracking learning online and selling digital courses. LMS technologies are driven by SCORM (Sharable Content Object Reference Model) and Tin Can, which are standard technologies for tracking learning online. Meanwhile, e-commerce technologies help sell courses online. If successfully combined, I believe they could form the basis for an EdTech business model whose value proposition hinges on the provision of serious games which work across the plethora of computing devices used in PreK-12 education today.

Combining HTML5 and Responsive Web Design technologies in serious game development provides games which can seamlessly be consumed across web browsers on desktops and mobile devices. I reasoned that the technologies offer the possibility of bypassing the crowded apps stores, to develop a digital learning platform which offers flexibilities for business model innovation. I imagined that if the venture’s web platform could successfully reach a large user base, we could then develop complementarities such as mobile apps and other downloadable educational content in order to enhance venture outcomes. However, given its relative novelty, developers with high-level skills for developing serious learning games based on the new technologies are difficult to find and expensive to recruit.

6.3.3 Constructing the Problem – From 03/09/2016

Events at this phase effectively began on the 3rd of September 2016. I started breaking down the New Venture Idea (NVI) into a business model, using the logic of the
Business Model Canvas (see Chapter 3). I finalised contractual agreements with the Dutch coder and clarified details of intellectual property (IP) relating to game ownership and source codes. I concurrently came up with the brand name of the new venture (CheduGames – a mnemonic shorthand for Children’s Educational Games) and elicited feedback from friends and family across various cultures. My Chinese contacts quickly reminded me that in the Chinese language, ‘Chedu’ may mean a car that is stuck and was, therefore, a poor representation of the business idea. Although fluent in Mandarin Chinese, I was at first surprised that this had not naturally occurred to me. Meanwhile, the web developer’s spouse disapproved of its potentially unpleasant meaning in her native region of India. The feedback was, therefore, unanimously negative.

I decided to take inspiration from home. The ‘Bannerman’s Turaco’, an endangered species of the turaco bird family found in montane forests of my country of origin (Cameroon) would become the project’s mascot. Furthermore, if the bird and its memorable story became well known through our branding, I imagined it might raise awareness towards its protection. After all, I remembered that one of the largest online social language learning platforms (busuu.com) successfully branded itself by raising awareness of the endangered language of the Busuu tribe of Cameroon. These thought processes led me to the name ‘Turaco Games’ which subsequently passed the scrutiny of friends and family. I proceeded to research possible trademark issues, followed by domain name registration and logo design (turacogames.com).

6.3.4 Skills Requirements & Collaborative Partnerships

Therefore, for the NVI to be realisable, multiple collaborators with critical skills would be required. The main collaborators would become co-inquirers in the core action research project. Accordingly, I identified the following roles and responsibilities needed to realise the project:
**Game Coding:** Coders with HTML5 game coding skills and experience are indispensable to the success of the project. They provide the skills needed to deliver a core part of the value proposition. Firstly, the programmers would work with me to create customisable game templates that are easy to edit by non-programmers. In addition, game templates need to have SCORM or Tin Can tracking so they are interoperable with a LMS.

**Web Developer:** A web platform developer would play the role of customising and integrating web, LMS and digital commerce technologies, on which customised games are embedded and distributed to customers and users.

**Founder:** As founder and funder, my role would hinge on integrating the skills of multiple collaborators, while using my knowledge as an educator to customise multiple learning games from coded game templates. I would use my knowledge of digital marketing and digital business development to search, test and validate a scalable business model.

**On-demand Collaborators:** Other collaborators will occasionally perform minor tasks such as blog article writing, audio recording and logo design only when required. They would be recruited from work-based talent platforms such as upwork.com and fiverr.com.

In March 2016, I began the process of building collaborative relationships with key actors. First, I looked within my network and received an early commitment from an India-based web developer with whom I have been collaborating for several years. Given the bonds of trust originating from many successful prior collaborative partnerships, he readily agreed to be part of this project. However, the real challenge lay with finding suitable game coders. While game coders were most critical to the early success of the venture, working with HTML5 game coders was new territory for me. I reasoned that
since game coders are critical to venture realisation, the decision to enlist their services could not be based on price alone.

Moreover, since the core project was also part of a doctoral dissertation, it was even more important to put measures in place to mitigate the risk of the project collapsing halfway through. Therefore, I decided to search for coders who owned a reliable company, and whose profiles were easily verifiable. I thought the LinkedIn professional network was a more reliable platform for finding individuals for business to business (B2B) collaboration as it allowed for easy verification of a professional’s profile. During my search, I was leaning towards selecting a Dutch game development company because I had had successful prior collaborative partnerships on other projects with actors from this part of Europe. The company profile suggested that the Dutch team possessed more technological know-how than was required. This was important to me because I was not very certain about the skills scope required to successfully and satisfactorily meet game development requirements. I prepared the project brief and scheduled a video meeting via Skype. The first meeting focused on trust building, overall needs analysis and project scoping. In the second meeting, the game coder returned with a price quotation.

6.3.5 Readiness to Engage

Unfortunately, the quotation for the project turned out to be more expensive than I had imagined, which stalled negotiations. However, I got a sense that the lead Dutch coder was a very reasonable individual who would be good to work with. He was also direct and honest about their lack of expertise in developing games for online learning. Therefore, SCORM and Tin Can integration was something they would have to learn. However, he reassured me that they had the capacity to overcome any software related challenges thrown at them.
With price quotation becoming a sticky issue, I highlighted other benefits of their participation. The Dutch coder explained that they were dealing with bigger clients who demanded more of their resources, and therefore, the high price quotation was justified. I wondered if this was just one of those very familiar negotiation ploys. I told the coder he could leverage the experience to develop skills in coding online learning games and expand the portfolio of offerings his company had. I shared deep industry insights in my space, and he became fascinated. He also reciprocated by offering me key insights on trends in game development. Through this process, we forged bonds of trust through information sharing, but I was careful to avoid communicating a sense of urgency for fear of being exploited.

In the end, the coder promised to get back with solutions after speaking with his team. In the meantime, I explored other avenues in case the cost remained prohibitive. However, in September of 2016, the coder returned with two propositions that would change the course of events. On September 21st, he Skyped the following message: ‘We do have a quiz game-engine now that we didn't have when we first talked’. This was a significant turn of events because it meant they could inexpensively reprogramme the engine to suit the needs of this project.

Secondly, the coder suggested that if the requirements for graphics quality were dropped slightly, it would further reduce the price quotation. Eventually, these events would halve the price of the first phase of the project. Having agreed to the terms of development, I would be required to provide a fifty per cent down payment as a guarantee before development could commence. As I did not have the company registration for the project ready, I consulted with my company’s tax accountant in Hong Kong who advised that it was okay to sign the agreement using my existing company and later transfer it to
the new company whenever it was ready. Box 6.2 subsequently captures my reflections on events to this point.

Box 6.2. Reflective Pause: Collaborators, Serendipity Leveraging & Flexibility
As entrepreneur, I was aware that I lacked the critical coding skills needed to drive this project. Thus, actors with coding skills were indispensable to venture success. The formation of collaborative partnerships appears crucial in evaluating the practicality of the new venture idea (NVI). The Dutch team and their skills are pivotal in the creation of customizable game templates, without which, a market-ready Minimum Viable Product (MVP) cannot be created to meet the needs of our identified end users. It ultimately supports the argument that entrepreneurship is not a solo enterprise, but a collaborative endeavour (Cooney, 2005). However, the nature of collaboration in this case is more of ‘dynamic collectives’ working together, as opposed to teams – whereby, a team suggests stability and dynamic collectives introduce the opposite (Nambisan, 2016). Given their independence and autonomy, and the potential for collaborative instability, I reasoned that this relationship needs to be handled with care and tact. It appears the democratization of entrepreneurship is a double-edged sword after all (Aldrich, 2014). On the one hand, it offers rapid search and access to talents with critical skills, but on the other, these talents introduce a new dimension of ‘key participant uncertainty’. Thus, it seems Opportunity Confidence (i.e., evaluation of NVI to determine its favourability) appears to be gained by negotiating, forming and strengthening rapport with key collaborators. Further, a rapport strengthening mechanism appears to be supported by flexibility and tactfulness in the negotiation of mutually beneficial partnerships beyond financial reward.

In the middle of it all, it seems staying flexible, open and patiently waiting for the right moment plays a critical role in negotiating collaborator participation. It was important for me to be flexible in finding workable, rather than perfect solutions (Baker & Nelson, 2005). Hence, I compromised on the quality of graphics and initial requirements. Staying flexible also seems to assist in leveraging serendipity such as the cost reductions that came from the reuse of a game quiz engine that was not previously available. It would seem serendipity is the generative structure of unexpected positive events, and flexibility is the actionable mechanism needed to maximize its potential.

Between the 15th to the 26th of September 2016, a series of critical events would eventually determine readiness to engage. First, the Dutch coder and I concluded on cost reducing solutions and agreed on the ethical terms of research participation. Contractually, I assessed my immediate financial means and agreed to the fifty per cent request for a down payment for the initial project milestone. Concurrently, the planning stages of the first action research cycle began while we jointly edited the contract document through Google Docs (docs.google.com) and digitally signed it through HelloSign.com (a digital platform for remotely signing contracts).

6.3.6 Pre-step Reflections
In my introspective and retrospective reflections on the pre-step, I made sense of what was going on. Text Box 6.3 captures these reflections.
**Box 6.3. Pre-step Reflections & Reflexivity**

**Personal Risk Mitigation**
In the spirit of entrepreneurial bricolage (Baker & Nelson, 2005), I decided to risk only the profits from my existing businesses to finance continuous development - informed by an ‘affordable loss’ mindset (Sarasvathy, 2001). I would also use excess capacity from existing businesses as long as it did not compromise them in any way. Thus, to reduce the cost of hosting the web platform, I decided to use redundant server space from existing ventures. Further, I reasoned that since my doctoral thesis project was being funded, additional savings which I had put aside for doctoral research expenses could be added to the new venture fund. However, to ensure that this research project was relatable to other resource-constrained digital entrepreneurs, I decided to keep existing ventures and their user bases independent of this project. Thus, although the target audiences may be related, no web traffic would be sourced from my established web platforms to grow the user base during the course of this study. I was also partly motivated by a personal quest to understand the challenges involved in growing the user base of a brand-new digital platform in this day and age for my own learning.

**Action Research & Risk Mitigation for Collaborators**
I introduced all parties to the Action Research (AR) dimensions of the project after negotiations had been concluded. I then informed them that they had the option to participate or withdraw as required by action research ethics. I was concerned that introducing the AR dimensions within negotiations would make collaborators change their behaviour for good or bad. I was particularly concerned that the Dutch coder might think it was a university-funded project and charge more. Thus, only after all agreements were in place did I introduce the research dimensions of the study. In so doing, I explained that AR is research ‘with people, not on people’. Therefore, I was not studying them as individuals. However, I would keep a record of events for research findings and dissemination within reasonable ethical guidelines. This explanation put the Dutch coder at ease, but he requested that price quotations only be revealed to academic examiners and supervisors on a need-to-know basis. Meanwhile, the web developer raised no concerns and trusted in my ability to do what was ethically sound.

**Research Quality Concerns**
To ensure that the quality of the thesis project was not compromised, I immersed myself in the AR literature before getting any deeper into the project. While my lead and co-supervisors doubled as ‘critical friends’ (Herr & Anderson, 2014, p.98-99), they constantly reminded me of the risks and challenges involved in engaging in this mode of inquiry. In fact, the first month of literature review was mainly directed at determining if AR was the right mode of inquiry for this study. As much of the AR literature I first came across tends to draw from an education context, I initially struggled to contextualize its use in an entrepreneurship context. Moreover, I constantly struggled with the question – How is it possible to remain objective as an insider participant? Many doubts were cleared when I stumbled on Insider Action Research (IAR) literature directed at an organisational context (Coghlan & Brannick, 2014). I learned that I was an Insider Action Researcher in a dual role as participant and researcher, and bias was acknowledged and critiqued through reflexivity. I also learned that keeping good reflective records of events was essential in ensuring the success and quality of the thesis project going forward.

**Content & Process Sense-making**
In retrospect, I began to see that many aspects of the pre-step encapsulated the later phases of new venture idea conceptualization and evaluation to gain ‘opportunity confidence’ (Davidsson, 2015). The emerging vision of a business model was the outcome of idea conceptualization, while opportunity confidence was an outcome of idea evaluation. The process of assessing my means, discussing and clarifying details of the new venture idea, as well as gaining collaborator commitment appear consistent with fundamental principles of an effectual decision-making logic (Sarasvathy, 2001). Meanwhile, knowledge from my master’s in Business and Entrepreneurship was giving me the vocabulary to more accurately articulate my thoughts and observations. Therefore, I find myself naturally using concepts from pragmatic entrepreneur theories such as effectuation (ex. affordable loss), bricolage and the lean start-up (Ries, 2011) innovation model (ex. Minimum Viable Product) which I would not have used before. I attribute the natural use of their key constructs to the closeness to which I thought they described what I have always done as an entrepreneur. Eventually, I will come to possess a deeper appreciation for what Schon (1983, p.243) meant when he said, practitioners ‘do reflect-in-action, but they seldom reflect on their reflection-in-action’, thereby making their knowledge tacit and hard to articulate to themselves, as well as to others. In hindsight, I certainly see my previous self as an accidental digital entrepreneur in this light.
6.4 **FIRST CYCLE NARRATIVE & REFLECTIONS**

In my dual role as researcher and entrepreneur, I initiated, participated and captured events in the AR cycles which followed. The following events took place during the first AR cycle and are presented in sequential order. Table 6.1 is a summary of these events.

*Table 6.1 Snapshot of Events in 1st Cycle – September to December 2016*

<table>
<thead>
<tr>
<th>Constructing</th>
<th>Planning</th>
<th>Taking Action</th>
<th>Evaluating Action</th>
</tr>
</thead>
</table>
| • Business model articulation  
• Generating, constructing & researching brand identity  
• Securing brand identity – registration of dot com (.com) domain name extension  
• Brand identity design – outsourcing logo design through talent platform (fiverr.com) | • Finalising & signing contractual agreements with game development team  
• Project milestone planning with Project Manager (PM) - specifying technical requirements of the first Minimum Viable Product (MVP)  
• Visual representation of plans in wireframes & mock-up designs  
• Defining roles, responsibilities, procedures and possible time frames of milestones | • Digital game artifact creation – two game template development (graphic designing, coding, technical & qualitative testing)  
• Web installations and technology integration by web developer in India  
• Change in strategy due to mistake and misunderstanding on my part  
• Initiating digital growth marketing (blogging, web page optimisation, search engine submission & indexing, web integration of analytics, social media & others)  
• Pre-empting cybersquatting by the registration of confusing domain names (including .cn domain) and the registration of social media extensions with the brand name, turacogames (ex. Facebook.com/turacogames)  
• Expanding MVP development by adding two new game templates – changing plans to leverage collaborator efficiency and emergent knowledge, renegotiating contractual agreements, rapport strengthening, qualitative testing, meetings & video tutorial on game customisation  
• Expanding digital growth marketing initiatives - more blog article writing and posting, web page optimisation, search engine submission & indexing | • Product outcome – developed the basis of MVP through four customizable games templates  
• Emergent knowledge – acquisition and application of new process knowledge  
• Uncertainty reduction - higher levels of new venture idea confidence, reduced levels of task-specific uncertainty due to new process knowledge  
• Strengthened rapport between new collaborators |

For a visual image of events in this cycle, see Appendix 2.

**6.4.1 Planning Action - From 26/09/2016**

Next, I began to collaboratively plan action from the 26th of September 2016 following initial contractual agreements. Breaking down the game development task into milestones, I started by defining the objectives of the first cycle and began brainstorming
with collaborators. Planning also involved specifying technical requirements, roles and responsibilities as summarized in Table 6.2 subsequently.

<table>
<thead>
<tr>
<th>Main Objectives</th>
<th>To develop two customisable (editable) game templates based on multiple choice game mechanics; game templates will be designed around a ‘Monkey Pirate’ and ‘Dragon’ theme. The game templates will be used to develop a Minimum Viable Product (MVP) for use in eliciting real user feedback that tests a number of hypotheses in the NVI.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaming Requirements</td>
<td>Technical requirements are to design and code customisable serious game templates that include SCORM tracking technology so game scores can be tracked on a Learning Management System (LMS). The game templates should easily be editable by non-programmers like myself.</td>
</tr>
</tbody>
</table>
| Responsibilities | The Dutch game team will design and code game templates.  
The web developer will set up a site on another server to test SCORM implementations in the games.  
I will integrate the skills of multiple actors while keeping an eye on the value proposition and business model.  
I will hire bloggers (on upwork.com) to write educational articles so our web platform can begin its journey as a blog. |

During planning, the following events occurred from the 7th of October 2016 onwards. I used my existing Hong Kong company to sign binding contractual agreements with the Dutch coder’s company. As a non-EEA national on a student visa, I was aware that I could not legally be self-employed in Ireland or register a company. The Dutch coder set up a collaboration group via Skype and appointed a Project Manager (PM). A first meeting with the PM focused on further clarifying technical requirements and what was feasible from a programming perspective. He submitted a wireframe of the project based on the meeting and asked for confirmation. All was looking good at this time but the PM asked for more clarity on SCORM integration as his team was not familiar with the technology. I was unsure myself but conducted a quick Google search which turned up a SCORM 2004 integration document. I sent the document to the PM, who transferred it to his programmer. The document I supplied would later turn out to be the wrong SCORM version, with a few consequences. Meanwhile, I worked with the web developer to set up a web account for testing SCORM on a Moodle LMS.
6.4.2 Taking Action - From 13/10/2016

From the 13th of October 2016, we were all set to start working as planned. To help readers follow the sequence of events, I have split this step into two phases.

**Phase 1. Initial Steps – Events Begin on 13/10/2016:** Events actually began in this phase with game design. I received three game character designs for the Monkey game theme to choose from, as well as mock-up designs of games as captured in the wireframe. We all reached a consensus and selected the best design. Meanwhile, I used the visual designs of the mock-ups to conduct a preliminary observational study with my five-year-old daughter - who was part of the end product’s target market. The study sought to determine what emotions the designs evoked. She reacted positively to the designs, believing them to be games she could begin engaging with.

Meanwhile, together with the web developer, we registered and secured all brand name extensions on dominant social networks such as Facebook, Twitter and Pinterest. Likewise, I proceeded to secure domain names that could be confusing. Accordingly, I registered turacogame.com (without the ‘s’) and asked a Chinese contact to secure the turacogames.cn versions of these domain names. I registered all email addresses which would be used for integrating web services such as Google Analytics, online feedback forms and social media channels. Prior knowledge had taught me that cybersquatting, a phenomenon whereby nefarious actors registered the domain name or similar domain name of a brand in bad faith, was a problem to pre-empt. I also created a web hosting account from excess server capacity of my existing ventures and provided access to the web developer. We searched, selected and purchased two front end web design interfaces from the online design marketplace – themeforest.net. They would be used for developing the platform’s user experience.
With all processes on track, I stopped to articulate the NVI on the Business Model Canvas. Meanwhile, the Dutch coder checked in to see that all was going well with game development. There were no issues so far and the PM would later submit character and mock-up designs for the Dragon game theme. Similarly, I conducted an observational study with my five-year-old and the reaction was equally positive. However, the PM mentioned that his team of programmers were struggling with SCORM integration on the test LMS that was set up. I informed the web developer who set up a meeting using Teamviewer (remote demonstration software) to assist the game programmer in integration.

As game and web platform development were proceeding smoothly, I began outsourcing the writing of articles as content for use in beginning the turacogames.com platform as a blog. I had known from prior knowledge that search engines used the age and regular updates on a website as one of many criteria for search ranking. Therefore, it was important to begin the platform as a blog that search engines could begin indexing. Hence, I shortlisted and hired two talents who were educators, on upwork.com for the blogging task. They would progressively supply the articles as they become ready.

The Dutch team developed a skeleton of the first game, which could be tested on the LMS. However, there were difficulties with poor SCORM tracking of learning results. The problem became evident as it pointed back to my previous actions. The SCORM integration document I had found and supplied earlier turned out to be SCORM 2004 and not SCORM 1.2 which is what was supported by most LMSs. The work done with coding could not be reversed without additional financial costs. I took responsibility for the error and provided new direction. As funds were limited, I decided that we would pivot by leaving out SCORM integration for now. The games would be used as free content to attract and grow a lead user base. However, I took comfort in the knowledge that the
Dutch team had the capability to code SCORM into games if the right software integration document was supplied. While the error limited our ability to test revenue models based on subscription for classroom score tracking, it did not compromise on the overall value proposition. We decided that the priority would be first and foremost, the growth of a user base before revenue model testing.

In another development, the bloggers began sending in the first set of articles they had written. Together with the web developer, we posted these articles on the blog, while adding necessary information as part of Search Engine Optimisation (SEO). Further, we integrated Google Analytics for tracking user behaviour and submitted an initial sitemap to Google Search Console to facilitate indexing by search engine bots (robots).

**Phase 2. Changing Plans – Events Begin on 28/10/2016:** Having witnessed the efficiency and agility with which the Dutch team was working on the games, I thought I could leverage this efficiency to request that two new game designs be added based on the same game mechanics. My reasoning was, a total of four game designs would make for an expanded MVP that could be used to elicit more accurate user feedback. Furthermore, the knowledge I had acquired to date about HTML5 coding made me feel confident about expanding the project. I also thought the expansion might tempt the Dutch coder to offer a reduced quotation for the new templates. I scheduled a meeting with the Dutch coder and put forth these suggestions, while work was being finalised on the first two templates. A favourable and reduced-price quotation was happily agreed on and an addendum was later added to the original contract. We switched to small talk and the Dutch coder gave me a virtual video tour of his office space and teams working, as well as an outside view of the surrounding buildings through Skype. He also looked at the website and advised that Google Analytics could be implemented more efficiently. I felt
very positive and more strongly connected to the Dutch coder and his team after the video tour.

Meanwhile, from the 1st of November, more articles came in from the bloggers. As usual, I checked for plagiarism and released payment. It also felt good to discover that the earlier articles had been indexed by Google’s search engine. At the same time, we signed the addendum to the game coding contract, but the Dutch coder was in no hurry to receive the additional fifty per cent down payment agreed on. I saw this as a sign of trust and was delighted. Subsequently, the PM sent in final versions of the first two game templates for tests. I engaged trusted friends and family in eliciting feedback on the completed game templates. Issues of long timing between animation transitions were well spotted and raised by my brother - I asked the PM to make changes accordingly. The changes were easily made and together with the Dutch team, we developed a simple learning activity adapted from the homework course contents of my daughter’s school curriculum. When she played the finished sample activity, I observed a highly positive engagement with the content – she repeatedly played the game three times on average before getting bored. I noted the positive reception and felt the idea was incrementally being validated.

Next, a meeting took place between the PM and I to discuss specifics of the additional two game templates. I gave his team more liberty this time in coming up with designs that were within budget. They came up with a Space Dog and Car Racing design theme. I was surprised to learn that these game ideas were less complex to code than the first two which originated from myself. Further, cost would be reduced because they would be reusing assets developed from the first two game templates. Work was completed much faster this time around on the new templates since much had been learned from coding the first two. I felt the new designs were much better than the first
theme ideas which I had come up with. I reasoned that in future, it would be wise to give the Dutch team more liberty in game idea generation. I followed similar procedures for gathering feedback on the new designs and a few recommendations were made. I conducted extensive tests across devices and browsers and found a coding bug when playing games on the Internet Explorer web browser. The bug was fixed, and I received final versions of the games. I duly completed payment, to the delight of the Dutch coder. I would later learn that they were delighted because some clients frustrated them with payment delays and I was not one of them. Concurrently, the web programmer had posted the last articles supplied by the bloggers and the web platform was looking like a full blog.

Box 6.4 Reflective Pause: Agile Development & Shorter Process Duration
What was good to see during this initial phase was the agility with which the Dutch team completed game development. The process went even faster after the first two game templates were developed. It was evident that emergent knowledge from developing the first two templates had contributed to this accelerated development. I had made room for uncertainties during planning and anticipated that the project might take much longer. To leverage the efficiency of the Dutch team, I changed plans to expand the MVP. As such, decision making flexibility appears to be a useful mechanism for leveraging and making the most of positive events and emergent knowledge.

However, to understand what was actually driving the speed of development under ideal circumstances, theory offered me a useful tool for arriving at explanations. It seemed the most plausible explanation is rooted in the argument that since digital artifacts are by nature highly granular and modular bits of information, it affords piecemeal co-creation (Kallinikos et al., 2013; von Briel et al., 2018). Hence, multiple processes can dynamically and concurrently be forked, merged and terminated, thereby gaining time efficiencies that shorten venture creation processes (Nambisan, 2016). I correlated these explanations to my own experiences developing the current and previous web platforms and concluded that this represents a fundamental difference between purely digital and traditional forms of new venture creation.

Effectively, we were simultaneously initiating multiple processes like blogging, logo designing, planning and executing the earlier stages of digital growth marketing, as game development was developing elsewhere. I counterfactually imagined that if these events were happening in a traditional form of new venture creation, the physical and tactile nature of the product or service being developed, would have limited our ability to split the project down to the tiniest tasks for concurrent co-creation. It became evident to me that if critical events in digital new product development were well planned and less uncertain, resourced and supported by an effective team, market offerings could be realised very rapidly, leaving entrepreneurs to worry more about digital growth marketing to achieve network effects. However, in the current context, financial resource constraints meant that entrepreneurial bricolage was our only option. Hence, I leveraged every resource at my disposal including my five-year old daughter who happened to represent a segment of the target market. Qualitative research based on the observation of her use of the end product, continued to yield invaluable insights that resulted in significant usability adjustments as consistent with the Design Thinking innovation model (Brown & Katz, 2011).
6.4.3 Evaluating Action – From 23/12/2016

There were several reasons why this first cycle was largely successful. Firstly, the Dutch coder and I scheduled a meeting to evaluate the project. Beside the SCORM issues, we concluded that the game coding process was in many ways more successful than anticipated. I was particularly happy with the PM whom I thought was efficient and communicated clearly and promptly. For me, the uncertainties surrounding HTML5 game development were eliminated and I gained new knowledge which gave me renewed confidence in realising the NVI. Moreover, I developed a strong sense of trust in what I thought was a reliable Dutch team. On the web development side, we had accomplished the task of setting up and customising the web platform. Likewise, bloggers had supplied eighteen distinct articles which were optimised and posted on the platform. These articles provided early content which was indexed by search engines as part of a long-term optimisation and growth marketing strategy.

As I was only partly aware of the background processes happening on the Dutch side, I conducted a conversational interview with the Dutch coder to gain some perspective on the process. I learned a lot more about his own entrepreneurial journey and found several similarities with mine. He had bootstrapped the Dutch gaming company to success. He defined success as freedom from the authority of a boss. He told me his philosophy for hiring team members was based on their ability to ‘live conscious’, and money was not everything for him. Therefore, he had worked with me because it felt positive. The Dutch coder proceeded to share with me the way in which his team operated. I learned that they were not all under one roof. The lead programmer worked from Spain and others like the font designer worked from Brazil. These talents were all managed through a project management platform called asana.com. From the conversations, I
gained even more clarity on how the HTML5 game development process worked from their end. Box 6.5 captures my reflections to this point.

<table>
<thead>
<tr>
<th>Box 6.5. Reflective Pause: Questioning Minimum Viable Product (MVP) &amp; Affordable Loss</th>
</tr>
</thead>
</table>
| On the 14th of October 2016, while developing the initial games as the basis of a Minimum Viable Product (MVP), the Dutch coder commented, ‘the first hit is worth a high value.’ He explained that this was a common saying in his community which meant that it was important to try and get it right the first time. I had not taken the comment seriously during development, instead choosing to see it as part of our rapport building efforts. In hindsight, the comment exposed a potential flaw in my thinking, which may have led to the SCORM implementation error which I introduced. In retrospect, it seemed the real problem was with my assumption that just about any workable product was fine as a MVP (Ries, 2011). Similarly, my thinking may have been based on the assumption that if users did not like the MVP and the venture was deemed unscalable, I could afford to lose the expenses and kill off the project. 

As I continued to probe the academic literature, I stumbled upon the concept of the Minimum Awesome Product (MAP) as a better mindset for innovation (Furr & Dyer, 2014) as opposed to a MVP. I wondered whether the SCORM error might have never happened if I had combined a MAP and an ‘unaffordable loss’ mindset from the beginning. I eventually converged on the idea that when the MVP and affordable loss mindset combined, their effect was the potential lowering of guard – thereby increasing the risk of slight carelessness which led to a poor outcome. I have a hunch that perhaps combining a MAP and an unaffordable loss (UAL) mindset might be a better approach to increasing the odds of successful new product enactment. It would seem an affordable loss mindset may be useful at the initial phases of idea conceptualization and evaluation to motivate action but needs to be superseded by UAL during new venture enactment. While I have no way of knowing in hindsight exactly why I was slightly careless in researching and introducing a SCORM error, in future, I will test the MAP plus UAL mindset during future developments or on other projects. Nevertheless, I am glad that the Dutch coder and his team seemed to have a different mindset of getting it right the first time. Without it, perhaps there might have been many more stumbles. |

6.5 SECOND CYCLE NARRATIVE & REFLECTIONS

With the game templates developed, it was time to custom create real learning activities for primary learners as a Minimum Viable Product (MVP) that could be used to
begin eliciting user feedback. Table 6.3 is a summary of events that occurred during the cycle.

**Table 6.3 Snapshot of Events in 2nd Cycle – December 2016 to May 2017**

| Planning | • Detailed project milestone planning on developing a market-ready Minimum Viable Product  
• The market-ready MVP would be based on customising games into multiple choice learning activities.  
• Planning game customisation & specifying Key Performance Indicators (KPIs) |
| Taking Action | • Market-ready Minimum Viable Product (MVP) development – Developing & refining market-ready MVP (educational game creation using templates & continuous web development), quantitative and qualitative data-driven research and development, code bug detection & debugging, coping with delays  
• Digital growth marketing activities - website usability planning, layout & testing, preliminary promotion & user testing from ad campaign, search engine friendly article writing, keyword placement and web page optimization, sustained Google & Facebook ad campaigns, concurrent data-driven optimization of usability and campaign effectiveness using analytics, qualitative feedback gathering, KPIs monitoring & reaction  
• Venture legalisation - initiating Hong Kong company registration & trademark application |
| Evaluating Action | • Usable MVP & key business model hypotheses validation – favourable initial user engagement (duration/bounce rate) – increased opportunity confidence relating to venture scalability  
• New knowledge – reduced uncertainty of process duration and market uncertainty, outcome uncertainty reduction |

For a visual image of events in this cycle, see Appendix 2.

### 6.5.1 Constructing the Problem – 23/12/2016

I imagined that if some 200 learning activities could be created, it would inform the basis of a MVP which can be used to gain real insights in order to inform venture scaling. It would also help us develop strategies that delivered the best results during scaling. I would customise the games and the web developer would upload and embed them on the website. Together, we would work to optimise pages to improve online visibility and content findability through various inbound marketing channels – organic keyword search, social media networks, referrals and more.

### 6.5.2 Planning Action – From 23/12/2016

From the 23rd of December 2016, I began to discuss the objectives of the project with the web developer. Table 6.4 is a summary of project planning in this cycle.
### Table 6.4 Objectives, Procedures & Responsibilities – 2nd Cycle

<table>
<thead>
<tr>
<th>Main Objectives</th>
<th>Procedure</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| • To create 200 learning activities by customising four game templates.  
• To use these activities as the basis of a market-ready MVP that would elicit feedback from a larger audience of users.  
• The activities would be based on the primary math, science and English language curriculum of the United States, United Kingdom and Ireland. They would be based on more generic activities that could be adapted to a multiple-choice quiz framework. Activities that could not be adapted would be the basis for future game template development. | • Activities would be uploaded to a Dropbox cloud storage folder and the web developer would transfer them to the website for embedding.  
• We would seek to optimise content visibility on search engines and findability on social networks, as well as improve usability and user engagement.  
• Therefore, we would use Google Analytics to keep an eye on the following digital marketing performance metrics: bounce rate (one-page views), site speed, visit duration, returning visitors and growth in organic traffic over time. | • I would conduct keyword (keyphrase) analysis and write search engine-friendly text to go with each customised game. Likewise, I would provide promotional designs to improve usability.  
• The web developer would play the technical role of embedding content and progressively improve usability through web coding. |

Having defined the above objectives, I downloaded the primary education curriculum from Irish, British and US government websites to determine what the main requirements for each level were. Using this information and course contents of primary schools in Ireland and the United Kingdom, I began to plan specific tasks. To determine the monthly demand for each activity, I set up a Google Ads account and conducted keyword research using the Google Keyword Planner tool. I planned to prioritise activities which could attract a larger volume of organic traffic. However, given the large user base in the primary EdTech segment, it seemed most activities generated a large monthly traffic volume. I estimated that if I created five to ten games a day, I could have 200 activities done in a month or two.

**6.5.3 Taking Action – From 15/02/2017**

I was about to begin game customisation but remembered that I had not prepared custom audio instructions for each game. I outsourced the task on Fiverr.com and a female voice artist recorded audio instructions. I tested my skills in game customisation with an activity for reviewing countries of the world vocabulary.
Meanwhile, the web developer and I discussed plans for the web platform layout. We chose web fonts, decided on the logical site menu order and content display. I uploaded four customised games with search engine optimised texts to begin site layout. I then set up a Facebook Ad campaign to test for initial reactions. The campaign generated five Facebook ‘shares’, nineteen site visits and over 3000 ‘likes’. I quickly learned that ‘likes’ was a vanity metric and gained initial insights on how to optimise ad campaigns. At the same time, I continued creating new games and quickly learned that the process was very slow and tedious. Only a maximum of five games per day seemed possible to create within my limitations, even when I focused on nothing else.

While customising games, I detected the first problem with the game templates. We had forgotten to include mathematical symbols in the coding. I asked the Dutch team for support with this, but there were delays because they were focused on other clients’ projects. My activities became restricted to games which did not require mathematical symbols. More bugs would subsequently be discovered in the game codes that further delayed development. The Dragon design theme had issues which made games unusable. As such, I suspended its use altogether. I would also later discover during further testing that audio would occasionally not play on iPads. The bugs were a surprise given that they had not surfaced during development and testing. The Dutch coder advised me to keep working with the templates while they work to find a fix. He anticipated that it may simply end up being the case of a code replacement as solution.

While waiting for coding solutions, I focused on activities such as company registration and brand name trademarking, which related to marketing and venture legality. With more content added to the web platform, I initiated a limited Google Ad campaign designed to drive traffic to the site and monitor usability. The web developer and I kept our eyes on key metrics such as bounce rate and visitor flow. We regularly
used data analytics to improve usability and optimise the site. As these activities were in progress, the Dutch team quickly fixed the bugs in the game codes and included the missing mathematical symbols. As predicted, this was a simple copy and paste fix. However, the iPad sound error proved elusive as it only appeared occasionally. As we researched ways to improve usability, I stumbled on a web platform, which made it easier and faster for high-quality graphics to be custom created for use in site layout and promotion. Likewise, I invited friends and family to offer qualitative insights on the site as it progressed. A friend pointed out that the website looked cluttered, and it was not immediately evident why she felt this way. Upon closer examination, I decided to make changes based on minimalistic graphic designs, and the feedback was more positive.

Meanwhile, data from Google Analytics was revealing a high bounce rate originating from mobile devices compared to desktops. We decided to deselect mobile devices temporarily from our Google Ad targeting campaigns. I proceeded to test an idea for a revenue model based on the sale of game templates. I wanted to see how many visitors would show interest in buying the templates. There were seventeen subscribers during the short testing period of a month. One user sent us an email wondering how they could download the template. After that, I terminated the test as I thought the concept was validated. I did not provide the template to the user but offered apologies for the unavailability of game templates at the moment. At this point, data from my Google Analytics panel revealed that Google Display Ads generated a higher bounce rate than Google Paid Search Placements. This information was valuable for planning future Google Ad campaigns geared towards scaling the venture. However, a meeting with the Dutch coder indicated that our use of Google Analytics was not optimal, and besides, it seemed poorly implemented. I would come to learn ex-post that he was actually raising my awareness to an Analytics reporting problem down the line.
Finally, a Hong Kong company was registered for the venture, and I received a scanned copy of the documents from the agent who processed the registration. We wrapped up actions in this cycle on the 14th of May 2017. Box 6.6 subsequently captures my reflections to this point.

### Box 6.6. Reflective Pause: Coding Errors, Delays & Digital Growth Marketing

**Coding errors:** So it seems that coding errors can become a cause for delays. Thus, it might be something to watch out for in future development. However, the ease with which these issues were fixed, points to the enabling characteristics of the technology they were built on. The modularity, reprogrammability and editability (Kallinikos et al., 2013) of digital artifacts indicates that digital products can easily be modified to fix issues discovered at subsequent stages. This may explain why the Dutch coder always seemed confident that they could troubleshoot any coding related issues. Whereas, this may not be the case with physical new market offerings. As such, it appears digital entrepreneurs, unlike their counterparts in the traditional spheres can enjoy a tremendous degree of flexibility in product innovation. Further, the fact that issues are surfacing during use, suggests that the actual completion of digital product development may only happen when the end user is engaged to generate feedback that could not be detected during development.

**Digital growth marketing:** Integrated data analytics revealed how leveraging the network effects of dominant digital platforms through digital ad campaigns can inform product development and growth initiatives. Feedback can be gathered instantly to drive decision making and experimentation while reducing task-specific uncertainty. I was able to set up digital ad campaigns, pause and resume them at will while data was being gathered to inform web development and identify potential usability issues. Given that this stage mainly entailed customising a market-ready MVP, data-driven operation (Huang et al., 2017) undoubtedly assisted our efforts towards creating a seamless user experience, growing the initial user base and developing the web platform. However, I realised that quantitative and qualitative data from digital analytics alone is insufficient for creating a user-friendly web platform. Nothing seems to trump the value of a good old qualitative study of product use based on direct observation, as well as brutally honest feedback from trusted associates. Thus, it appears the combinatorial and complimentary use of the Lean start-up (Ries, 2011) and Design Thinking (Plattner et al., 2009; Brown & Katz, 2011) innovation models, underpinned by pragmatic entrepreneurship theories of decision making and action (bricolage/effectuation), offer actionable mechanisms for driving digital new venture emergence and performance.

### 6.5.4 Evaluation Action – From 15/05/2017

We only created fifty games in the end and therefore failed to achieve our objective of creating 200 games. I learned that I had overestimated my ability to create 200 games and was only capable of creating a maximum of five a day. Further, the process was tedious and a real test of patience. Increased academic commitments did not equally allow much time for customisation. Moreover, a number of bugs in the code of the game templates slowed down game content creation. However, there were also many positive outcomes. We were able to attract over 5000 visits to the web platform which offered us valuable insights for planning action in the next steps. These visits resulted in a fifty per
cent bounce rate, which I thought was acceptable. We also developed strategies for optimising future advertising campaigns and managed to attract natural links and traffic back to the website. Real users offered comments which showed interest in the product and a few organic searches began to use our brand name. Finally, with an average visitor duration of two and a half minutes on only fifty games, I concluded that these were positive signals which could be further improved with new game templates and more learning activities. Therefore, it was important to begin the incremental scaling of game creation by adding new game templates with unique quiz mechanics to diversity activities on the web platform.

6.6 Third Cycle Narrative & Reflections

The third cycle, therefore, sought to diversity game templates for use in the creation of more learning activities. Table 6.5 is a snapshot of events that occurred in this cycle.

| Planning | • Defining objectives for next iteration of MVP – to develop four new game templates based on unique quiz mechanics  
| Contractual negotiations & risk assessments - affordability, time scales, collaborator availability  
| Compromising on requirements – three games templates agreed on, not four  
| Exploring alternatives due to uncertainty introduced by key actor unavailability  
| Definition of technical requirements, roles and responsibilities  
| New collaborator commitment and adjusting to key collaborator exit  
| Rapport building with new project manager |
| Taking Action | • Extending MVP development – three new game template development (graphic designing, coding, technical & qualitative testing), successful SCORM implementation, incremental product (games) delivery, qualitative and quantitative testing & feedback gathering, research and development, leveraging entry of new collaborator to speed up development, pre-empting and reversing potential usability and coding problems, extended debugging, final product delivery  
| Continuous digital growth marketing - site speed optimisation, search engine optimisation (SEO), social media marketing, continuous web traffic building |
| Evaluating Action | • Extended MVP basis created – three new game templates as basis for an expanded, market-ready MVP for broader user testing  
| New knowledge acquired – reduced uncertainty of technological integration, increased opportunity confidence in venture idea & overall reduced levels of uncertainty |

For a visual image of events in this cycle, see Appendix 2.
6.6.1 Constructing the Problem – 15/05/2017

It was important to re-engage the Dutch team for fear that lessons from the first cycle may become stale. I was simply trying to strike while the iron was hot. I was also concerned that key actors may move on. Therefore, it was important to minimally scale game template development that could be used in an expanded Minimum Viable Product (MVP). The next iteration of the MVP would be a more complete product that would not give users the impression that the project was only a work in progress. I also thought that if the templates could be developed as fast as the Dutch coders did in the first cycle, we could create and distribute enough activities to conduct a larger test in the back-to-school months of September to December.

6.6.2 Planning Action – 16/05/2017

In the planning stage, I discussed the next phase of the project with the Dutch coder. The plan was to develop four new games templates based on new quiz game mechanics. This time around, we would try and get SCORM or Tin Can integration right. The summary of objectives and requirements are captured in Table 6.6 subsequently.

| Main Objectives | • To develop four customisable game templates based on four game mechanics (quiz types) to add to the existing four game templates developed in the first cycle. These games will include Tin Can or SCORM score tracking technology.  
• To assess the feasibility of retrofitting SCORM version 1.2 or Tin Can tracking on existing game templates.  
• The web developer would continue to research the seamless integration of technologies for the sale of multi-seat course licenses. |
| Requirements | • The new templates should be developed rapidly as in the first cycle of game development to allow for ample time to customise more learning games before the school season begins in September.  
• Game templates should be developed at an affordable cost. |
| Responsibilities | • The Dutch game development team will design and programme games.  
• I will continuously create new games from existing templates and work with the web developer to improve website usability. |
Negotiations for game development kicked off with several difficulties that would put the continuation of the entire project in doubt. First, the Dutch coder’s price estimates for developing the new templates was almost twice my budget. Hence, we engaged in brainstorming ideas which stayed within budget. I made compromises by reducing the number of games from four to three. Even then, the cost remained prohibitive. However, the Dutch coder reciprocated by finding solutions that would reduce the cost of development. He was dealing with even bigger challenges. Programming could only begin in September because his team was committed on other projects.

The delay would mean that we lose an important opportunity to test our MVP at the right time. As these events were beyond my control, I could only see two ways out of this. First, I would wait for the Dutch team to finish and miss the school season starting in September. A second option was to renew my search for other HTML5 game developers. I found a potentially good coding team but got no reply to my request for collaboration. They seemed to be working with bigger companies and I seemed to be of little interest to them. I came to the realisation that the Dutch company may have truly done me a favour by agreeing to work with me.

In the middle of my contemplations, the Dutch coder returned with three potential solutions based on a new turn of events. However, these solutions all carried great risks, he cautioned. With the first solution, his team would work on the project, but the price may be higher, and time will be longer. Secondly, he could scramble together other teams he worked with prior but could not be certain about price. Finally, he could outsource the project to external teams but could not be certain of price and quality. I thought the first two solutions were the better ones. The Dutch coder agreed to return with more clarity on the first two solutions. Unfortunately, there was more bad news later as a key programmer had just dropped out of his team.
However, twenty days later there was some good news. The Dutch coder had found a solution which made the project feasible within a reasonable time frame. His team would jointly work with external teams and freelancers to get the job done. There were three risks, though. If bugs were found in the coding later, it would be harder to troubleshoot, given the input of external and freelance teams. Nevertheless, the Dutch coder reassured me that it would be difficult but not impossible to resolve these issues. Secondly, one of the new programmers had a habit of underestimating the time needed to complete major tasks. Thirdly, it was not certain if SCORM or Tin Can tracking could be retrofitted on older game templates. By now, I was comfortable with bearing the uncertainties involved in estimating the time of completion and projecting outcomes of the coding process. Hence, I agreed to take a few risks. I had come to terms with the fact that game development deadlines were not within my control. Therefore, flexibility was required on my part. With negotiations concluded, the Dutch coder scheduled a Skype video meeting in which I was introduced to the new Project Manager (PM). We broke the ice and I looked forward to working with him. The meeting branched out into small talk and we concluded on an amicable note. Thus, on the 14th of July, we were ready to begin after the usual fifty per cent down payment was made.

6.6.3 Taking Action – From 17/07/2017

The PM emailed eight ideas for game templates with a link to an editable Google Doc file for me to choose and input suggestions. I picked three and asked that the others be reserved for future projects. I was impressed by the ideas and felt vindicated in giving the teams more autonomy for coming up with game ideas. A few days later, the PM returned with a link to a Drag and Drop spelling game idea. I requested that a preloading screen be included but was told they would recycle existing screens and assets from previous games. That way, development would be less expensive and faster. Further, it
would keep branding consistent. Meanwhile, the Dutch coder checked in to see how we were doing so far and I was happy to report my positive impressions of his new PM. Two weeks into development, the PM asked for access to the test LMS site as progress was being made on Tin Can integration. However, the web developer had second thoughts on Tin Can and discouraged its use. He said the technology was still evolving and it would be wise to stick to SCORM 1.2. I heeded his advice and asked the PM if it was too late to make the changes. Thankfully, they were only getting started and a switch was made to SCORM without additional costs. A few days later, the PM shared the first mock-ups for the spelling game, titled Turaco Baker. I was delighted to see the designs.

In a concurrent development, the web programmer was making progress with the integration of e-commerce and online learning technologies. He had found a company which could assist us with integration issues for a fee. I took the risk of purchasing the solutions for testing. He would later make progress in integrating these technologies which could be used for effecting multi-seat subscription revenue models. Although we did not end up using the technologies, we at least knew that the solution was available if needed. In the meantime, the Dutch coder shared great news regarding the arrival of a new artist that could speed up the work. I contemplated adding new designs to leverage the positive development, but the cost was prohibitive. At the same time, the PM supplied the finished artwork of the first game, and I thought it looked perfect. However, I suggested a few changes to add more colour to the design. The Dutch coder mentioned that the coding was different and potentially easier to edit from a customisation perspective. I welcomed the development.

At the same time, the web platform was slowly attracting users without much advertising and I received a second email request for game template download. However, a Facebook user posted a comment in which they complained about the questions not
having an audio recording. I thanked the user for the comment and noted the suggestion. However, I thought that additional audio would increase file size and further impede game customisation. Nevertheless, I decided that if more users asked for this feature, we would have no choice but to include it.

Game development was mainly on track, but the team ran into a few delays. While I was impressed by the artwork, the Dutch coder noticed that they were pixelated. Moreover, the current designs would not be user-friendly on mobile devices. Hence, the delays were an attempt to pre-empt a future problem. However, the Dutch coder shared his screen with me via Skype and I saw the progress that was being made with the other games. In a subsequent breakthrough, the PM sent in a SCORM 1.2 sample and it worked well on the test LMS. Graphic designing was ironically turning out to be the main problem this time. The Dutch coder feared that poor design could result in poor usability and hoped we would not have to do much troubleshooting later. The Dutch coder delayed deliveries of the games until they had passed his scrutiny. I had time to play with the unfinished versions while inviting friends and family to offer qualitative feedback. The feedback was positive. The Dutch coder delayed delivery even further to allow him time to spend Christmas and to do a more thorough check afterwards. In the end, he delivered the three game templates on the 1st of February 2018.

6.6.4 Evaluation Action – From 03/02/2018

There were several developments which made this cycle a success. Firstly, the Dutch team had finally demonstrated that they could integrate SCORM and Tin Can tracking technologies correctly. However, it would be later before I would learn if retrofitting these technologies on earlier games was possible. The ability to integrate SCORM created new possibilities for experimenting with subscription-based revenue models. The Dutch team had also developed new knowledge for themselves in integrating
these technologies which would help them expand their own portfolio of offerings. I was now fully confident that it was possible to scale game development, given the difficulties we had learned to overcome. Furthermore, upon customising my first games with the templates, I learned that they took slightly less time than the first four templates. Therefore, we had found a more efficient way to code future games. By now, I had eliminated my lack of knowledge of how the HTML5 game coding process worked. Hence, I was ready to custom create more games for testing against user feedback in the next cycle.

6.7 **FOURTH CYCLE NARRATIVE & REFLECTIONS**

This cycle would seek to determine venture scalability by acquiring feedback from a larger number of potential lead users. Games would be progressively developed and embedded on the web platform. Table 6.7 is a snapshot of events in this cycle.

<table>
<thead>
<tr>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Detailing specifics of an expanded market-ready MVP creation process</td>
</tr>
<tr>
<td>• Specifying growth and performance metrics from digital growth marketing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taking Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Extended Minimum Viable Product development – new online learning games created from editable templates, search engine optimised content writing, qualitative user testing and adjustments</td>
</tr>
<tr>
<td>• Intensive digital growth marketing initiatives - site speed monitoring, social media postings, data-driven usability testing, search engine optimisation, KPIs monitoring and optimisation, Google ad campaign optimization and expansion, strategic partnerships with related web sites, qualitative detection of slow speed in China, traffic building, automated social media posting, outsourcing search engine optimised article writing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluating Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Scalable business model validation – planning next steps in venture scaling</td>
</tr>
<tr>
<td>• New knowledge &amp; highly reduced levels of multiple uncertainties – of scaling, content creation duration, precise cost estimation</td>
</tr>
</tbody>
</table>

For a visual image of events in this cycle, see Appendix 2.

6.7.1 **Constructing the Problem – 15/02/2018**

This was the stage when I sought to acquire enough feedback upon which a final decision to scale or disband would be based. If successful, I would seek to develop a roadmap for scaling using actionable data from a larger user base of early adopters.
6.7.2 Planning Action – 30/02/2018

In the planning phase, I discussed the objectives with the web developer, responsibilities and key performance indicators (KPIs) to focus on – summarised in Table 6.8 subsequently.

Table 6.8 Objectives, Requirements & Responsibilities – 4th Cycle

<table>
<thead>
<tr>
<th>Main Objectives</th>
<th>Performance metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To create 400 new games to add to the fifty games already being used on the web platform using the seven game templates</td>
<td>We will focus on actionable performance metrics defined as follows: bounce rate; organic &amp; direct traffic growth; brand penetration rate; conversions from site and newsletter subscriptions; returning visitors time spent per session and per channel of entry; social media mentions and shares; qualitative user comments through multiple online channels</td>
</tr>
<tr>
<td>• To add variety to the activities on the web platform</td>
<td></td>
</tr>
<tr>
<td>• To write search engine optimised articles to add to the web pages</td>
<td></td>
</tr>
<tr>
<td>• To incrementally drive traffic to the website from multiple online channels</td>
<td></td>
</tr>
</tbody>
</table>

With the objectives, metrics and responsibilities defined, we were all set to enact the fourth cycle. The actions taken during this cycle will be crucial in determining venture scalability.

6.7.3 Taking Action – From 18/05/2018

At initial stages, I conducted long tail and short tail keyword research using Google Keyword Planner and gained specific insights on the potential demand for specific activities. I concurrently hired a freelancer on Fiverr.com to record more customised audio instructions for use in the games. After the first twenty-two games were developed at a rate of five to six per day, I concluded that the process was still not as fast as I would have preferred. However, I now resolved to stop stressing about it.

I resumed the Google Ad campaigns to drive traffic to the new games, and my now six-year-old daughter used the games to practice core skills aligned with her school assignments. I observed that due to poor motor skills, she struggled with the new spelling games as the time allocated for completing the exercise was inadequate. I made changes to the timing of the games to accommodate this discovery and she could successfully
complete the activities within the time limit. The web developer replaced existing games with improved timing, while continuously using feedback from Google Analytics to optimise the web site functionality and usability. We agreed that a visually appealing web font was needed and made changes accordingly. Likewise, the web developer updated the sitemap and uploaded it to Google Search Console. At this stage, more pages were indexed by Google’s Search engine.

I paid the web developer for new milestones achieved and we carried on working on adding content and optimising the web platform. I monitored Google Analytics regularly and acted accordingly to improve performance. So far, I was delighted to find that no bugs were found in the game codes. We continued to work on social media postings to share new content and attract users while optimising pages for search engines. I forged new partnerships with related sites in an attempt at attracting more targeted users. For some reason, visits from partner sites were not being tracked on Google Analytics. I learned to my disappointment that Google Analytics had been poorly implemented all along. I realised that the Dutch coder had tried to draw my attention to this issue earlier. However, given that the web developer had integrated Google Analytics effectively on previous projects, it lulled me into lowering vigilance in this instance.

While on summer break in China, I noticed that our website loaded very slowly in the country. This was disappointing because I had trusted the web developer to optimise the website properly. In fact, he had not implemented a site speed optimisation technology which we had used from previous projects. I felt disappointed because this meant that advertising expenses in targeting countries with slow internet speed was being wasted all along. It explained the high bounce rates for some countries. I wondered whether familiarity coming from working on prior projects was leading the developer to falsely assume that well-known steps were already completed. Perhaps, it would be wise to pair
him up with another web developer if the venture proves scalable, I thought. I eventually shrugged off the frustration of the moment but decided that nothing going forward would be taken for granted. In the end, we resolved all the issues found.

Meanwhile, I began an intensive ad campaign through Google and Facebook for a week prior to the resumption of schools. Insights from the campaign were meant to assist in formulating effective Pay Per Click (PPC) marketing strategies. From the experiment, I decided that it might be best to eliminate many countries with a slow internet connection for now. I also finally confirmed that ads targeting desktop users generated lower bounce rates than mobile ad targeting. I used the insights to refine and optimise our digital marketing campaigns forensically. Consequently, bounce rates dropped, and time spent on site improved. However, in November 2018, bounce rates increased but the time spent on site increased. The good news, however, came from the progressive growth in organic and direct traffic.

Moreover, having been offered the opportunity to teach a digital marketing module in my college, the opportunity to refresh and update my knowledge presented itself. While planning one of my digital marketing lectures, I stumbled on literature which suggested that a high bounce rate of over sixty per cent was normal on a new website. Hence, I decided to stop agonising over bounce rates as a performance indicator and place emphasis on active user engagement. Concurrently, I continued content creation through game customisation which by now had totalled 150 games.

By the end of December 2018, organic traffic began to grow steadily, and search results showed that users used targeted long tail keyphrases to visit newer landing pages on which games were embedded (see Image 6.1).
I learned that recent changes in search engine ranking rules favoured pages with over 250 words of text. Some of the search optimised texts I had uploaded were less than 250 words long. I, therefore, outsourced the writing of search engine optimised articles that used targeted keyphrases of the site. I hired a teacher on Upwork.com to write 90 short articles of about 200 words each and submit progressively. She wrote the articles which described each landing page in detail using her perspective as a teacher. We posted the new articles as descriptions below games.

To avoid cluttering web pages with too much text, we added a feature after the first two sentences of each article that required users to click to read more of it. I reasoned that since human users were more visually and interactively driven, less text on games pages was recommended. However, search engines tend to mainly base website ranking decisions on textual data and its on-page placements. Consequently, search results continued to increase as a result of these efforts. At the same time, the web developer
used the new articles as content to post on our social media pages. We automated this process using Hootsuite.com, a social media management tool that enabled us to schedule content for automatic posting at designated intervals. Box 6.7 subsequently captures my reflections to this point.

Box 6.7. Reflective Pause: The Sociomateriality of Digital New Venture Enactment

The above narrative would suggest that digital material agencies play a crucial role in driving digital growth marketing efforts. Digital growth marketing activities to date all seem to be attempts at meeting the needs of two types of stakeholders. Since we cannot simply dump new market offerings on the web platform and expect users to find them, our efforts to date on search engine and social media optimisation can be interpreted as attempts to meet the needs of algorithmic gatekeepers. Without meeting the needs of search engines through careful keyword placement, web page optimisation and quality natural link building, our offerings may never be found by the human users we seek to serve. Thus, I see algorithmic agencies as significant non-human stakeholders driving digital new venture enactment and performance.

Data-driven operation appears to be the mechanism by which the gap between the needs of the human and digital material stakeholder is bridged. Hence, digital growth marketing is the parallel and concurrent process of satisfying the needs of both algorithmic gatekeepers and human end users. It probably lends support to the argument that digital entrepreneurship is an inherently sociomaterial process (Davidson & Vaast, 2010). Sociomateriality theory (Orlikowski & Scott, 2008, 2015) indeed appears to be a useful lens for theorising digital growth marketing activities. Through its emphasis on the role of non-human agencies in the entrepreneurial process, it offers a useful framework for explaining how the intermingling of human and digital material agencies that are embedded in digital tools and systems, help shape entrepreneurial action and venture performance.

Hence, building on its core axioms, one can conclude that material discursive practices in digital growth marketing hinge on leveraging the affordances of digital tools and systems to satisfy the imposed and often secret rules of algorithmic gatekeepers as the path towards gaining traction online (Holiday, 2014; Brown & Ellis, 2017). Therefore, data-driven operation (Huang et al., 2017) is a mechanism by which digital entrepreneurial actors experiment in search of efficient ways of meeting the needs of material and human consumers. Given the control that algorithmic agencies exert in the process, patience and persistence is needed in the slow and painstaking tasks of continuous process and outcome optimisation.

I conceptually represent this understanding using the figure below.

(Figure to be re-introduced as 7.14 in Ch. 7 Analysis)

**Box 6.7 Reflective Pause: The Sociomateriality of Digital New Venture Enactment**
With substantial growth in the site’s user base, I thought it was the right time to test two advertising revenue models. I tried to determine how much money could be made if the site relied on ad revenues alone. I used an existing Google Adsense account (a site monetisation platform) to test for a few days and it generated revenue. I also tested a second revenue model whereby users could subscribe to remove ads on the website. I quickly discontinued the test because I thought it was too early to generate any meaningful results. Instead, I tested the model on one of my existing platforms with a much larger user base. The results were encouraging as we began to collect subscriptions within 24 hours. I have since added this as a permanent revenue model on the existing site following the positive results. Finally, on the 14th of March 2019, I decided to wrap up the cycle. This would also be the last cycle within the scope of this doctoral study.

6.7.4 Evaluating Action – From 15/03/2019

We had achieved most of our objectives but failed in creating the 400 games planned. In total, I managed to create 150 games and write 150 articles to go with the games. Game creation and writing search engine friendly articles was indeed a slow and tedious process which proved to be a pure test of patience. Perhaps, if I did not have academic commitments, game content might have doubled. On average, I could only create five games and accessories a day when I did absolutely nothing else. However, 150 games still allowed us to elicit very useful insights from user interaction with the content. We attracted nearly 55,000 users during the fourth cycle – see Image 6.2 subsequently.
However, active users were the focus of our actionable metrics (Ries, 2011). Of the nearly 55,000 users, some 10,000 were active users. Active users mainly came in through organic search, direct traffic and natural link referral channels.

Image 6.2. **Overall Data Analytics of Multiple Channels** – June 2018 – March 2019

On average, they spent over three minutes per session on the site and in some cases up to forty-five minutes. Given the minimal nature of the product (150 games), I considered this to be a success. It suggests that if we quadrupled content, we could reach more users and grow the user base exponentially over time. Content is ultimately at the centre of digital growth marketing efforts. Moreover, organic growth continues an upward trend as the web platform’s search engine ranking grows.

**Brand Penetration** grew as seen through the lens of an increase in direct traffic and growth in organic search engine queries which used our brand name (turaco games) and its variants - see Image 6.3 subsequently.
Conversions were manifest in the comments we received from users interested in licensing the game templates, which was a signal that a revenue model based on selling customisable templates was also possible. Although we did not actively pursue subscription revenue models, some 141 leads opted into our mailing list and web platform subscription system.

Image 6.3. Keywords Used in Search Engines – June 2018 – March 2019

Conversions also manifested in social media shares. Using the share buttons on our website from AddThis.com, users shared our content 615 times on social networks throughout the four cycles – see Image 6.4.
As for revenue models, we received three indicators that revenues could be generated to create a sustainable business model. First, paid Ad Removal generated $220 USD during the brief testing period, and ad revenue from Cost Per Click (CPC) advertisers generated $42 from 704 clicks ($0.06 per click). At the moment, three revenue models look possible, with a fourth that cannot be tested at the moment since it requires a large user base to generate any meaningful insights – see Image 6.5 subsequently.

Perhaps the most encouraging signal of new venture idea validation was the growth in the number of natural links which led to viral traffic increases from key influencers – as shown in Image 6.6 subsequently. They resulted in higher engagement as seen through low bounce rates and higher visit duration on average.
Given the performance indicators, we concluded that the new venture was deemed scalable and the next step would involve the acceleration of scaling (beyond the scope of this study). To further prove that the venture could scale, we paused all paid advertising at the end of the study and collected data to estimate the natural and organic growth potential. The data (see Appendix 10) reveals that for three months between March 14th to June 14th, there were over 14,000 visits from 11,000 unique visitors – with 25% being returning visitors. We also monitored our paid ad removal revenue experiment on an established platform and found that over $1,000 had been generated with some $800
coming in the three months. Thus, we developed the following twin roadmaps for scaling.

The first idea is based on existing means and resources, while the second rests on what is unexpected but beneficial if it occurs. Table 6.9 is a summary of the two scaling ideas.

<table>
<thead>
<tr>
<th>Idea 1. Bootstrapping from Founder’s Means</th>
<th>Idea 2. Significant External Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The value proposition which is a key piece of the new venture idea will remain the same. It will be developed according to my means and resources.</td>
<td>• The second idea is contingent on us receiving significant venture funding.</td>
</tr>
<tr>
<td>• We plan to custom create ten new game templates that will vary the types of learning activities on the web platform.</td>
<td>• Regardless of venture funding, this idea would be an expansion of the first idea should it become profitable.</td>
</tr>
<tr>
<td>• We will strive to custom create over 500 learning activities over the next year after the PhD.</td>
<td>• A higher level of membership would allow educators more flexibility in content creation using our game templates and platform.</td>
</tr>
<tr>
<td>• I will seek to solve the problem of creating a more user-friendly LMS and discontinue the use of Moodle.</td>
<td>• A second feature would allow that they download SCORM trackable games for their own commercialisation using any LMS.</td>
</tr>
<tr>
<td>• When 500 new activities are created, we will initiate an intensive and highly optimized ad campaign during the peak seasons of September to December 2020, and January to May 2021 to reach an early majority of over 50,000 monthly users. Likewise, I may promote the new venture on my existing sites for free.</td>
<td>• Thus, games would have to be SCORM and Tin Can compliant.</td>
</tr>
<tr>
<td>• We will deploy activities progressively and incrementally boost search engine rankings, as well as attract natural links through free content sharing (link baiting technique).</td>
<td>• That way, we would empower educators to quickly customise their own learning games using multiple game templates.</td>
</tr>
<tr>
<td>• Email subscriptions and lead generation will be given more attention in tests.</td>
<td>• The platform would be coded to include all the features required for multi-seat course management and sale.</td>
</tr>
<tr>
<td>• New activities will target long tail keywords for organic user base growth.</td>
<td>• LMS, E-commerce, gaming and more technologies would be seamlessly integrated to manage platform subscription and use.</td>
</tr>
<tr>
<td>• Growth by bootstrapping is expected to be slow but will result in an externally debt-free venture.</td>
<td>• While I do not intend to actively seek funding for reasons discussed in Chapter Four (i.e., trust issues due to race), I remain open in case it emerges.</td>
</tr>
<tr>
<td>• I will continue to work for free until the venture achieves a large user base to become profitable.</td>
<td>• Growth by venture funding would be fast and key team members would be locally stationed for the most part.</td>
</tr>
<tr>
<td>• In three years, I expect the venture to recover all costs and start turning a profit.</td>
<td>• Funds would be used for content diversification and a sustained ad campaign geared towards growth.</td>
</tr>
<tr>
<td></td>
<td>• The business model would create jobs in coding, marketing and customer support.</td>
</tr>
</tbody>
</table>

The road map marks the end of the core project, which has successfully enacted and chronicled a digital new venture creation process in EdTech from pre-step to the fourth action research cycle. Hence, the first objective of this research, which is focused on the acquisition of a holistic narrative of process, has been achieved. The next step is a deeper retrospective sense-making geared towards understanding events in the narrative.
6.8 Visual Mapping & Narrative Sense-Making

Organisational sense-making is the ‘ongoing and retrospective development of plausible images that rationalise what people are doing’ (Weick et al., 2005, p. 409). Hence, the above narrative was interspersed with introspective and retrospective sense-making using the tools of critical reflection and reflexivity. This section, however, captures sense-making in retrospect, against the backdrop of the conceptual process model developed in Chapter Three (see Fig. 3.5). It allows me as the researcher to stand back from the narrative in order to view events in the third person. Based on the conceptual model, I visually map events in this case in Figure 6.2, subsequently. Together, the above reflective pauses and subsequent retrospective sense-making ultimately serve to answer the first part of the research question – How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process? As the central non-human subject around which the narrative is woven, the new venture idea (NVI) triggered the initial phases of digital new venture creation in this case.

Idea Conceptualisation became the first tangible step in the process, moderated by temporal and spatial dimensions relating to the focal entrepreneurial actor’s embeddedness (Welter, 2011). Historical and current embeddedness in the EdTech sector as teacher and entrepreneur informed the perception of a changing industry that offered new opportunities and challenges. These perceptual processes (Baron, 2006), ultimately resulted in the birth of a business model vision as a conceptual outcome (Amit & Zott, 2001). The vision was anchored in the value proposition of creating fun, interactive online learning games which could be consumed seamlessly across multiple devices. By evaluating his effectual means (Sarasvathy, 2001), the entrepreneur took the first step towards the next phase of idea evaluation.
Figure 6.2: Visual Mapping & Narrative Sense-Making
Idea Evaluation was the phase in which collaboration actually began. The African metaphor, ‘a child is only yours when it is in the womb’, illustrates the transition between idea conceptualisation and idea evaluation. Since idea conceptualisation is a mental process, it represents the child in the womb. However, the birth and nurturing of that child into adulthood becomes a collaborative endeavour involving medical professionals, friends, family and the wider society. Accordingly, in this case, idea evaluation began with the collaborative specification and articulation of key project requirements, as well as the strategic negotiation and formation of partnerships with mission-critical collaborators. Mission-critical collaborators brought new means by the knowledge and resources they offered. In addition, defining challenges and exploring solutions, as well as leveraging serendipity, resulted in the idea maturing into ‘opportunity confidence’ (Davidsson, 2015). The opportunity confidence outcome of evaluation resulted in a reduced overall level of perceived uncertainty prior to action (McMullen & Shepherd, 2006).

Enactment was defined by two main concurrent but interrelated events, with their respective sub-events. These were digital product development and digital growth marketing. Digital product development was marked by the planning and creation of digital artifacts and platforms as new market offerings. Hence, educational game coding, customisation and visual designing were hallmarks of digital artifact creation involving iterations of Minimum Viable Products (MVPs). The MVPs were used in eliciting user and customer feedback, as consistent with core principles of the lean start-up innovation model (Ries, 2011). Meanwhile, digital platform creation was underpinned by web template customisation and coding, as well as server installations and set-up. It focused on providing the platform for digital game artifact distribution and consumption by end users and algorithmic agents.
Likewise, digital growth marketing was supported by market research, data analytics monitoring, search and social media optimisation (SEO/SMO), visual layout designing and the running of digital ad campaigns. Growth marketing was equally marked by platform usability research and qualitative product research through direct observation in use. Furthermore, intellectual property (IP) protection and branding, manifested through the brand name research, the registration of web domain names, as well as trademark research and application. Meanwhile, digital growth marketing is an integrated form of marketing whose main objective, in this case, was the optimisation of the performance of new market offerings, and the growth in user base (Chaffey & Smith, 2017). The significance of its role in the digital entrepreneurial process rests on the argument that strong network effects are central in understanding digital new venture performance. Hence, there is a need to be proactive in optimising new market offerings to achieve lock-in, viral growth and increased user switching costs (Amit & Zott, 2001).

Accordingly, digital product development and digital growth marketing processes were tightly interwoven in symbiotic relations that shaped each other. Both processes were defined by the dynamic and concurrent forking, merging and termination of diverse activities (Nambisan, 2016) geared towards moving the digital entrepreneurial process forward. Process fluidity was in turn afforded by the digital tools and systems that co-creating actors leveraged in processing nearly costless communications and transactions, as well as the simultaneous engagement of multiple participating actors.

Outcomes of enactment resulted in the incremental launch of a viable new market offering which was used to elicit user and customer feedback. The feedback was then used to make several adjustments to action and the new venture idea (Ries, 2011; Garud & Giuliani, 2013). Adjustments in this case mainly resulted from higher levels of opportunity confidence. At the end of the critical early phases, user and customer
engagement helped reduce market uncertainty, thereby priming the venture for scaling. Unlike the process model developed in the literature, exit was not an event in this case.

6.9 CONCLUSION

This chapter has met the first objective of this research which sought to engage in practice and develop a holistic narrative of a pure digital new venture creation process. It has also captured my sense-making as researcher. Consequently, it has answered the first part of the research question – *How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process?* As such, it sets the reader up for the next chapter on thematic analysis. The analysis will serve to answer the critical second part of the research question – *What mechanisms are consequential in driving digital new venture emergence and performance?*
7 Chapter Seven. Narrative Thematic Analysis, Interpretation & Findings
7.1 **INTRODUCTION**

This chapter presents a critical analysis and findings which answer the core question of this research. Since the question hinges on the identification and explanation of consequential mechanisms and causal scenarios, it provides answers relating to why the digital entrepreneurial process developed in the way it did in this case. Using an abductive approach, emergent themes were grounded in the literature to arrive at generalisable explanations regarding the mechanisms driving a pure digital entrepreneurial process. The chapter begins by walking the reader through the process of narrative thematic coding in this case. In so doing, it provides an audit trail on how the data (the narrative) was first coded to surface key mechanisms and causes; and how the second round of coding ensured that these findings were accurately identified. Finally, temporality was considered in identifying how consequential a mechanism was at various phases of the digital entrepreneurial process. The reader can expect several diagrammatic representations in this chapter, as consistent with the pragmatic epistemology of presentational knowing (see Ch. 5).

7.2 **NARRATIVE THEMATIC ANALYSIS**

Narrative thematic analysis ultimately seeks to answer the second part of the research question – *What mechanisms are consequential in driving the process of digital new venture emergence and performance?* Figure 7.1 is a summary of key phases in data analysis.

*Figure 7.1 Process of Data Analysis*
To answer this question, data reduction began by distilling over 40,000 words of reflective notes and files in my action research journal, down to the narrative (see Chapter Six). I prepared Volume Two for examiners and supervisors in case further validation is required. Given the highly confidential details included and ethical guidelines agreed to, widespread dissemination of Volume Two is not possible. Nevertheless, the distilled narrative in Chapter Six is a comprehensive representation of the core project. For coding, I separated the distilled narrative into five files and coded using the Nvivo qualitative software package. The five files were sub-narratives of the pre-step and four action research cycles in the temporal order of occurrence.

7.2.1 Narrative Coding & Categorisation Process

I followed a coding logic which moves from the particular to the general, in a manner consistent with Saldana (2015, p. 14). Since events are the units of analysis in establishing narrative causality (Van de Ven, 2007), events were the departure point for coding. In Nvivo software, events were coded as ‘cases’. I organised events according to Figure 6.2, which relates to the conceptual framework developed from the literature (see Fig. 3.5). In the first round of coding, events were found from the narrative which linked to mechanisms and enablers drawn from the ‘mechanism framework’ developed from the literature (see Fig. 4.8). Informed by this exploratory coding, I developed and refined a tree-like structure of categories (called Nodes in Nvivo) – events, mechanisms, enablers and causal scenarios. The Codebook produced by Nvivo defines coded categories (see Appendix 3).

**Events:** Figure 7.2 subsequently represents the coding structure of events. Idea conceptualisation, evaluation, enactment and adjustments were main events under which sub-events were organised.
Mechanisms: Figure 7.3 subsequently represents the coding structure of various mechanisms. The categories of actionable mechanisms, actor-independent mechanisms and actor mechanisms assist in organising the search for consequential process mechanisms.
**Enablers & Causal Scenarios:** Figure 7.4 subsequently represents the coding structure of various enabling conditions and causal scenarios. Digital technologies and their interrelated typologies provided structures for identifying external generative causes of actor-independent mechanisms which had traceable influences on events. Since the focal actor is usually a central subject, I singled out prior knowledge, emergent knowledge and resources out as causes of actionable and cognitive mechanisms. Meanwhile, I examined collaborators in terms of their dual role as providers of new resources which reduced uncertainty, as well as being sources of uncertainty due to their independence.

![Figure 7.4 Enablers & Causal Scenarios](image)

Having organised the structure of coding, the second round of detailed coding began. I read through each sub-narrative file within Nvivo, while selecting and coding key references to cases (i.e., events) and their corresponding causal nodes (i.e., categories of mechanisms and causes). In the end, the number of references under each category assisted in showing the degree to which mechanisms and causal scenarios were consequential in driving the digital entrepreneurial process at various temporal phases. I
then manually grouped related categories together to arrive at higher order mechanisms which potentially explain digital new venture emergence and performance. In an abductive approach, I combined the data with theoretical findings to arrive at best explanations that are potentially generalisable to other cases.

7.2.2 Preliminary Analysis & Findings

A preliminary analysis broadly gives an overview of the consequential mechanisms and structures giving rise to events.

Events: Figure 7.5 is a summary of events with a corresponding number of references coded in the second round from the narrative. I obtained the figure as a screenshot from the Nvivo software and slightly edited it to improve clarity and presentation. I coded references to events under their main event tree and further coded them to mechanisms or causal structures which gave rise to them. Likewise, I also noted the frequency in which they occurred at various phases of the narrative, to preserve temporality in explanations of efficient causes.

An overview of Figure 7.5 indicates that as in other forms of entrepreneurship, action is truly the centre of the digital entrepreneurial process (McMullen & Shepherd, 2006). Hence, I coded 95 references under enactment, compared to 21 under idea evaluation, 10 under adjustments and 7 references under idea conceptualisation.
Mechanisms Overview: With regards to mechanisms, Figure 7.6 below is a broad overview of consequential mechanisms which were surfaced through Nvivo assisted coding. To reiterate, *Cycles* was an indication of the frequency in which a mechanism occurred in the entire process narrative, from the pre-step, to the fourth AR cycle. There were five AR cycles in total, including the pre-step narrative (think of it as Cycle 0). As for *references*, it refers to the number of times a particular mechanism was coded in the narrative. By combining frequency across the narrative and number of references, I was able to broadly determine consequential mechanisms driving the digital entrepreneurial process in this case.
Consequently, *data-driven operation* and *concurrent enactment* appear to be central actionable mechanisms, while *metacognition* was by far the most important cognitive mechanism of the focal actor in leading the process successfully. Meanwhile, *uncertainty reduction* and *resource expansion* were consequential actor-independent mechanisms of digital technologies that drove new venture creation activities.

However, to arrive at a more nuanced explanation, I correlated the number of references to the IAR cycle to determine its importance at various phases. For instance, *perceptual processes* only occurred in one cycle (pre-step) but was consequential because it was coded up to 3 times, making it just as significant as metacognition which occurred 15 times across 5 cycles. Taking a temporal dimension into consideration, the reason for the occurrence of perceptual processes in the pre-step is explained by the fact that its role
in the digital entrepreneurial process is perhaps required only at the initial phases. Therefore, a more meaningful analysis would focus on event drivers at key phases of the digital entrepreneurial process.

**Enablers & Causal Scenarios:** Finally, explanations were made comprehensive by linking events and mechanisms to enablers and causal scenarios – see Figure 7.7.

![Figure 7.7 Enablers & Causal Scenarios – Cycles & References](image)

Based on this preliminary analysis, several findings began to emerge. However, since temporality is critical in explaining efficient causes (Van de Ven, 2007), I conducted further analysis.

### 7.3 FINDINGS – IDEA CONCEPTUALISATION & EVALUATION

As consistent with Figure 6.2, events and their sub-events, broadly appeared in the following temporal order: idea conceptualisation, idea evaluation, enactment and
adjustments. Definitions of events, mechanisms and causal scenarios are captured in the ‘code book’ developed through Nvivo (see Appendix 3).

7.3.1 Idea Conceptualisation - Mechanisms & Causal Structures

As noted in Figure 6.2, idea conceptualisation was defined by two sub-events. They were environmental perception and means assessment. A number of causal structures and varied mechanisms contributed to idea conceptualisation and the subsequent business model vision. Digital technology-driven change, digital artifacts and digital platforms were the key external enabling drivers. Meanwhile, the focal actor and collaborators were actor enablers of the idea. The interaction between these mechanisms and structures resulted in a business model vision as new venture idea – see Figure 7.8.

**Actor-independent Mechanisms & Digital Technology Enablers:** Externally, digital technology-driven change was partly responsible for the birth of the new venture idea. This excerpt from the narrative serves to illustrate why this was the case:

> The problem however, lay in the fact that change rendered obsolete, some of the technologies that my industry had relied on for rapid, rich digital education content creation… I saw the trend moving towards mobile apps that were distributed through app stores, largely controlled by Google and Apple… Four combinable key technologies act as external enablers shaping my new venture idea. HTML5 and Responsive Web Design are the two new complementary technologies that enable cross-platform compatibility of digital content distribution and consumption. (Pre-step Narrative Chapter Six).

Technological obsolescence, primarily driven by the role of key industry actors in the mobile revolution such as Google and Apple, is cited as a key driver of new venture idea conceptualisation. It resulted in an ecosystem-wide change which brought new challenges but also offered potential solutions in the form of new technologies. Solutions resided in two types of digital artifacts – HTML5 and Responsive Web Design technologies. The reprogrammable and standardise characteristics of digital artifacts offer mechanisms of *combination* and *generation* (Kallinikos et al., 2013; Davidsson et al., 2017).
Combination is defined as the bringing together of two artifacts to provide new functionality, while generation is a mechanism which allows for the creation of new artifacts. Thus, the fact that HTML5 and Responsive Design could be combined to create cross-platform compatible, app store-independent games for online learning, explains how actor-independent mechanisms of combination and generation partly contributed to the birth of the new venture idea.

**Actor Mechanisms & Enablers:** At the level of the focal actor, which refers to my leadership role, prior sectoral knowledge was identified as the generative structure giving rise to the new venture idea. My embeddedness in the EdTech context as teacher and entrepreneur resulted in perceptual processes that contributed to idea conceptualisation. Hence, in my role as entrepreneur, I comment:

Using my prior sectoral knowledge as English language educator and digital entrepreneur in the PreK-12 content market segment of the EdTech industry, I had observed that the proliferation of mobile devices created enormous potential for on-demand and ubiquitous learning. However, with this change came challenges, which if surmounted could result in the creation of a sustainable new venture. (Pre-step Narrative Chapter Six).
As Baron (2002, 2004) argues, such prior experiences help entrepreneurs construct mental prototypes which represent patterns or categories of objects in the mind. Likewise, Gaglio and Katz (2001) posit that based on these experiences, entrepreneurs develop schemas or mental frameworks which aid their alertness to external stimuli. Mental schemas facilitate the search and recognition of changes, as well as market disequilibria. I find this argument to be a compelling, contributing explanation for the conceptualisation and birth of the new venture idea in this case. Given that I, as the entrepreneur was embedded in the EdTech context, it assisted in my recognition of multiple external stimuli which resulted in the envisioning of a value proposition and business model geared towards addressing problems of users.

However, while perceptual processes aided idea formulation, metacognition further assisted in refining it. Metacognition refers to an individual’s awareness and control over their cognitive capabilities (Flavell, 1979; Haynie et al., 2010). It was useful in the conceptual separation of the new venture idea from mere fantasy. Accordingly, as entrepreneur, I state:

As founder and funder, my role would hinge on integrating the skills of multiple collaborators, while using my knowledge as an educator to customise multiple learning games from coded game templates. I would use my knowledge of digital marketing and digital business development to search, test and validate a scalable business model. (Pre-step Narrative Chapter Six)

It is worth noting that the text uses the imaginative form ‘would’ to capture my thought processes as entrepreneur in time. It indicates the imaginative nature of idea conceptualisation. By the awareness of my cognitive capabilities and limitations as entrepreneur, I knew what was required to make the project feasible. Thus, metacognition acted as a compartmentalisation mechanism which dealt with challenges strategically.

**Actionable Mechanisms & Enablers:** By separating the idea from mere fantasy, the actionable mechanism of *means-driven development* began at the transition phase
between idea conceptualisation and evaluation. Means-driven development combines a
decision-making and action mechanism which derives from both effectuation theory
(Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005). Means-driven development
involves examining one’s own tangible and intangible means as the basis for decision-
making and action. Hence, at the conceptualisation phase, I reflect as follows:

…in the spirit of entrepreneurial bricolage, I decided to risk only the profits from my
existing businesses to finance continuous development - informed by an affordable loss
mindset’. (Pre-step Reflection Chapter Six)

Given the analysis, this study concludes that the birth of the new venture idea was a nexus
between external and internal enabling mechanisms and their related causal structures.
External structures such as digital artifact characteristics and industry change generated
mechanisms of combination and generation, which were consequential drivers of the new
venture idea. I, as the entrepreneur, used prior sectoral knowledge and cognitive
mechanisms of perceptual processes to identify and formulate the new venture idea. The
idea was then run through a filtration process by the mechanism of metacognition which
separated it from mere fantasy into something conceptually realisable. Through this
interrelationship, the idea was envisioned as a business model.

7.3.2 Idea Evaluation - Mechanisms & Causal Structures

As the new venture idea transitioned from conceptualisation to evaluation, the
preliminary steps of new venture enactment began, driven by multiple mechanisms and
causal structures. Not surprisingly, therefore, Fig. 7.5 records 21 references to idea
evaluation, compared to only 7 references for idea conceptualisation. It suggests that the
process incrementally moved into a phase of more action. Key activities in this phase
included partnership formation, specifying requirements, means assessment and
contractual negotiations. Other activities included leveraging positive events and
exploring alternatives. Together, these activities were geared towards reducing the overall
levels of uncertainty, with the effect being an increase in opportunity confidence (Davidsson, 2015). Figure 7.9 is a representation of the mechanisms and structures of idea evaluation.

*Figure 7.9 Mechanisms & Structures Driving Idea Evaluation*

**Collaborator & Focal Actor Enablers:** The knowledge, skills and resources of key actors was a major driver of this phase. Given that critical knowledge and skills needed to determine the favourable realisation of the new venture idea resided in key collaborators, they represented causal structures giving rise to events. Collaborators also introduced uncertainty, since the degree to which they could help realise the new venture idea could not be fully determined in advance, due to the novelty of partnership and collaborator independence. As digital entrepreneur, my knowledge, negotiating skills and resources played a central role in gaining collaborator commitment.

**Actor Mechanisms & Enablers:** Likewise, *metacognition* relating to my role as focal entrepreneur, was a major mechanism underpinning most of the decision making and action at this phase. Given the awareness of my capabilities and weaknesses as the
entrepreneur, I was willing to adopt flexibility in negotiating with key collaborators. Further, as HTML5 game coding was a new area, I knew I lacked full knowledge of how the process worked, and the skills to realise it. Therefore, it was imperative to build trust and stay open to suggestions from critical actors who could move the project forward.

**Actionable Mechanisms:** Three actionable mechanisms tended to be the consequential drivers of this phase - *rapport strengthening, means-driven development* and *flexibility*. This study defines rapport strengthening as the process of gaining, building and maintaining trust among previously unconnected actors. It involves creating a shared vision by accommodating the needs and views of mission-critical new entrants in a manner that motivates them towards realising the new venture idea sustainably. Rapport strengthening was particularly necessary in this case because key collaborators were dynamic collectives who only opted into the process on their terms (Nambisan, 2016). To illustrate how rapport strengthening drove this phase, this excerpt provides a good example:

With price quotation becoming a sticky issue, I highlighted other benefits of their participation. The Dutch coder explained that they were dealing with bigger clients who demanded more of their resources, and therefore, the high price quotation was justified. I wondered if this was just one of those very familiar negotiation ploys. I told the coder he could leverage the experience to develop skills in coding online learning games and expand the portfolio of offerings his company had. I shared deep industry insights in my space and he became fascinated. He also reciprocated by offering me key insights on trends in game development. Through this process, we forged bonds of trust through information sharing, but I was careful to avoid communicating a sense of urgency for fear of being exploited. (Pre-step Narrative, Chapter Six)

Rapport strengthening was in turn facilitated by means-driven decision making and flexibility on the part of the focal entrepreneur (Sarasvathy, 2001; Fisher, 2012). Since the mission-critical collaborator’s needs were business needs, satisfying them depended on what financial resources, I as the entrepreneur could muster and make available towards meeting them. Hence, means-driven decision-making was a mechanism which I leveraged to secure key collaborator commitment and reduce uncertainty.
Likewise, flexibility was a mechanism which worked by compromising on some of the project’s requirements and allowing new input from collaborators. Through flexibility, collaborators were willing to find cost-cutting solutions, leverage serendipity and eventually render new venture enactment feasible. These mechanisms ultimately had the effect of boosting opportunity confidence and setting the stage for the next phase, defined by intensive new venture enactment.

7.4 FINDINGS – NEW VENTURE ENACTMENT & ADJUSTMENTS

Since new venture enactment is the core of the entrepreneurial process, it naturally calls for more emphasis. As depicted in Figure 7.5, new venture enactment, in this case, was dominated in equal amounts by two main events – digital product development (48 references) and digital growth marketing (47 references). Digital product development was defined by the planning and development of digital artifacts and web platform as iterations of Minimum Viable Products or MVPs (Ries, 2011). The 1st and 3rd AR cycles were marked by the intensive creation of the digital game artifact and less so for the 2nd and 4th cycles which were more concerned with customisation and testing against real users on the web platform. Hence, cycles 2 and 4 were dominated by digital growth marketing activities.

7.4.1 Identifying Mechanisms & Causal Structures of Enactment

Since actionable mechanisms are more tractable, Berglund and Korsgaard (2017) argue that they should remain the prime focus for explaining entrepreneurial action. Further, they are more proximal explanations of process theory (Van de Ven, 2007). Hence, this section focuses on actionable mechanisms as the basis for examining related mechanisms and causal structures driving enactment. Figure 7.10 was generated from the
Nvivo coding process as a visualisation of the dominance of various actionable mechanisms during enactment.

Figure 7. 10 Actionable Mechanisms of Digital New Venture Enactment

As evident, four interrelated mechanisms were prominent in shaping enactment and enhancing outcomes. They were identified as concurrent enactment (linked to piecemeal co-creation), data-driven operation, flexibility and rapport strengthening. I will further discuss them subsequently.

Actor Mechanisms: Likewise, actor mechanisms of cognition and motivation were essential drivers of enactment that closely interrelated with actionable mechanisms. Figure 7.11 is a visualisation of the dominance of each actor mechanism.
As evident, metacognition, persistence and self-control were the three cognitive mechanisms driving events. They were in turn generated by my prior and emergent knowledge as entrepreneur. Prior and emergent knowledge reduced uncertainty, which in turn enabled me to be resilient under challenging circumstances. Metacognition continued to enable me to know when to let collaborators take charge by promoting leaderful practices (Raelin, 2009).

**Actor-independent Mechanisms:** Meanwhile, actor-independent mechanisms, which mainly resided in the generativity of digital technology affordances (Leonardi, 2011; Majchrzak & Markus, 2012), offer more distal explanations for the causes of
enactment. Figure 7.12 is a visual representation of these mechanisms surfaced through the Nvivo coding process.

*Figure 7.12 Actor-independent Mechanisms of Digital New Venture Enactment*

As evident, digital technologies in general, mainly aided enactment through mechanisms of resource expansion, uncertainty reduction and compression (Davidsson et al., 2017). However, to determine how mechanisms, enablers and causal scenarios interrelated in driving digital new venture enactment, I developed Figure 7.13 as the departure point for explanations.
In a retroductive and critical realist approach to generating inferences, mechanisms are theorised backwards from their effects or roles (see Ch.5). Hence, this study finds that the effects which interrelated mechanisms and structures had on enactment was in shaping and outcome-enhancement (Davidsson et al., 2017). Shaping manifested in agile processes which produced temporal efficiencies, as well as reduced task-specific uncertainty through experimentation (Ries, 2011). Likewise, outcome-enhancement was seen through user feedback that assisted in growing the user base of lead users.

7.4.2 Concurrent Enactment, Piecemeal Co-creation & Causal Relationships

As identified, concurrent enactment was among the most consequential mechanisms driving digital new venture enactment in this case. Concurrent enactment is here defined as the simultaneous and dynamic initiation, forking, merging and
termination of diverse activities (Nambisan, 2016). It usually interrelates with piecemeal co-creation, which is the breaking down and assigning of tasks to multiple participating actors (Von Briel et al., 2018). While co-creation is a mechanism embedded in entrepreneurship theories such as effectuation, piecemeal co-creation more accurately describes co-creation in this context. Piecemeal co-creation, unlike concurrent enactment, is usually, but not always a human collaborative activity owing to the influential and force-multiplying role of digital material agencies. Likewise, piecemeal co-creation is not always concurrent. However, given the close similarities, piecemeal co-creation can be more comprehensively combined with concurrent enactment. Thus, it is highly likely that both will be jointly encountered as concurrent piecemeal co-creation. There were 14 references to concurrent enactment and 6 references to piecemeal co-creation, giving both a total of 20 references.

Concurrent enactment and piecemeal co-creation were jointly the most consequential drivers of digital new venture enactment. An analysis of the narrative indicates that there were several references to expressions that used the past continuous tense and temporal adverbials such as ‘concurrently’, ‘as activities were in progress’ and much more, during enactment. The following excerpt serves as an illustration of how these mechanisms manifested throughout new venture enactment:

While waiting for coding solutions, I focused on activities such as company registration and brand name trademarking, which related to marketing and venture legality. With more content added to the web platform, I initiated a limited Google Ad campaign designed to drive traffic to the site and monitor usability. The web developer and I kept our eyes on key metrics such as bounce rate and visitor flow. We constantly used data analytics to improve usability and optimise the site. As these activities were in progress, the Dutch team easily fixed the bugs in the game codes and included the missing mathematical symbols. As predicted, this was a simple copy and paste fix. (Second AR Cycle Narrative, Ch. 6)

**Actor-independent Mechanisms & Causal Relationships:** Concurrent enactment and piecemeal co-creation were in turn largely generated by the modifiable, extremely modular and granular characteristics of digital artifacts (Kallinikos et al., 2013) and their
standardised protocols (Von Briel et al., 2018). Given the characteristics, it enabled a
digital form of modularisation wherein tasks based on digital artifacts such as digital game
creation, could be broken down into their smallest constituents and simultaneously
enacted and later merged by one or multiple participating actors. In the narrative, game
coding, web platform development, graphic designing and digital growth marketing
activities all seemed to be happening simultaneously and dynamically without clear
beginnings and endings. The effects were temporal efficiencies which accelerated digital
product development phases. Likewise, the actor-independent mechanism of resource
expansion was generated by digital talent platforms. Indeed, digital talent platforms and
marketplaces facilitated concurrent piecemeal co-creation by allowing rapid access to
resources and talents that could be instantly engaged to carry out specific tasks like
blogging, logo designing and audio recording.

However, digital infrastructures played the most enabling role in facilitating
communication and collaboration. For instance, in the Third IAR narrative, I write:

…the Dutch coder shared his screen with me via Skype and I saw the progress that was
being made with the other games. (Third Cycle Narrative, Chapter Six)

Indeed, digital collaboration tools like Skype and Teamviewer enabled remote visual
demonstrations of work in progress, as well as aiding in troubleshooting. For instance,
Teamviewer was used to remotely take over and control screens for demonstrations and
troubleshooting. Likewise, systems such as Google Ads and Google Analytics were often
alluded to as part of concurrent piecemeal co-creation. Digital tools, with their
mechanisms of compression and conservation, made concurrent piecemeal co-creation
appear seamless and instant. Thus, they helped eliminate temporal and spatial
inefficiencies (Kirzner, 1997). Consequently, Nambisan’s (2016) argument that
digitisation renders entrepreneurial processes less-bounded in terms of their temporal and
spatial structures is supported.
**Actor Mechanisms & Causal Relationships:** Finally, my leadership role as focal agent was driven by strong metacognition, which interrelated with concurrent enactment and piecemeal co-creation. Metacognition was in turn causally generated by knowledge and resources which I possessed as entrepreneur. For instance, financial resources, prior knowledge and skills in using digital platforms, enabled the decision to rapidly outsource tasks to other actors who could perform them more effectively.

7.4.3 **Data-driven Operation, Flexibility and Causal Relationships**

Likewise, data-driven operation was the second most consequential actionable mechanism identified in new venture enactment. Huang et al. (2017) define it as the collection of vast amounts of user data, as well as data from other sources to inform growth-oriented initiatives. It was specifically more dominant in digital growth marketing activities. As noted in the reflective pause (Box 6.7), digital material agencies such as search and social media algorithms, act as material gatekeepers whose needs must be satisfied as a path to serving human consumers. Hence, in the narrative, I reflect:

> Without meeting the needs of search engines through careful keyword placement, web page optimisation and quality natural link building, our offerings may never be found by the human users we seek to serve. Thus, I see algorithmic agencies as significant non-human stakeholders driving digital new venture enactment and performance. Data-driven operation appears to be the mechanism by which the gap between the needs of the human and digital material stakeholder is bridged. Hence, digital growth marketing is the parallel and concurrent process of satisfying the needs of both algorithmic gatekeepers and human end users. (Fourth Cycle Narrative, Chapter Six)

The conceptual schema captured from the reflective pause in Box 6.7 is here reintroduced as Figure 7.14, subsequently. As reflected in Box 6.7, the role of digital material agencies in driving new venture performance can be theorised using a sociomateriality lens (Orlikowski & Scott, 2008). Sociomateriality theory exposes the invisible but influential role of algorithmic agencies in driving organisational processes (Orlikowski & Scott, 2015). As noted, digital material agencies engender material discursive practices - whereby, such practices hinge on unlocking the hidden affordances
of digital technologies, while navigating their imposed constraints (Leonardi, 2011). Hence, data-driven operation (Huang et al., 2017) is the mechanism by which human actors activate algorithmic affordances and navigate their constraints to drive venture performance in the form of network effects (Amit & Zott, 2001).

Figure 7.14 Digital Growth Marketing as Conceptualised in Box 6.7

Accordingly, digital growth marketing is but the manifestation of a data-driven operation mechanism that drove venture performance in this case. It achieved this by generating a virtuous circle of feedback loops which led to adjustments in digital product development and attempts to identify, anticipate and meet the needs of algorithmic agencies. In sum, data-driven operation was ultimately a consequential higher-order mechanism driving venture performance and supporting the process of venture emergence. Data-driven operation and flexibility jointly manifested in the regular use and application of qualitative data from human observations in making adjustments to digital product development. Likewise, quantitative and qualitative data from digital analytics largely informed continuous web platform optimisation. The combination of data gathering measures shaped decision making and action that ultimately resulted in the growth of the user base.
**Actor Mechanisms & Causal Relationships:** Data-driven operation was in turn driven by actor mechanisms and knowledge. The analysis reveals that metacognition and persistence were two mechanisms which were equally prevalent during digital growth marketing (Nambisan & Baron, 2013). Metacognition, as already noted, is an awareness of one’s strengths and weaknesses, which in turn promotes leaderful practices and the formulation of effective task strategies. Hence, metacognition was consequential because it enabled me as the entrepreneur, to focus on tasks within my core competencies while leveraging those of other actors to compensate for areas of known weaknesses. It equally contributed toward piecemeal co-creation and concurrent enactment mechanisms in digital growth marketing.

Meanwhile, persistence, which is defined as the willingness to sustain long-lasting and intensive activities that are less enjoyable but necessary (Baron & Henry, 2010), was consequential in driving venture performance. Indeed, digital growth marketing and game customisation were two tightly interrelated activities. There were several allusions in the narrative of these activities being slow, painstaking, detailed and potentially boring. Hence, my persistence as entrepreneur proved pivotal in sustaining data-driven operation and product development until the needs of algorithmic and human consumers could be met satisfactorily. Since persistence increases the chances of acquiring emergent knowledge, it potentially enhances metacognition because new competencies are developed along the journey and efficient co-creation strategies are formulated.

**Actor-independent Mechanisms & Causal Relationships:** Further, data-driven operation was in turn driven by the affordances of digital technologies – especially digital infrastructures. Digital tools and systems such as data analytics and digital advertising systems allowed for instant data gathering and decision making. They contributed
towards uncertainty reduction on multiple levels. Since data could be gathered to drive experimentation, it led to a regular increase in emergent information and knowledge that incrementally reduced the levels of outcome uncertainty. Likewise, digital platforms offered mechanisms of resource expansion and conservation because more knowledge assets could readily be sourced and integrated to perform specific tasks on an on-demand basis. Likewise, it resulted in compression because available knowledge resources could be concurrently engaged, thereby reducing the time it took to perform activities (Nambisan, 2016; Davidsson et al., 2017).

### 7.4.4 Adjustments – Mechanisms & Causal Relationships

At the adjustment phase, concurrent enactment and data-driven operation equally played a significant role – see Figure 7.15 subsequently.

*Figure 7. 15 Actionable Mechanisms Driving Adjustments*
As noted, flexibility and pre-emption were just as consequential. However, flexibility was the most defining mechanism of this phase because it closely related to rapport strengthening and two key mechanisms of enactment (concurrent enactment & data-driven operation). The outcomes of flexibility were the adjustments that actors often made to the new venture idea and enactment process. Likewise, pre-emption was equally prominent because it involved taking steps to stave off a potential crisis that could result in loss of temporal efficiencies. For instance, in the narrative, I write:

Game development was mainly on track but the team ran into a few delays. While I was impressed by the artwork, the Dutch coder noticed that they were pixelated. Moreover, the current designs would not be user-friendly on mobile devices. Hence, the delays were an attempt to pre-empt a future problem. (Third Cycle Narrative, Chapter Six)

In this instance, poor quality graphics was an emerging problem of usability that could have resulted in several unpleasant outcomes subsequently. Pre-emption saves time by staving off future problems. Pre-emption also manifested in the thorough search and elimination of bugs in game codes that could see a repeat of a previous problem. Hence, pre-emption was driven by prior and emergent knowledge of actors.

7.5 SUMMARY & DISCUSSION OF FINDINGS

To sum up, the consequential mechanisms driving digital new venture creation in this case, one must depart from the basic premise that the process was marked by high levels of uncertainty. As McMullen and Shepherd (2006) argue, entrepreneurial action is the result of the amount of uncertainty perceived and the willingness to bear uncertainty. Hence, mechanisms driving the evolution of the digital entrepreneurial process appear to hinge mainly on managing perceived uncertainty and taking action to drive venture emergence and performance. Moreover, this case was defined by resource scarcity, thereby making the judgemental decisions of the focal actor consequential (Casson, 1982). In the narrative, I, as the entrepreneur, was dealing with multiple forms of task-
specific and outcome uncertainty. However, as emergent knowledge was gained and combined with prior knowledge, perceived levels of uncertainty decreased incrementally.

Principles of pragmatic entrepreneurship theories such as effectuation and bricolage, with their emphasis on controlling rather than predicting an uncertain future, are major drivers of decision making in this case (Sarasvathy, 2001; Baker & Nelson, 2005). Similarly, combined principles of the lean start-up and design thinking which prescribe a hypothesis-driven approach to co-creating the future are constantly referred to in the narrative (Ries, 2011; Brown & Katz, 2011; Blank & Dorf, 2012; Eisenmann et al., 2012). Ultimately, pragmatic entrepreneurship theories and hypothesis-driven models are united by experimentation, co-creation and flexibility as actionable mechanisms driving new venture creation under uncertainty (Fisher, 2012). Therefore, this study largely confirms the validity of these theories in a digital entrepreneurial process. However, Nambisan (2016) argues that while they offer great value, they stop short of providing ‘fine-grained’ insights on how a digital entrepreneurial process develops over time. Hence, examining various mechanisms at various temporal phases, aids in providing more granular explanations of the causal interrelationships that drive the digital entrepreneurial process.

Consequently, this study broadly distinguishes between two broad phases of the digital entrepreneurial process and identifies consequential mechanisms under each. The early phase is concerned with digital new venture idea conceptualisation and evaluation, while the later phase is defined by action and adjustments.
7.5.1 Phase 1 - Early Phase Mechanisms

Table 7.1 is a summary of the mechanisms that this study identified as consequential in the early phase. The numbers in bracket indicate their references in the narrative.

<table>
<thead>
<tr>
<th>Idea conceptualisation</th>
<th>Idea evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actor Mechanisms</strong></td>
<td><strong>Actor Mechanisms</strong></td>
</tr>
<tr>
<td>• Perceptual processes (3)</td>
<td>• Metacognition (5)</td>
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<tr>
<td>• Metacognition (2)</td>
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<tr>
<td><strong>Actionable Mechanisms</strong></td>
<td><strong>Actionable Mechanisms</strong></td>
</tr>
<tr>
<td>• Means-driven development (3)</td>
<td>• Rapport strengthening (4)</td>
</tr>
<tr>
<td>• Rapport strengthening (4)</td>
<td>• Means-driven development (4)</td>
</tr>
<tr>
<td>• Flexibility (2)</td>
<td>• Flexibility (2)</td>
</tr>
<tr>
<td>• Serendipity leveraging (1)</td>
<td>• Serendipity leveraging (1)</td>
</tr>
<tr>
<td><strong>Actor-independent Mechanisms</strong></td>
<td><strong>Actor-independent Mechanisms</strong></td>
</tr>
<tr>
<td>• Combination (1)</td>
<td>• Uncertainty reduction (1)</td>
</tr>
<tr>
<td>• Generation (1)</td>
<td>• Combination (1)</td>
</tr>
</tbody>
</table>

At early phases, perceptual processes are identified as consequential cognitive or actor mechanisms leading to the birth of the new venture idea, while metacognition is central to evaluation (Baron, 2004; Nambisan & Baron, 2013). Meanwhile, means-driven development and rapport strengthening are identified as consequential actionable mechanisms of idea conceptualisation and evaluation. Rapport strengthening is in turn supported by the mechanism of flexibility. Together, their effect is reduced levels of uncertainty and an increase in opportunity confidence (Davidsson, 2015) as new actors are engaged and commit to new venture realisation. These mechanisms jointly offer proximal and pragmatic explanations of the key drivers of this phase.

With relation to more distal drivers of the early phases, combination and generation, are identified as actor-independent mechanisms of digital artifacts that are consequential. Together, they render the new venture idea possible by allowing two digital artifacts to come together in powerful new combinations of market offerings. Thus, they are partly responsible for the birth of the new venture idea in this case. Combination
and generation mechanisms of digital artifacts result in the envisioning of new market offerings and business models. Likewise, digital platforms and infrastructures reduce uncertainty and build opportunity confidence through the rapid search and integration of independent knowledge assets.

7.5.2 Phase 2 - Later Phase Mechanisms

Meanwhile, Table 7.2 is a summary of the mechanisms which this study identified as consequential at the crucial later phase of the process.

<table>
<thead>
<tr>
<th>Table 7.2 Later Phase Mechanisms</th>
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<tbody>
<tr>
<td><strong>Enactment</strong></td>
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<tr>
<td><strong>Actor Mechanisms</strong></td>
</tr>
<tr>
<td>Metacognition (9)</td>
</tr>
<tr>
<td>Persistence (5)</td>
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<tr>
<td>Self-control (3)</td>
</tr>
<tr>
<td><strong>Actionable Mechanisms</strong></td>
</tr>
<tr>
<td>Concurrent enactment (14)</td>
</tr>
<tr>
<td>&amp; Piecemeal co-creation (6) = 20 in total</td>
</tr>
<tr>
<td>Data-driven operation (17)</td>
</tr>
<tr>
<td>&amp; Flexibility (8)</td>
</tr>
<tr>
<td>Rapport strengthening (8)</td>
</tr>
<tr>
<td>Means-driven development (5)</td>
</tr>
<tr>
<td>Pre-emption (5)</td>
</tr>
<tr>
<td>Serendipity leveraging (3)</td>
</tr>
<tr>
<td>Leaderful practices (2)</td>
</tr>
<tr>
<td>Task automation (1)</td>
</tr>
<tr>
<td><strong>Actor-independent Mechanisms</strong></td>
</tr>
<tr>
<td>Uncertainty reduction (9)</td>
</tr>
<tr>
<td>Resource-expansion (8)</td>
</tr>
<tr>
<td>Compression (6)</td>
</tr>
<tr>
<td>Conservation (2)</td>
</tr>
<tr>
<td>Combination (2)</td>
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<tr>
<td>Reach (1)</td>
</tr>
</tbody>
</table>

The numbers in bracket indicate their references in the narrative. As noted, metacognition and persistence are identified as central actor mechanisms of decision making and motivation driving the process. However, concurrent enactment and piecemeal co-creation, as well as data-driven operation and flexibility are the most central actionable mechanisms driving this phase. Together, they have the effect of delivering temporal
efficiencies and reducing outcome uncertainty. Meanwhile, metacognition, rapport strengthening, and flexibility are consequential mechanisms that carry on from the early phase. The three mechanisms continue to be essential in reducing participant uncertainty.

7.6 CONCLUSION

Given the findings, this study concludes that digital new venture creation appears to be a dynamic journey defined by the enactment of multiple concurrent processes which result in temporal efficiencies (Nambisan, 2016). Given the centrality of digital artifact creation as new market offerings, and the role of digital platforms and infrastructures as enabling operand resources (Nambisan, 2013), pure digital entrepreneurship is inherently sociomaterial (Orlikowski & Scott, 2008; Davidson & Vaast, 2010). Whereby, material discursive practices translate digital technology affordances (Leonardi, 2011) into new venture ideas and offerings, as well as generate pragmatic mechanisms that reduce uncertainty and drive venture performance. Given the democratic control of key knowledge assets, leading this journey demands strong metacognition from focal actors and a corresponding rapport strengthening mechanism that sustains co-creation and limits key participant uncertainty from exit. Further, flexibility is required at all phases in the formation and nurturing of strategic partnerships, navigation of challenges and the leveraging of emergent knowledge and events to shape outcomes. Finally, through persistence and self-control, digital entrepreneurs potentially increase the odds of gaining traction and achieving network effects that determine venture scalability.

To reiterate, the main aim of this study was to identify and theorise consequential mechanisms and causal structures that drive digital new venture creation. The study adopted an Insider Action Research approach which resulted in the enactment and acquisition of a holistic narrative of a pure digital entrepreneurship process in EdTech.
By analysing the narrative, the study identified key mechanisms that interrelatedly drove digital new venture emergence and performance at various phases. By adopting abductive inference, mechanism-based (Pentland, 1999; Ylikoski, 2018) and process theorising (Van de Ven, 2007), the findings were linked to theory and generalisable explanations of digital new venture emergence and performance were derived. Consequently, Chapter Six and Seven have answered the central research question and met three core objectives of this study. In Chapter Eight, the fourth objective of this study is met by drawing lessons from the findings which are relevant to policy and the practice of digital entrepreneurship.
8  *Chapter Eight. Pragmatic Model of Pure Digital Entrepreneurship*
8.1 Introduction

This chapter meets the fourth objective of this study, which seeks to offer practical guidelines for nurturing the growth of Pure Digital Entrepreneurship (PDE) ventures at pre-scaling phases. Therefore, it is assumed that the context of application is likely a start-up defined by resource scarcity and high levels of perceived uncertainty. Meeting the fourth objective of this research is consistent with a design science orientation, which seeks prescriptive knowledge outcomes of practical utility (March & Smith, 1995; Berglund et al., 2018). Practicality is essential for ensuring that this study satisfies the needs of multiple stakeholders (Reason & Marshall, 1987, p.112; Frank & Landstrom, 2016). Thus, this chapter is built on the assumption that practitioners and policymakers seek knowledge which potentially increases the odds of developing scalable new ventures that solve problems for society. As Storey and Greene (2010, p. 208) argue, nurturing the growth of young fast-growth ventures should be an important element in enterprise policy development. To determine how best to nurture young fast-growth digital new ventures, it is essential to first understand the process by which they emerge and grow (McKelvie & Wiklund, 2010; Leitch et al., 2010). Accordingly, the previous two chapters have provided an empirical basis for offering practical guidelines.

**The Utility of Extant Entrepreneurship Theories & Models:** Firstly, it is essential to point out that new venture creation in the current case operated in a network-centric rather than firm-centric context (Nambisan & Sawhney, 2011). Thus, it was consistent with the open innovation approach (Chesbrough, 2007). As such, the key collaborators are dynamic collectives (Nambisan, 2016). It, therefore, reflects a hybrid mode of venture growth which combined internal and external capabilities, as well as the resources of willing partners (McKelvie & Wiklund, 2010). Secondly, this study also finds that innovation models such as the lean start-up (Ries, 2011; Maurya, 2012; Blank, 2013) and
human-centred design (Brown & Katz, 2011) offer useful, actionable mechanisms at various phases of digital new venture creation. Furthermore, when the context is marked by high levels of uncertainty and resource scarcity as in this case, effectual logic (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005) also inform decision making and venture enactment.

However, what appears evident from the research base is that none of these theories or models on their own offer sufficient guidance on pure digital new venture creation. Nambisan (2016) came to a similar conclusion in his agenda-setting article on digital entrepreneurship. This study suggests that if a comprehensive model of practical utility is to be developed, then an eclectic approach is the path to offering those ‘fine-grained’ and tactical process guidelines on digital new venture creation which Nambisan called for. Therefore, based on the research findings, this study envisions and develops a pragmatic model of pure digital new venture creation subsequently.

8.2 Pragmatic Model of Pure Digital New Venture Creation

The model is a two-phase model. Phase 1 is the ideate and evaluate phase, while Phase 2 is the enact and react phase. Figure 8.1 is a parsimonious version of it.

Figure 8.1 Pragmatic Model of Early Stage PDE
The model is in many ways analogous to the academic research process where Phase 1 can be equated to the secondary research process, while Phase 2 resembles the primary research process. Expanded versions of both phases are developed in Figures 8.2 and 8.3, subsequently. They identify the events, skillsets, mindsets and toolsets that are expected and necessary to drive the PDE process to possible success. Appendix 4 provides a list of suggested tools that are useful at various phases and steps.

8.2.1 Phase 1 - Ideate & Evaluate

Phase 1 is a pre-enactment phase focused on the birth of the new venture idea and the lowering of uncertainty. Figure 8.2 represents the steps which move from abstract ideation to concrete action.

Steps in Phase 1

Ideation & Vision: Ideation is the conceptual generation of a rudimentary vision or digital new venture idea. It could be the result of a proactive, reactive or fortuitous search (Davidsson, 2012). The emphasis is on proactive search which involves environmental scanning for digital technology and related change. Traditional business frameworks such as STEEPLE (Social, Technological, Economic, Environmental, Political, Legal & Ethical) and VUCAH (Volatile, Uncertain, Complex, Ambiguous & Hyperconnected) offer useful toolsets for proactive environmental scanning. Combining STEEPLE with a VUCAH framework assists in searching for the WHAT and HOW of environmental change. Proactive ideation is often aided by prior knowledge and direct experience in the environments in which entrepreneurs are embedded. It requires a mindset of alertness to identify business ideas coming from shifts in the proximal or distal environment. For instance, the entrepreneur, in this case, was embedded in an EdTech context, which assisted in ideation through awareness of change in his environment.
By being alert to changes in his environment, I, as the entrepreneur discerned that four typologies of digital technologies could be combined to solve problems for end users and customers in the education sector. The technologies were HTML5 and responsive web design, e-commerce and online learning technologies. Further, this case indicates that when the idea is aimed at solving problems for millions of users in a rapidly growing industry, the potential for new idea diffusion exists. In the current case, the new venture is gestating against the backdrop of a rapidly growing EdTech industry with a large user base (PreK-12). Irrespective of how the idea is formed, a vision is the by-product or outcome of the ideation process. The central question in this step is – Is there a real problem requiring a timely solution? This question should translate into a vision that encompasses an identified problem, a value proposition and target market.

Regarding digital technologies, search must be guided by their ability to form powerful new combinations geared towards solving problems for early adopters. Thus, the ability to decode the hidden potentials of new technologies and link them up to societal needs is a required mindset and skillset. Thus, seeing new digital technologies in terms of their potentiality for societal problem solving and value creation, as opposed to focusing on the features of the technology, presents a path to unlocking digital value (Nambisan et al., 2017).

**Articulation:** Following ideation, articulation is an important next step that refines and translates the vision into a communicable and concrete opportunity which is both time-bound and valuable. Hence, visualisation of the idea through descriptive writing and basic sketching is critical to idea articulation. Articulation is essential because putting pen to paper (or the digital equivalent) is a reflective process which aids further refinement and understanding of the vision. It allows entrepreneurs to have a dialogue with their idea. Indeed, scholars studying practice have long identified that when a practitioner’s ideas
are tacit, they are difficult to formulate into strategies which they or others can understand and develop (Schon, 1983, p. 243). Tools such as the Business Model Canvas (Osterwalder & Pigneur, 2010) and Lean Canvas (Maurya, 2012) have been developed to assist in the articulation of business ideas. The focus of these canvases at this step should be on clarifying the problem and value proposition, as well as identifying potential target users or customers through data-driven personas.

**Preliminary Evaluation:** Following articulation, the next step is a preliminary evaluation. The goal is to rapidly determine available means, potential market demand, competition and possible partners. A major difference between digital versus traditional new venture creation is the speed at which markets can be researched to acquire critical insights. Digital tools such as Google Keyword Planner (incorporated into ads.google.com) can be used to precisely determine the number of monthly searches conducted by location using specific keywords or phrases related to the value proposition.

Market evaluation can begin by looking at the stated value proposition and developing key phrases of between two to four words that sum up the vision. Since it is only a preliminary evaluation, a maximum of about five key phrases that encapsulate the vision is sufficient. In the current case, key phrases such as ‘math games’, ‘math games for kids’ and ‘interactive math games’ were used to query Google Keyword Planner for estimating global monthly searches for the math games market segment. Furthermore, the same key phrases were used to query Google Search to determine top ranking websites in this category. The sites were then queried on similarweb.com to determine their competitive positions and sources of web traffic. Since a large user base was deemed critical to venture success, in this case, basic digital market research helped to reduce demand uncertainty.
However, it is important to mention that a large user base is a relative concept. While some markets may not have a user base in the millions, they may have high paying customers - thereby making it possible for a business to remain sustainable or profitable. In the case of B2B (Business-to-Business) pure digital business models, a large user base may be as little as 5000 global users, while in B2C (Business-to-Consumer) it could be in the millions. For instance, in the EdTech context, LMS (Learning Management System) providers often adopt B2B cloud-based models while education content development is aimed at both B2B and B2C segments with a potential user base in the millions (Docebo, 2014, 2017). In addition, depending on the nature of the vision, a market may not be known in advance or may not have formed yet. Thus, a lack of clear evidence of a market is not a reason to discontinue the pursuit of the idea at this stage. Taking action may lead to market discovery and thus subsequent iterations. A historical analysis of myself as the entrepreneur, in this case, reveals that when I launched my first website back in 2005 (esl-galaxy.com), I was surprised to learn that most of its users did not come from countries I had anticipated. Thus, some markets may only reveal themselves through enactment and learning.

Additionally, it is suggested that digital entrepreneurs undertake a rudimentary assessment of their own material means, networks and personal capabilities including motivation (Sarasvathy, 2001). This exercise helps pinpoint what resources and capabilities are lacking and therefore needed from partners to realise the vision.

Finally, preliminary evaluation should seek to determine if the vision is based on incremental, radical or disruptive innovation. As Christensen (2013) explains, disruptive innovation is associated with low-end market encroachment and can be pulled off by digital new ventures with limited resources. On the contrary, radical innovation tends to rely on venture capabilities, individual and organisational human capital. Thus, it is
resource intensive. Meanwhile, incremental innovation, which is where the bulk of new venture ideas fall, involves imitative offerings with minor tweaks to existing technology combinations, products and processes (Davidsson, 2012).

**Strategic Partnership Formation:** Having gathered reasonable amounts of information from preliminary evaluation, strategic partnership formation is a critical first step towards enactment if the vision appears realisable. It involves the identification and establishment of rapport with mission-critical actors. Since it is unlikely that one individual or firm will possess all the capabilities and resources needed to realise the digital new venture idea, collaboration with key actors is necessary. Mission-critical actors are those whose skills, knowledge or resources are indispensable in advancing the vision. Partners could be traditional investors, lenders and teams involving previously connected parties.

However, digitisation has democratised entrepreneurship (Aldrich, 2014), making it likely that teams (Cooney, 2005) or dynamic collectives (Nambisan, 2016) will co-create value. Teams and venture partners introduce stability due to binding contractual or social arrangements, co-ownership and a shared interest in venture success. Dynamic collectives, however, are loosely connected individuals with different goals (Nambisan, 2016). While they have the advantage of offering rapid and often inexpensive, on-demand access to capabilities and resources via talent platforms, they also introduce instability. Hence, traditional forms of co-creation often based on proximal agents are insufficient in understanding partnership formation in a pure digital new venture creation context.

Therefore, what is new and challenging in this context is the geographically dispersed nature of co-creation with collectives who are previously unconnected. Forming such partnerships is a risk mitigation process which begins by identifying the platforms around which critical collectives congregate. For reliable critical actors, this
study finds that the LinkedIn.com professional platform is an invaluable tool. Critical actors need to be trusted entities that would not suddenly disappear and leave projects in limbo. Hence, this study suggests that when it is feasible, forming such partnerships should be with established organisations that have employees, as opposed to freelancers with no verifiable legal identity. These organisations must also have, among others, verifiable samples of their work and a reputation to protect, judged by such things as customer ratings of their online presence. Triangulating multiple sources of information as part of potential partner research assists in determining the trustworthiness and reliability of collaborators. Once reliability is confirmed, contact can be initiated, and rapport building can begin. It is possible that an open dialogue with potential partners could result in iterations of the business idea based on new information, or its discontinuation. Negotiations should be centred around balancing the needs of the venture and unique goals of potential partners. For instance, in the current case, partners suggested the removal of non-essential and non-beneficial features which made the project more affordable. Flexibility is, therefore, a highly recommended leadership mechanism for making compromises, leveraging serendipity, reaching agreements and reliably accessing key partner capabilities and resources affordably. It is important to note that formed partnerships, especially with dynamic collectives, need to be nurtured and strengthened throughout the process.

**Final Evaluation:** Having found new partners and negotiated access to mission-critical capabilities and resources, a final evaluation is conducted which seeks to determine the overall levels of confidence in pursuing the vision. New and existing resources provide the potential for realising the vision and assessing the current levels of uncertainty. It is recommended that at this step, entrepreneurs begin to consider possible revenue streams which could ensure venture sustainability and profitable scalability. One
of the challenges in generating substantial revenue in the digital Pre-K-12 context has been identified as commoditisation. Given the range of free offerings that users can access across the web, many are less willing to pay for certain services. Thus, it is reasonable to expect that most traffic to a digital web page or product would not end in sales conversions. However, a large user base creates the potential for experimenting with multiple revenue models. At this point, the venture should determine the potential for multiple revenue streams. It is advisable to proceed when two or more potential revenue streams are foreseeable. Thus, research on how value is captured in the industry is essential.

For instance, if an industry has a large user base but customers who are unwilling to pay for offerings, an ad-supported or freemium model may be the most logical choice. However, generating substantial revenue from ads requires a large user base. Therefore, it is possible that the venture only starts to capture value after a tipping point of adoption is reached. To estimate revenues from advertising models, tools such as Google Ads (ads.google.com) can be used to research how much advertisers are willing to pay for certain keywords or phrases. If the Cost Per Click (CPC) is low, other revenue models should be factored in the final evaluation such as a subscription, affiliate or paid content access. At this juncture, it is worth remembering that pure digital new market offerings may be expensive to create but can be reproduced at nearly zero marginal cost (McAfee & Brynjolfsson, 2014). Thus, the key is to reduce financial overheads during product development in order to increase the odds of recovering expenses sooner and transitioning into profitability. Digital entrepreneurs also need to remember that business model innovation is itself a path to unlocking the real value of pure digital new ventures once a large user base has been grown (Chesbrough, 2007).
Additionally, a more detailed digital market research is essential for deepening knowledge of market segments, competitors, revenue streams and potential partners. It is recommended that a digital growth marketing plan is developed which includes measurable steps. The SOSTAC (Situational Analysis, Objectives, Strategy, Tactics, Actions & Control) and RACE (Reach, Act, Convert & Engage) frameworks offer useful planning and evaluation tools (Chaffey & Smith, 2017). Further, precise estimates of costings and affordability should be carried out as part of the final evaluation. While a traditional business plan has fallen into disrepute due to its reliance on educated guesses, pure digital business planning can be based on more accurate projections. The reason for the accuracy stems from the inexpensive and open access to data that assists in reducing demand uncertainties. Therefore, pure digital business planning is a distinct phenomenon that adopts different tools and mechanisms.

Based on this evaluation, digital entrepreneurs should determine if the level of confidence in pursuing the vision is high or low. High-level confidence implies that uncertainties are greatly reduced, and the vision is deemed realisable. High levels of confidence may be a consequence of newly acquired means and resources from collaborators that expand the range of possibilities. A low level of confidence is the opposite and may stem from the lack of available resources and poor market conditions revealed by detailed analysis. For instance, a more in-depth analysis of the market may have revealed that a key player in the market would require a disruptive innovation to challenge. As the digital environment promotes winner-take-all market dynamics, some market segments with dominant players may be hard to sustainably compete against using imitative or incremental innovation. Thus, it requires adjustments in the business idea, approach to innovation or its discontinuation. Depending on the outcome, three decisions can be arrived at. If the level of confidence is low, it may be advisable to discontinue or
postpone the pursuit of the vision until enabling conditions are right. A low level of confidence may also result in a decision to adjust and proceed or adjust by revisiting and revising key steps in Phase 1. With a high level of confidence, entrepreneurs should proceed to Phase 2.

8.2.2 Phase 2 - Enact & React

Phase 2 is action and reaction intensive. Enactment is initiated by the prioritisation and planning of activities under two main categories - digital growth marketing and agile digital product development. Figure 8.3 subsequently captures the steps in this phase.

Steps in Phase 2

Project Planning: Planning needs to be based on the understanding that concurrent enactment of multiple integrated processes informs agility and pure digital venture performance (von Briel et al., 2018). Two main events and their sub-events need to be planned for concurrent enactment – digital growth marketing and agile product development.

Digital growth marketing (Huffman, 2018) should start before or at the same time as agile product development. At the planning of enactment, tasks are prioritised, objectives and measurable milestones are clearly defined. Likewise, clarifying key roles and responsibilities is part of planning. Further, these responsibilities need to be communicated, understood and agreed on by all parties. Since value is ultimately created through strong network effects, it is important to realise that digital growth marketing is a more important activity than digital product development. Indeed, one must never lose sight of the fact that gaining online traction is central to creating value in pure digital new ventures. Further, it is not the highest quality pure digital products that succeed in the market but those that are good enough and findable (Chaffey & Smith, 2017, p. xxiii).
Figure 8.3: Phase 2 - Enact & React

Phase 2: Enact & React

- Adjust
- Measure
- Learn
- Agile Product Development
- Marketing Growth
- MPP / MVP
- Test, Optimize & Release

- Iterate
- Scale

Strategic web partnership formation
Content writing & positioning
Monitoring
Digital analytics integration
Qualitative product research
Digital content creation
Leadability research & design
SEO/SMO
Product branding & research
Digital market research

Definition of objectives & milestone definition
Define roles & responsibilities
Holding procedures and next steps
Concurrency & interweave
**Concurrent Enactment – Growth Marketing & Product Development:** Whether the value proposition rests on developing a mobile app, web platform or both, digital growth marketing should begin with creating a website, platform or blog. As I have learned as entrepreneur, app stores such as Google and Apple stores are crowded and controlled by these ecosystem leaders. Thus, it is ideal to grow a user base or traffic that one has control over. Apps-only and related digital ventures that heavily rely on dominant ecosystems are subject to the whims and caprices of the ecosystem leader. As an example, I learned that a required update on the Apple app stores, saw sales drop from $4500 at peak to $500 – evidence provided in Volume Two for examiners and supervisors only. Likewise, as entrepreneur, I have had to cope with my apps being removed from the Google Play app stores because I did not respond in time to a requested policy change (was on holiday). A user base controlled by an entrepreneur such as a mailing list, owned media such as blog or website traffic and social media pages is critical to mitigating these risks. If the venture is a web platform as in this case, then apps which are distributed through dominant app stores are simply complementary offerings.

Digital growth marketing should be started prior to or at the same time as agile product development. Agile development should inform the creation of a Minimum Perfect Product (MPP) to support digital growth marketing activities (further explained below). Since content that drives user base growth need not be the core product itself, digital growth marketing can begin with such activities like blogging and vlogging (video blogging), article writing and posting on social media networks to meet the needs of algorithms, as well generate conversation and interaction among human users. Following the development of a MPP, digital growth marketing can become more intensive and focused.
What does not appear to have changed over many years of search engine updates is the basic rule that search algorithms rank digital products such as websites based on longevity, the regularity of updates and relevant inbound links pointing to them. For instance, Domain Authority (DA) is a well-known search engine ranking criterion which combines the age of a website domain name, relevant inbound links and others, as signals to Google’s search engine algorithms of a site’s importance. A higher DA score increases the chance of the website becoming more findable through search engines results pages (SERPs). Thus, DA is a long-term process which needs to begin concurrently or even prior to core product development. It is useful to remember that digital growth marketers, unlike their counterparts in the traditional spheres are meeting the needs of both algorithms and human end users. Hence, a traditional approach to product innovation and commercialisation that is based on a linear model is ill-advised (Porter, 1985).

Development of the MPP greatly assists digital growth marketing efforts. Perfect in MPP is a mindset which focuses on sustainably creating a perfect product with little need for iterations post-launch. Such a product comprehensively addresses the envisioned needs of users. MPPs could also be full-featured products which aim to satisfy the needs of a small but core segment of a bigger market comprehensively – also known as a ‘beachhead’ market (Aulet, 2013). The beachhead market should be selected based on the degree to which it maximises the chances of drawing lessons which could be used for subsequent expansion. It could also maximise the chances of creating a product which is reusable in other areas for incremental or rapid scaling. Thus, the beachhead could be a market with the potential for acquiring lead influencers. The MPP should be developed on the assumption that if the venture were to lose or run out of critical capabilities and resources (such as key partner exit), it could carry on as a scaled down version that serves a niche for the time being. In the current case, the Pre-K-12 market was the wider market,
but as entrepreneur, I incrementally developed games for the low levels of K-3 education before including more levels. Furthermore, the same game templates were used to create more learning activities for other levels and subjects. This approach ensured that if the process ended abruptly, the web platform could simply continue as a low-level children’s education web platform or scaled using existing game templates over time.

However, if an MPP cannot be achieved, then digital entrepreneurs should settle for a Minimum Viable Product (MVP). MVPs, as this research understands it, is a workable product which is meant to elicit user or customer feedback. This study raises four potential issues with adopting a MVP mindset from the outset in a resource-constrained PDE context. First, aiming for a MVP aims low, which could result in an inferior outcome. A MPP may not always be attainable, but the aspiration psychologically focuses entrepreneurs on a higher achievement in a first attempt, with the possibility of better outcomes even if they fall short. Secondly, MVPs have attracted criticisms for their potential to increase overheads (Ladd, 2016). Under conditions of resource constraints, this study recommends that entrepreneurs should aim to get it right in the first attempt. Thirdly, a MVP could result in misleading feedback which informs ineffective decision making and subsequent action. Thus, a pivot or change, of course, could be ill-informed, when persistence may have delivered better results in the long run. Fourth, a MPP as opposed to MVP, delivers confidence in digital growth marketing efforts, as opposed to marketing that is built on the lack of confidence in a product’s ‘completeness’. Fifth, a MVP assumes that key participants are stable, and will, therefore, be available for the next iteration of product co-creation. However, as this research highlights, dynamic collectives represent a major source of uncertainty due to the independent and democratic nature of collaboration in a PDE context. Once a reliable partnership or team has been formed, digital entrepreneurs should focus on maximising their potential while it lasts.
The narrative of this study has shown that when mission-critical actors exit, projects get thrown in limbo.

**Test, Optimise & Release:** Following the concurrent enactment of digital growth marketing and agile product development, the next step is to test, optimise and release the MPP or MVP based on a small-scale pilot digital promotional campaign. What this study has shown is that digital product development is only completed when the user is engaged in feedback gathering. Technical problems such as bugs in codes, poorly optimised web pages and usability issues are often detected when multiple users engage with pure digital products. Thus, a limited test with a larger audience of end users will help optimise web offerings prior to a full release. Tools such as Facebook and Google Ad systems enable flexibility in terms of how digital ad campaigns are run. Tests may be conducted by running limited but targeted ad campaigns for optimisation purposes. Techniques such as A/B testing allow limited experiments to be run on landing pages to decide on the best course of action.

In fact, this step is most important as a buggy product or slow web page may create a bad first impression, as well as end in a waste of scarce financial resources from running digital ad campaigns. It might also mislead decision-making. Furthermore, the test itself is meant to reveal how online campaigns are best optimised for maximum impact. For instance, tests may reveal that a targeted keyword in an ad campaign is leading to poor conversions. Thus, it might be advisable to disable targeting based on the identified keywords or select those with high conversions. For testing and optimisation to be effective, data analytics tools must be properly integrated and regularly monitored.

For instance, an initial poor response from a digital ad campaign may not have to do with the quality of the core product itself. In a PDE context, multiple issues beyond the MPP can generate a poor response. For instance, data analytics may reveal that users
are not interacting with a product due to a slow web page or bug in the code. Thus, it is important to engage the end user in the product testing process before release.

**Measure, Learn & React**: Following release to a larger audience, the next step involves the continuous collection of quantitative and qualitative data to inform learning and reactions. Learning results in three possible reactions. First, an ideal scenario involves a positive response from end users and a decision to proceed with another iteration of enactment. A positive initial response may need to be scaled without iterations to enactment or adjustments to the vision. Data may also reveal that major or minor adjustments need to be made. It may also reveal that the venture is not worth progressing with and discontinuation is the best option. Postponement may also be an outcome for reasons such as resource inadequacies or the exit of key partners. Likewise, enactment may reveal that the market is not yet ready for the new venture idea.

The steps in both phases of the model potentially increase the odds of creating a scalable pure digital new venture if followed. Thus, it is a useful tool for novice digital entrepreneurs, business incubation centres and policymakers invested in nurturing the growth of young digital ventures. However, as with every model or guidelines aimed at an unpredictable phenomenon such as entrepreneurship, adopters of this model are advised to adapt it in context. Its modularity is its ultimate strength. Thus, it is important that the model does not become an artifact whose material agency constrains rather than enables the fluidity of thought and action based on unique and ever-changing circumstances and learning.

### 8.3 Digital Entrepreneurial Ecosystems & Policy Implications

Based on the findings of the primary and secondary research, this section identifies enterprise policy and legislative implications which are relevant to digital entrepreneurial ecosystems. Hence, it suggests guidelines for enabling digital value
creation for society. Indeed, Storey and Greene (2010) note that nurturing the growth of gazelles (young fast-growth firms) should be an essential element in enterprise policy development. With cross-border data flows now generating more economic value than traditional flows of goods (McKinsey, 2016), it is no surprise that the digital economy is now a top policy agenda in OECD countries (OECD, 2017). Given the differences between traditional and pure digital forms of value creation, enterprise and regulatory policies towards digital entrepreneurial ecosystems need to be formulated with due consideration for how they impact pure digital value creation.

8.3.1 Digital Entrepreneurial Training & Education

Among the most crucial implications for pure digital entrepreneurship (PDE) that this study raises, is the need for training and education which nurtures the growth of such ventures. Given that significant differences exist between pure digital versus traditional value creation, education and training aimed at aspiring digital entrepreneurs, need to be tailored differently. Indeed, planning and managing a concurrent, piecemeal and data-driven process of value co-creation among dynamic collectives, requires different mindsets, skillsets and toolsets as discussed over. Accordingly, this study recommends the use of the above model as a tool for guiding the process of digital new venture creation and training. The model has the benefit of showing how entrepreneurs can progressively limit risks and manage uncertainty to drive new venture performance.

Since pure digital entrepreneurs may likely come from a technical background (but not always), there is a danger that they become obsessed with digital product innovation while ignoring the significance of digital growth marketing. As previously indicated, it is not the best designed digital products that succeed in the market but those that are good enough and can be found. Thus, training should emphasise skills in digital growth marketing, which need to be leveraged in the prior or concurrent development of
both the new product and the growth of a user base. Further, given the open source and often non-proprietary nature of digital technologies, an emphasis on patent protection at early phases may be ill-advised for most but not all PDE ventures. In fact, PDE market offerings can be imitated rapidly. What remains hard to copy is network effects.

For agencies which support PDE ventures, training should emphasise the fact that they are more likely to adopt a growth to profit, rather than profitable growth model. As Davidsson et al. (2009) point out, growing profitably following a Resource-Based View of the firm, is generally considered ideal. Under such circumstances, firms grow profitably within their resources and capabilities, though the growth process may be slow. However, a growth to profit model involves a venture coping with losses or low profitability while growing rapidly. A growth to profit model is more feasible with pure digital new ventures because ideas based on intangibles and non-rival products (can be consumed by many without being depleted), may be expensive to create but can be reproduced at nearly zero marginal cost (Shapiro & Varian, 1999; McAfee & Brynjolfsson, 2014). Given that digital infrastructures allow ventures to scale without mass (Brynjolfsson et al., 2008), hosting additional users after an inflexion point is reached does not incur much extra cost. Accordingly, once a user base has been grown, PDE ventures will transition into a phase of high profitability and disproportionately reduced transaction costs (Amit & Zott, 2001).

Thus, at early phases, it is necessary to focus on how fast and deep a pure digital new venture is gaining traction among targeted users. Traction provides the departure point for capturing value that enables the venture to break even and transition into profitable growth.
8.3.2 Digital Entrepreneurial Finance

Similarly, the contextual chapter has identified access to finance as a potential barrier to digital entrepreneurship. Debt and equity finances are two well-known sources of venture funding besides bootstrapping and others. When obtaining finance for a new venture risk is a major concern for lenders and venture capitalists.

**Debt Finance:** Access to debt finance is notoriously harder for PDE ventures because they do not fit traditional evaluation criteria based on collateral (Storey & Greene, 2010; van Welsum, 2016). This situation is explained by the fact that PDE ventures are often knowledge and talent based. Thus, an information opacity exists whereby talent and knowledge are hard to demonstrate to potential lenders. As the literature suggests (Storey & Greene, 2010, pp. 332-333), entrepreneurs often prefer debt finance when they are confident of growth because it allows them to acquire funding without diluting their shareholding. Retaining much of the business equity at pre-scaling phases ensures that their financial harvest is larger when the venture becomes open to other shareholders for investment (Mason & Harrison, 2006).

This study recommends that a pure digital new venture’s intangible characteristic should not put off lenders. As the research suggests, fast growth new ventures often come from technology industries, and a good line of credit is required to nurture their emergence. However, that does not imply a lack of prudence in funding PDE initiatives. Since digital entrepreneurs can often experiment with new venture ideas at low cost, perhaps a preferable approach to convincing lenders is to begin by bootstrapping. Financial bootstrapping (Winborg & Landstrom, 2001) signals a commitment by entrepreneurs to their new venture ideas. Likewise, bootstrapping has been associated with innovativeness and resilience in start-ups. Commitment is essential because this study identifies persistence as a key actor mechanism driving performance. For digital
entrepreneurs, therefore, it is advisable to approach creditors when early steps have been taken to obtain actionable metrics and key business hypotheses have been validated. That way, actual metrics can help reduce information asymmetries which concern lenders.

**Debt Finance, Traction & Risk Mitigation:** This study recommends that traction be used as a mechanism for assessing a new venture’s potential since pure digital value creation often hinges on achieving strong network effects (Amit & Zott, 2001). For instance, questions must be asked regarding how much traction a PDE venture has already achieved online or has the potential of achieving. If there is potential for traction, the first round of limited funding might be issued based on an ‘affordable loss’ mindset (Sarasvathy, 2001) – whereby entrepreneurs are asked to return for more funding only when concepts are data-proven in continuous active user base growth. Based on the insights, data-driven decision making can help lenders and investors mitigate risks of providing credit.

To further mitigate risks, the digital new venture idea should be examined by the degree to which it is dependent or independent from dominant platforms. For instance, an app-only digital new venture idea which is heavily dependent on Google or Apple app stores is vulnerable to policy changes and actions taken by these platform leaders. Likewise, a new venture idea which is heavily dependent on its relationship with a dominant platform such as Facebook presents a high-risk proposition. This study hypothesises that platform-based digital new venture ideas which are less dependent on the strategic decisions of dominant platform leaders are less risky for creditors. That is not to suggest that high-risk propositions should not get access to credit. The key is to be aware of the risks and mitigate accordingly. One way of mitigating the risks could be by providing credit incrementally as the venture develops through the phases identified in
the above model. When data reveals promise through traction, access to credit can be scaled to allow the venture to ‘milk’ the opportunity while it lasts.

**Equity Finance:** In instances where entrepreneurs are willing to share equity, this study recommends a few guidelines. First, equity finance providers should avoid short-termism. A short timeline for expected returns may not be realistic in a PDE context. However, given the heterogeneous nature of various PDE ventures, an exact time frame may be difficult to define for investors. As the literature suggests, profitability could come at any point between three years to twelve years of founding (Kazanjian & Drazin, 1990). This study demonstrates that growing and deepening the network of PDE ventures can take time and resources at early phases. Thus, value capture in the form of profitability may only occur when a critical mass of users has been achieved and a market segment has been fully dominated. When that occurs, investors can expect the venture’s cost of operation to steadily decrease, thereby delivering profitability (i.e., the Zero Marginal Cost concept). Investors should expect digital growth marketing to represent a significant cost driver in the first few years. Access to substantial amounts of venture finance has the potential to enable rapid penetration in digital markets through sustained ad campaigns that reach a critical mass faster. Short to medium term growth concerns should be focused on whether the venture is gaining traction and at what pace. Hence, as in debt financing, digital entrepreneurs must be asked to incrementally provide actionable metrics based on specified Key Performance Indicators or KPIs (Ries, 2011). In addition, if metrics indicate that KPIs hold promise, subsequent rounds of funding could be incrementally offered with the purpose of accelerating scaling.

Investors and support agencies can expect that value will primarily be created through digital growth marketing as opposed to digital product creation. The reason being, pure digital products can be rapidly coded – meaning they can also be rapidly
copied given the low barriers to entry. To reiterate, what remains hard to copy is strong network effects in the form of control over a large and active user base.

**Digital Business Plans:** Finally, whether funding comes by equity or debt finance, the concept of the *business plan* as a tool for communication with external stakeholders needs to be revisited. This study takes the view that a business plan is still a vital tool. However, digital business plans need to be understood differently. Such plans should be based on justifiable and verifiable data on markets since this information is often easy to obtain through digital tools and systems, or by running small and inexpensive experiments. Furthermore, they can be expected to undergo several iterations along the way. A key insight from this research is the capacity for digital technologies to reduce market, task-specific and outcome uncertainty based on data crunching. Thus, projected figures included in digital business plans need to be interrogated and double-checked against openly available data sources. Whereas, this may not always be feasible in a traditional entrepreneurial context.

### 8.3.3 Skills Divide & Education Systems

An equally significant barrier to digital entrepreneurship has been identified as a skills deficit. For societies to take advantage of opportunities in the digital economy, digital skills which go beyond everyday computing need to be woven early into education systems. Societies which develop digital capabilities early appear well-positioned to capture value from the digital economy in an age of blockchain, artificial intelligence (AI) and more. As noted in Chapter Four, vacancies in computer science and ICT positions remain among the hardest to fill globally. Likewise, this study finds that programmers and visual designers are indispensable to venture success. Accordingly, this study recommends the introduction of basic coding, digital analytics and visual design as being among critical skills to be introduced early in primary and secondary level public
education curricula. As this research finds, coders and graphic designers are mission-critical actors who are hard to recruit and retain.

However, one must not lose sight of the fact that value is ultimately unlocked by the creative application of new technologies by individuals who may not necessarily know how to code. Thus, digital business and managerial skills that emphasise creative, strategic and critical thinking that drive growth cannot be ignored solely in favour of STEM (Science, Technology, Engineering & Math) skills. Society needs a combination of varied skills and talents, working together to drive value creation. It is worth remembering that in my capacity as entrepreneur, I have developed pure digital new ventures from zero coding skills that attracted over 45 million global visits over time (see Appendix 1). What this suggests is that strategic and creative integration of multiple talents, coupled with knowledge of digital growth marketing are perhaps more prominent sources of value creation.

Furthermore, it may be important to caution that while STEM degrees are essential in short to medium term, a future of very smart AI (Artificial Intelligence) could see individuals with these skills being made redundant. For instance, what happens to STEM graduates in a long-term future in which powerful algorithms write better codes and produce better designs than human actors? Perhaps, the focus of education systems should be on the production of well-rounded and adaptable individuals who combine a plurality of skills as captured in the World Economic Forum’s (2016, p. 3) ‘21st Century Skills’ framework. The plurality of skills will allow for versatility and adaptability in an increasingly VUCAH (Volatile, Uncertain, Complex, Ambiguous & Hyperconnected) world.

In the specific context of business education in universities and colleges, the management and integration of multiple digital talents and technologies suggest a
different type of managerial skill based on leaderful practices (Raelin, 2009), data-driven decision-making, strategic flexibility and agility. Currently, it appears business degree programmes and the literature they are based on, are heavily skewed towards leadership in a stable and traditional business context. However, with the global digital economy surging to nearly 25 per cent of global GDP by 2021 (see Chapter 4), there is a need for balance in business education. Additionally, pure digital new ventures are ultimately geared towards transforming or disrupting traditional processes. Thus, digitisation and digitalisation have combined to have a significant impact on current and future value creation. It is therefore difficult to envisage a future where any business venture can survive without critical digital managerial skills. Thus, entrepreneurship and business master’s and undergraduate degree programmes will become more current and future-proofed by a significant integration of a digital technology perspective (Nambisan, 2016). Furthermore, these programmes should be as open and dynamic as possible, allowing individuals from different backgrounds to engage. The evidence suggests that disciplinary silos are a thing of the past as disciplines increasingly overlap.

8.3.4 Unemployment & Self-employment through PDE

In a similar vein, developing digital skills which mirror the future of work is essential. While enterprise policies often have the end goal of creating jobs to solve the ills of unemployment in society, pure digital new ventures do not appear to create significant employment as their traditional counterparts currently. However, their benefits to society cannot be viewed solely through the prisms of immediate and measurable employment. For instance, today’s digital technology giants are among the most valuable companies globally, yet they seem to hire fewer workers than car manufacturers or traditional business giants with less revenue. However, their role in value redistribution
may become crucial to societal value creation, though it can be less tractable and measurable than traditional employment figures.

For instance, the success of Google’s Adsense programme is arguably a consequence of a generous 68 per cent revenue share it offers the millions of bloggers and web owners who host its display ads (google.com/adsense). In my experience as entrepreneur, I have benefited tremendously from the Google Adsense programme since it enables small digital ventures like mine to focus on content creation while Google takes care of monetisation. In my case, revenues from Adsense went on to fund the bootstrapping of other ventures which are not Adsense-dependent (kizphonics.com). The other side of the Adsense programme is Google Ads (ads.google.com) a platform which enables businesses of all sizes to instantly research and target consumers accurately. Policies need to comprehensively consider how the digital platforms of technology giants like Google create value networks that enable solo entrepreneurship, freelancing and self-employment (Burke, 2015). Thus, policymakers are called upon to develop a more comprehensive framework for evaluating societal value creation that goes beyond traditional job creation metrics that are often favoured.

Accordingly, PDE needs to be examined in terms of its potential for self-employment and solo entrepreneurship. As Burke (2015, p. vii) observes, the phenomenon of freelancing and solo entrepreneurship is transitioning from precariat workers to highly skilled and high earners performing several roles for businesses. Some PDE ventures, as my experience suggests, can generate high levels of profitability while staying lean and achieving network effects. They may also leverage digital platforms and collaborate on an on-demand basis - in the so-called gig economy. Lessons may be drawn from such experiences to recognise and formalise such forms of self-employment as a
career path or dual career path where individuals both hold a full or part-time job while freelancing in the digital economy as a side ‘gig’.

### 8.3.5 Broadband Infrastructure

Ultimately, freelancing and self-employment can only be effective where investment in high-speed broadband infrastructure is made. Yet, even in a developed country like Ireland, a large chunk of its relatively small population is still not served by high-speed broadband. High-speed broadband offers flexibilities in terms of places where digital value creation can take place. Since pure digital entrepreneurs and their customers are often not spatially bound, new ventures can be created from any location on the globe with high-speed internet access. However, in the context of Ireland, entrepreneurs are limited to areas around big cities like Dublin, which reduces flexibilities and potentially increases overheads in new venture creation. For instance, it is reasonable to expect that since pure digital new venture creation might be costly at early phases, operating in locations with lower living costs but which have rapid internet access can enable successful bootstrapping. Thus, investing in critical broadband infrastructure and making it affordable has been identified as a critical factor in the World Economic Forum’s Networked Readiness Index (NRI) – see Chapter Four.

### 8.3.6 Regulatory Considerations

As noted in Chapter Four, regulation represents a major source of uncertainty and a potential barrier to digital new venture creation. Recent changes in General Data Protection Regulations (GDPR) in the European Union (EU) and Article 13 signal a trend towards increased regulation of the digital economy in the western world. While regulation is essential for maintaining a healthy digital ecosystem, it must be done with deep and thoughtful consideration of its effects across value networks in the digital economy. Likewise, it is necessary to include multiple stakeholders in legislative debates
to arrive at a more comprehensive understanding of issues involved, given that much is at stake. It is not clear what level of public consultation went into passing new regulations, and what long term impact it might have for pure digital businesses. For instance, data localisation, which is a clause in GDPR, curtails the ability of certain PDE ventures to benefit from enabling cloud services beyond geographical borders. While security and accountability are often cited as a rationale for the clause, critics argue that localised data is no guarantee for security. They argue that the law exhibits a fundamental misunderstanding of the digital technology ecosystem and mimics actions taken in autocratic regimes.

8.3.7 Digital Taxation

Similarly, OECD countries are currently grappling with sound measures for taxing digital business ventures (OECD, 2018). Existing tax regimes appear obsolete when juxtaposed with PDE ventures. Since digital entrepreneurship is often based on multisided business models and the sale of intangibles, new ventures can ‘scale without mass’ across geographical boundaries (Brynjolfsson et al., 2008). As such, where value is created and appropriated can become difficult to calculate from a taxation perspective. Furthermore, the growth of the on-demand economy has led to the rise of non-standard work, which often does not fit nicely into existing taxation frameworks. In sum, pure digital forms of entrepreneurship appear to be moving faster than tax legislation can keep up. Technologies such as blockchain, which offer new and secure systems for record keeping and the processing of financial transactions through cryptocurrencies have not made these challenges any more straightforward to resolve. Not surprisingly, therefore, two broad proposals on digital business taxation have proven contentious in the EU. One suggestion is for pure digital businesses to be taxed by the location of their user base, while another suggests imposing taxes in the country of business registration. As
countries are at different levels regarding the digital divide, those that have made previous investments in bridging the gap through positioning themselves favourably along the Networked Readiness Index (World Economic Forum, 2016), may find that ill-conceived tax policies simply rob them of the gains of these investments. With the lack of consensus, some EU countries are moving ahead with unilateral digital tax legislation. There are concerns that such a move would result in double taxation of some pure digital business ventures across national borders. The consequence may be a digital taxation landscape which proves complicated to navigate and imposes compliance costs that stifle the growth of pure digital entrepreneurial ventures. Furthermore, lack of compliance may see some ventures denied access to certain national markets. If this occurs, the digital economy in the EU risks becoming indistinguishable from those in centrally controlled regimes like China, which block access to multiple sites.

Granted, the focus of these tax proposals appears to be on big digital technology companies. These companies have recently come under public scrutiny due to certain practices that were allowed to go unchecked. It has resulted in what some have described as a techlash. Hence, media coverage lately appears to focus on the negative issues, with the potential for obscuring the enormous benefits big digital technology companies offer as external enablers of all forms entrepreneurship. There is a very real danger that tax and regulatory policies may be swayed by the negative press with the consequence being the enactment of regulation that torpedoes these digital value networks.

Accordingly, the OECD (2018) identifies negative impacts on investment, innovation and growth, as well as over-taxation as being among the more potent dangers of ill-conceived digital tax regulations. This research argues that developing productive taxation policies is incumbent on a profound understanding of the distinctiveness of pure digital entrepreneurial forms of value creation. Adopting a one-size-fits-all approach to
digital taxation, which may prove disastrous for digital value creation. Tax initiatives will deliver better results if a comprehensive understanding regarding the differences between digital and traditional forms of entrepreneurship are carefully considered. Without this understanding, there is growing concern that legislation may prove to be the nemesis of the digital economy as a level playing field for actors of all sizes (Downes, 2018).

8.4 CONCLUSION

To conclude, this chapter has met the fourth objective of this study, which is geared towards developing next practices and offering guidelines which assist in nurturing the development of pure digital new ventures. Consistent with the study’s action design research and pragmatist epistemology, the chapter offers knowledge which is relevant to the practice of pure digital new venture creation. Therefore, it ensures that this study balances rigour and relevance, as espoused by its combined philosophical positions of critical realism and pragmatism – see Chapter Five. For me as the researcher, the writing experience has enabled me to articulate tacit experiential knowledge and built much-needed confidence in my ability to apply them in multiple contexts. In sum, teachers and students of entrepreneurship, as well as novice entrepreneurs and policymakers will be greatly assisted by the evidence-based pragmatic model of pure digital new venture creation developed in this chapter. With the research question answered, the next chapter will seek to bring this study to a close.
9 CHAPTER NINE. CONCLUSION, CONTRIBUTIONS, LIMITATIONS & RECOMMENDATIONS
9.1 **INTRODUCTION**

With soaring cross border data flows generating more economic value than traditional flows of goods (McKinsey, 2016), digitisation has ushered a ‘shift in the locus of innovation’, calling for a re-examination of widely held assumptions in organisational scholarship (Benner & Tushman, 2015, p.2). Indeed, thought leaders have described the shift as a 4th Industrial Revolution’ (Schwab, 2017) or ‘Second Machine Age’, marked by the ‘digitisation of just about everything’ (McAfee & Brynjolfsson, 2014, pp. 57-70). In Chapter One, this study notes that ubiquitous digitisation is leading to the transformation of entire industries, with a ‘tech’ suffix in new industry nomenclatures indicating this transformation. Hence, FinTech, MarTech, MedTech and EdTech have emerged as some of the more prominent examples of where digital transformation is evident. The EdTech sector, against which this study is contextualised is seeing double-digit growth to a projected $240 billion by 2021 (Docebo, 2017).

Given the changes, *digital entrepreneurship* has recently attracted significant scholarly interest in the entrepreneurship and Management Information Systems (MIS) disciplines. In his agenda-setting article, Nambisan (2016) points out that digitisation calls to question the degree to which trusted theories of entrepreneurship can provide ‘fine-grained’ insights on varied issues relating to the digital entrepreneurial process. This challenge is especially pronounced in a Pure Digital Entrepreneurship (PDE) context (Nzembayie et al., 2019) governed by the rules of ‘economic of bits’ – whereby, intangible digital artifacts and platforms which are new market offerings can be reproduced at ‘close to zero marginal cost’ (Faulkner & Runde, 2009; McAfee & Brynjolfsson, 2014, p. 62).
Accordingly, two main hypotheses have been advanced in the emerging literature. Firstly, Nambisan (2016) contends that digitisation renders entrepreneurial processes less-bounded in terms of their temporal and spatial structures; and its democratic nature results in a ‘diffused locus of entrepreneurial agency’, marked by the entry and exit of dynamic collectives as independent value co-creators. Secondly, von Briel et al. (2018) hypothesise that pure digital new venture ideas which are based on loosely coupled digital artifacts (Ekbia, 2009) potentially result in shorter new venture creation processes.

Given the context, the overarching question guiding this research rested on exploring, describing and explaining how a pure digital entrepreneurial process develops over time, as the basis for identifying and explaining the consequential mechanisms and generative structures which drive new venture emergence and performance. The aim of the research is rooted in the argument that PDE is significantly different from traditional assumptions of entrepreneurship. Accordingly, secondary research in Chapter Two began by examining extant theories of the entrepreneurial process, as a precursor to identifying key differences between digital entrepreneurship in Chapters Three and Four.

To gain those ‘fine-grained’ insights which Nambisan (2016) called for, this study adopted an Insider Action Research approach to inquiry that combined reflective practice with collaborative inquiry and design research for multi-stakeholder knowledge production (Coghlan, 2019; Nzembayie et al., 2019). Among the key justifications of this approach discussed in Chapter Five is the need to study the entrepreneurial process in real-time with sensitivity to temporality (Davidsson et al., 2011; McMullen & Dimov, 2013). Moreover, it answers calls for an enactive approach using action design research in the messy world of entrepreneurial practice (Dimov, 2016). Only through such a challenging mode of inquiry can fine-grained insights be unearthed that guard against problems of hindsight bias, survivor bias and the dearth of temporality in
entrepreneurship process theories (Moroz & Hindle, 2012). As a reminder, therefore, this research set out to answer the following question:

*How can my self-aware actions in leading digital new venture creation, contribute towards knowledge of the digital entrepreneurial process and the consequential mechanisms driving emergence and performance?*

The question embeds within it, two interrelated aims. The first is to describe a pure digital entrepreneurship (PDE) process from empirical evidence and the second is to offer mechanism-based explanations for the consequential drivers of new venture emergence and performance. These aims were further deconstructed into four main objectives.

The first objective is to enact and gain insights on a pure digital entrepreneurial process in an EdTech (Education Technology) context. Based on meeting the first objective, the second objective is to identify and critically evaluate the consequential mechanisms and their generative structures that causally interrelate to trigger and drive digital new venture emergence, as well as enhance new venture outcomes. A third related objective is to extrapolate and infer from the current case, key insights which are potentially generalisable to other contexts. Finally, a fourth objective focuses the research on developing next practices and guidelines which may assist in nurturing the development of digital new ventures for entrepreneurs and policymakers.

### 9.2 Contributions to Knowledge

This section summarises the key contributions to knowledge originating from the primary research. As a brief overview, the contributions are listed as follows:

- **Contribution 1** offers ‘fine-grained’ insights on how a pure digital entrepreneurial process develops over time and the key events that define the pre-scaling phases, as distinct from traditional assumptions of entrepreneurship.

- **Contribution 2** focuses on the mechanisms identified as consequential in driving new venture emergence and performance at various temporal phases of the journey.
• **Contribution 3** offers an evidence-based pragmatic model of pure digital new venture creation, of practical value to the community of digital entrepreneurial practice.

• **Contribution 4** is based on the knowledge that Insider Action Research, with its multimethod approach is an entrepreneurial methodology, and this study represents its pioneering application in a PDE context.

In sum, enacting an entrepreneurial process and acquiring fine-grained descriptions of events captured in real-time has been called for in the entrepreneurship discipline but remains largely unanswered due to known challenges of feasibility and risk (Davidsson et al., 2011; Johannisson, 2011; McMullen & Dimov, 2013). In the digital entrepreneurial context, Nambisan (2016) renews this call and suggests the use of an action design research approach to arrive at those fine-grained insights which differentiate PDE from traditional assumptions of entrepreneurship. Arriving at fine-grained insights implies the search for mechanisms and related deep structures that underlie a PDE process narrative. Accordingly, this study contributes by answering these calls while acquiring a detailed but distilled record of events which show and tell how a pure digital entrepreneurial process develops at pre-scaling phases. It identifies the mechanisms that underlie the process by using the recommended action design research approach by Nambisan, thereby pioneering this mode of inquiry in entrepreneurship – expatiated as Contribution 4.

### 9.2.1 Contribution 1 – Distinctiveness of Pure Digital Entrepreneurship

In Chapter Six, this study reveals that the pure digital entrepreneurial process would not be entrepreneurship if it did not share a similar underlying storyline with established constructs of entrepreneurship. Thus, it is still new venture creation, based on the envisioning, initiation, evaluation and enactment of new venture ideas leading to
innovative or imitative new market offers and organisations (Davidsson, 2012; Davidsson, 2015). These ideas are externally enabled by factors which may or may not be immediately perceived by actors driving the process (McMullen & Shepherd, 2006). However, the study shows that these similarities belie consequential differences relating to how PDE process events develop. These differences are in turn the result of the surface and deep structures that underlie the process.

**Digital Product Development & Temporal Efficiencies:** Generally, the findings confirm that ideas based on loosely coupled digital artifacts result in shorter venture creation processes compared to ideas based on tightly coupled, physical or tactile artifacts (von Briel et al., 2018). Accordingly, this research identifies two deeply interrelated and symbiotic events that drive temporal efficiencies and reduce uncertainty. They are digital product development and digital growth marketing. The shorter venture duration processes are mainly observed during digital product development – i.e., digital artifact and digital platform creation. Given that pure digital new market offerings are knowledge-based intangibles, they exist as coded ‘quasi objects’ (Ekbia, 2009). The affordances of digital artifacts and related technologies eliminate spatial and temporal boundaries, thereby affording agility in product development. Underpinned by the granularity and extreme modularity of digital artifacts, as well as their standardised protocols, this study finds that ideas based on the creation of purely digital market offerings may be split into multiple bits and concurrently co-created by multiple participating actors (Kallinikos et al., 2013) – hence, the temporal efficiencies. It confirms Nambisan’s (2016) assertion that action in the digital entrepreneurial process is marked by the constant and dynamic forking, merging and termination of diverse activities involving multiple participating actors. These actors and their democratically controlled knowledge resources are rapidly integrated through digital talent platforms and marketplaces and assigned specific tasks.
on an on-demand basis. Thus, such digital platforms, in turn, contribute towards expanding the range of resources available for new value creation. Likewise, digital tools and systems eliminate spatial inefficiencies by the seamless integration of knowledge resources in new venture co-creation.

**Digital Growth Marketing & the Role of Algorithmic Agencies:** Meanwhile, this study finds that digital growth marketing constitutes algorithm-imposed activities which are critical to the reduction of uncertainty and driving venture performance. However, compared to digital product development, its outcomes take longer to realise. The longer duration is a consequence of the role algorithmic agencies play as gatekeepers with unique needs. Following a technology affordances and constraints theoretical lens (Leonardi, 2011; Autio et al., 2018), algorithmic gatekeepers offer the potential for bootstrapping a venture to growth through network effects but impose constraints on the process and duration by which such growth can be achieved. Given the finding, this study concludes that digital growth marketing is a concurrent and interrelated process of meeting the needs of both algorithmic and human stakeholders. Thus, it is unlike traditional marketing, which greatly emphasises customer sovereignty. Since digital new ventures ultimately create value through strong digital network effects (Amit & Zott, 2001), digital growth marketing is comparatively more value-adding than digital product development. Without meeting the needs of algorithmic agencies such as search engines, well-crafted digital products will remain *lost in cyberspace*, unreachable to the human customers or consumers whose needs the new venture sets out to satisfy. However, this is not to suggest that digital product development is unimportant. The study finds that the departure point for successful digital growth marketing is a well-crafted digital product offering. Thus, a symbiotic and concurrent relationship exists between digital growth marketing and digital product development.
Ultimately, digital growth marketing is based on continuous data-driven experimentation, which contributes towards uncertainty reduction in product development and outcomes. Accordingly, actors make ‘continual adjustments’ (Garud & Giuliani, 2013) to process and venture idea as they reduce uncertainty in search of a scalable digital business model. Validation of the business model and venture scalability is determined by the degree to which the venture grows its user base. Since established entrepreneurship theories such as effectuation and bricolage tend to be actor-centric (Garud et al., 2014), they do not account for the digital material counterpart whose agency is critical to driving process and performance. Hence, they stop short of theorising the sociomaterial entanglements between human and digital material agencies that shape new venture outcomes (Orlikowski & Scott, 2008, 2015). Therefore, this study’s theorising of the role of algorithmic agencies contributes towards addressing this gap.

**Diffused Locus of Agency & Key Actor Uncertainty:** Additionally, uncertainty remains a cornerstone of all entrepreneurship process theories (McMullen & Shepherd, 2006). This study finds that while multiple participating actors expand venture creation resources, they help reduce uncertainty but at the same time, introduce key participant and task-specific uncertainties. The democratisation of entrepreneurship (Aldrich, 2014), which is a defining characteristic of PDE, appears to be a double-edged sword. When mission-critical actors such as programmers and designers are dynamic collectives, they opt in and out of the process on their terms. Loosely connected collectives are not necessarily committed to realising the new venture idea. They temporally perform specific roles that align with their own goals. The result is key participant uncertainty from potential exit - whereby, such participants may exit the process leaving mission-critical projects in limbo.
9.2.2 Contribution 2 – The Mechanisms Driving Emergence & Performance

As a second contribution, this study identifies and theorises the consequential causal mechanisms which interact to drive pure digital new venture emergence and performance. The findings upon which Contribution 2 is based, are detailed in Chapter Seven. Three types of mechanisms are first differentiated. Actor mechanisms, which are cognitive mechanisms, and actionable mechanisms which reside in human action, jointly interrelate as actor-dependent or actor enabled mechanisms. Meanwhile, actor-independent mechanisms are externally enabled mechanisms. This study contributes by identifying and theorising how the three categories of mechanisms interrelate to drive the PDE journey at various temporal phases of new venture emergence.

Mechanisms Driving Idea Conceptualisation: At the very early temporal phases of idea conceptualisation (ideation), perceptual processes are identified as consequential actor mechanisms (Baron, 2006), while combination and generativity are actor-independent mechanisms of digital artifacts (Davidsson et al., 2017) that contribute towards generating the new venture idea. Perceptual processes are the result of the generativity of prior sectorial knowledge of the entrepreneur, which facilitates the construction of mental prototypes. These mental prototypes represent identified problems and imagined solutions for users. When mental prototypes are aligned with a technology-market combination, the new venture idea is born. Hence, this study confirms Gregoire and Shepherd’s (2012) argument that the process by which new venture ideas are born in technology markets is a product of the complex process of cognitive alignment between mental prototypes and technology-market combinations.

Mechanisms Driving Idea Evaluation: Following the birth of the new venture idea in the form of a business model or vision, idea evaluation enables the building of opportunity confidence (Davidsson, 2015). Evaluation, as this study finds, is defined by
tangible and intangible resource mobilisation and acquisition – whereby, knowledge remains the most valuable but democratically controlled resource. Hence, strong metacognition emerged as a key actor mechanism that shapes idea evaluation. Indeed, digital technologies foster the democratisation of entrepreneurship as this study affirms (Aldrich, 2014). Hence, metacognition is identified as consequential because it enables the lead entrepreneur to negotiate access to knowledge, based on a deep sense of awareness of core capabilities and weaknesses.

Metacognition, in turn, contributes towards the actionable mechanisms of rapport strengthening and means-driven decision making, which result in opportunity confidence. This study finds that rapport strengthening builds and nurtures trust among mission-critical dynamic collectives, thereby weaving key knowledge assets together in co-creation. Rapport strengthening is necessary because dynamic collectives co-create value on their terms. Therefore, they need to be motivated to stay committed to realising aspects of the new venture idea. Likewise, resource expansion and uncertainty reduction are identified as actor-independent mechanisms which causally interrelate with the actor-dependent mechanisms of this phase. Together, they deliver opportunity confidence which advances the PDE process into the enactment phases.

**Mechanisms Driving Enactment & Adjustment:** With high levels of opportunity confidence, venture enactment begins by the planning and forking of two main interrelated events – digital growth marketing and digital product development discussed under Contribution 1. Given that action is truly the epicentre of the entrepreneurial process (McMullen & Shepherd, 2006), enactment was driven by actionable mechanisms and efficient causes (Van de Ven & Engleman, 2004). Hence, concurrent enactment and piecemeal co-creation relatedly surfaced as two consequential mechanisms which result in temporal efficiencies. Concurrent enactment is in turn enabled by the granularity of
digital artifacts and their standardised protocols which allow multiple simultaneous processes to be forked, merged and terminated. Meanwhile, *data-driven operation* (Huang et al., 2017) and *flexibility*, which are largely connected to digital growth marketing, emerged as consequential mechanisms which reduce task-specific and outcome uncertainties. Flexibility is also required of leadership to promote responsiveness and cooperation in co-creation – thereby contributing towards adjustments and reactions to ever-changing and uncertain future circumstances.

At the actor-independent level, digital infrastructures generate *uncertainty reducing* mechanisms, while digital platforms result in mechanisms of *resource expansion* and *compression* (Davidsson et al., 2017). Since digital tools and systems drive data-driven operation and flexibility as actionable mechanisms, they contribute towards uncertainty reduction as data can be collected to inform sound decision making. Likewise, since digital platforms allow multiple participating actors to be engaged on a piecemeal and concurrent basis, they expand the range of resources needed to drive venture performance. Therefore, they contribute towards the related actionable mechanisms of concurrent enactment and piecemeal co-creation. When combined with the *reprogrammability* and *editability*, as well as the *recombinability* and *distributability* of digital artifacts (Kallinikos et al. 2013), this study finds that it allows tasks to be split into granular bits for simultaneous enactment – hence, the temporal efficiencies discussed above.

Meanwhile, at the actor level, strong *metacognition, persistence* and *self-control* emerged as *self-regulatory* cognitive mechanisms (Fixson & Rao, 2011; Nambisan & Baron, 2013) of digital entrepreneurial leadership that drive venture performance. Metacognition, in turn, influenced flexibility in decision making and rapport strengthening. Likewise, persistence and self-control emerged as critical self-regulatory
processes which enabled leadership to sustain under circumstances where actions were out of control, frustrating or not enjoyable (Sawhney & Nambisan, 2007; Zahra & Nambisan, 2012).

By identifying and theorising the consequential mechanisms driving pure digital new venture emergence and performance, this study contributes by developing an understanding of the embedded structures that underlie PDE processes. The mechanisms reveal that while there are similarities between traditional entrepreneurship mechanisms, significantly different mechanisms drive PDE. For instance, bricolage and effectual logic (Sarasvathy, 2001) emphasise means-driven development (bird-in-hand), flexibility and co-creation (crazy quilt) as similar actor-dependent mechanisms that are consequential in driving new venture emergence in PDE. However, data-driven operation, concurrent enactment and piecemeal co-creation are not emphasised, thereby reducing the ability of effectuation theory to provide the ‘fine-grained’ understanding of PDE that Nambisan (2016) mentions. Furthermore, these theories are silent on actor-independent mechanisms, thereby providing a level of justification for the criticisms directed at theories like effectuation theory based on the lack of comprehensiveness and over-optimism in the ability of focal actors to control an uncertain future (Arend et al., 2015). The study finds that the theory of external enablement by Davidsson et al. (2017) can combine to compensate for some of the shortcomings of theories such as effectuation, bricolage and a hypothesis-driven approach to entrepreneurship (Eisenmann et al., 2013; Blank, 2013) which tend to be actor-centric. However, the lean start-up is partly exempt from these criticisms by its emphasis on actionable metrics and innovation accounting. This study finds that data-driven operation is the mechanism which underlies the experimental approach captured in the lean start-up.
Finally, traditional entrepreneurship theories emphasise actor mechanisms of cognition such as self-efficacy and ability models. However, this study finds that these models have limited applicability in a PDE context. Given the democratic nature of participation and the network-centric context of PDE, high dependencies between firms and actors dictate different mental models. Hence, self-regulatory mechanisms such as metacognition, self-control and persistence (grit) are identified as consequential actor drivers of performance (Nambisan & Baron, 2013).

9.2.3 Contribution 3 - Evidence-based Pragmatic Model & Policy Guidelines

Building on the findings of this research, Contribution 3 provides a pragmatic model of early-stage PDE detailed in Chapter Eight. The model is split into two phases. Phase 1 is the Ideate and Evaluate phase, while Phase 2 is Enact and React. The two phases are further expanded into concrete and prescriptive steps that guide pure digital new venture creation, of practical utility to novice digital entrepreneurs and other members of the digital entrepreneurial community of practice. While the model shares similarities with the iterative and experimental nature of a hypothesis-driven approach to entrepreneurship (Eisenmann et al., 2013), it offers unique variations which more accurately reflect a PDE process as experienced in this case. In addition, the phases are accompanied by actionable suggestions for the mindsets, skillsets and toolsets needed to drive each phase. More importantly, it is a modular framework which can be adapted as needed for use in various contexts.

In Phase 1, the model focuses on ideation, evaluation and collaboration with specific emphasis on dynamic collectives. It assumes that adopters will be growth-oriented digital entrepreneurs and related stakeholders. Thus, it suggests tools for proactive ideation and articulation. It also offers guidelines on how to collect data on digital markets and the digital technology tools that may assist in data-driven decision
making prior to enactment. Further, Phase 1 provides fine-grained suggestions for forming partnerships with dynamic collectives. Ideally, the outcome of this phase is the reduction in uncertainty and the increase in confidence.

Phase 2 is action and reaction focused. It builds on the confidence in Phase 1 to begin planning two main types of activities in project milestones – digital growth marketing and agile product development. Both activities are concurrent and tightly interwoven in symbiotic and dynamic relations of co-creation. As in Phase 1, practitioners are served with several tools and related skill sets which are necessary to drive Phase 2. At this phase, the model is distinguishable from the lean start-up (Ries, 2011) by its emphasis on the Minimum Perfect Product (MPP) as opposed to Minimum Viable Product (MVP) mindset. A rationale for such an approach is offered based on findings in this research and identified criticisms of the lean start-up model (Ladd, 2016). While learning is a key feature of all hypothesis-driven models, such as the lean start-up and human-centred design (Brown & Katz, 2011), Phase 2 provides a more operational step for ensuring that the data that informs learning in PDE is accurate and reduces the potential for misinforming learning and misleading reactions. This distinction is crucial because the sovereign and human customer-centred assumptions in other hypothesis-driven models (McMullen, 2017) may blind digital entrepreneurs to the significant role algorithmic agencies play as consumers with gatekeeping capabilities for shaping PDE performance. Thus, a Test, Optimise and Release step is recommended to ensure that the needs of both human and machine agents are met prior to a full release and continuous large-scale experimentation.

Finally, Chapter Eight builds on the model and research findings to offer practical guidelines for nurturing the growth of PDE ventures at a policy and societal level (Storey & Greene, 2010). Consequently, this research highlights the need for digital
entrepreneurial training based on the developed pragmatic model and ecosystem-wide implications for nurturing the growth of digital gazelles. Such ecosystem-wide implications hinge on access to venture funding, education which leverages the affordances of digitisation for societal value creation and thoughtful regulation that nurtures rather than harms PDE.

9.2.4 Contribution 4 – Suitability of Insider Action Research for PDE Studies

As it is the nature of an event-driven approach to inquiry, some contributions will be unintended and unanticipated (McMullen & Dimov, 2013). Hence, Contribution 4 was a significant contribution that this study did not purposefully set out to achieve. Accordingly, this research found itself advancing the development and use of Insider Action Research in an entrepreneurship context (Nzembayie et al., 2019). As I found as researcher, event-driven longitudinal studies of the entrepreneurial process have been called for but remained largely unanswered in the entrepreneurship discipline due to known challenges (Aldrich, 2001; Bygrave, 2007; Davidsson et al., 2011). Moreover, given the nascent stage of inquiry in digital entrepreneurship, calls for an enactive, event-driven and design approach to inquiry have specifically and more recently been renewed (Nambisan, 2016; Dimov, 2016; Berglund et al., 2018). As no evidence was found showing the use of such an approach in the discipline, this research found itself pioneering its use by offering practical guidelines for implementation in a pure digital entrepreneurial process study (Nzembayie, 2017; Nzembayie et al., 2019). The findings point to the suitability of Insider Action Research for PDE research.

Accordingly, this study finds that actionable mechanisms such as rapport strengthening, and flexibility are skills required by the second-person dimensions of insider action research. Indeed, the democratisation of collaboration in PDE implies that high levels of interpersonal skills are indispensable for leadership that drives success.
Further, actor mechanisms such as metacognition parallel critical reflection required of the first-person dimensions of insider action research – i.e. reflection and reflexivity. Thus, there is strong evidence to support phenomenon-methodology fit, which is necessary for assessing the quality of organisational and management studies (Edmondson & McManus, 2007). Moreover, researchers adopting similar research designs are building the capabilities necessary to drive successful outcomes in digital entrepreneurial practice.

Secondly, the research demonstrates that in the context of PDE, known challenges of role duality and risks are limited due to the force-multiplying role of digital technologies and shorter venture duration processes (Nzembayie et al., 2019). Digital technologies double as robotic research assistants facilitating remote collaboration and rich data capture and analysis. Synchronous and asynchronous digital communication technologies provide the space in which to generate, observe and record data of events in real-time. Meanwhile, screen and audio recording software can be installed on computers to record these interactions. With the rich and varied data, it becomes easier to take readers down a completed PDE journey, in stories supported by audio-visual evidence. As this study learns, such rich data allow researchers to vividly relive lived experiences during analysis, thus enhancing visual mapping and retrospective sense-making (Langley, 1999).

In sum, this study finds that digital technologies assist in forging a symbiosis between new venture co-creation and new knowledge co-production. This case indicates that the pre-step-in Insider Action Research (IAR) cycles adapts to the initial ideation and evaluation phases geared towards gaining increased opportunity confidence (Davidsson, 2015). Meanwhile, the IAR cycles mostly wrap around the actual digital new venture creation, with feedback loops – thus achieving phenomenon-methodology fit. Therefore, in hindsight, a fifth objective has been shadowing this research all along which reads:
To explore the feasibility of using an Insider Action Research approach to inquiry in entrepreneurship and suggest practical guidelines for design and implementation based on a live case in pure digital new venture creation

Having met this unintended objective, a path is paved for the adoption of similar research designs which may arrive at more fine-grained insights on the digital entrepreneurial process across cases and contexts. Ultimately, the use of IAR answers the call for an ‘Entrepreneurial Method’, whose mechanisms, Sarasvathy and Venkataraman (2011) define as ‘action, reaction, transformation and explicit co-creation’.

9.3 LIMITATIONS OF THE RESEARCH

As with every research design, however, there are strengths and weaknesses depending on the perspective from which it is assessed. Insider Action Research (IAR) is no exception. Since IAR is based on engagement in a longitudinal process of change, it is useful for developing an accurate and fine-grained profile of organisational processes. However, the flip side of this advantage is that only one live case can be studied at a time by a single researcher due to its demanding nature. Consequently, it was only feasible to enact one case in the EdTech sector, though it might have been desirable to enact two or more concurrently.

Thus, digital new venture creation as core project operated concurrently with the demands of the thesis project (Zuber-Skerrit & Perry, 2002). Given the demand for immersion in the theoretical context and continuous validation of a new research approach, there were heavy demands pulling me as the researcher from multiple directions. In fact, it is well-known that role duality represents a challenge to an IAR approach to inquiry (Coghlan, 2019, pp. 81-83). However, in this case, role triplicity appears to more accurately describe the combination of digital new venture creation, doctorate thesis production and the methodological trailblazing in entrepreneurship,
which was the ultimate test of resilience. Given the challenges, it was only feasible to enact and study a single case of pure digital new venture creation at pre-scaling phases. Nevertheless, the study shows that even against role triplicity, PDE is different as spatiotemporal efficiencies of the phenomenon offer mechanisms which reduce some of the challenges involved.

Moreover, I as the researcher, who is also a portfolio digital entrepreneur, attests to the strong parallels between the demands of an Insider Action Research project and the practice of new venture creation. Thus, emerging from an insider action research process in entrepreneurship, builds the resilience that is a transferrable capability needed to drive entrepreneurial performance. It is a similar insight that led Rasmussen and Nielsen (2004) to ask – *Is entrepreneurship action research in disguise?*

A second limitation of this study arises from the nature of the phenomenon it investigates. As von Briel et al. (2018) point out, rapid advances in digital technology endanger the timeliness and relevance of any academic pursuit of analysis and prediction in a digital entrepreneurial context. Thus, there is a possible short time stamp on some of the current knowledge output, which calls for sensitivities to temporality and other contextual factors in future research and generalisations. For instance, as entrepreneur, I have been immersed in the community of digital entrepreneurial practice since 2005, which has allowed me to see events that drive digital growth marketing come and go. However, I have also observed that fundamental principles remain unchanged.

### 9.4 Recommendations for Future Research in Digital Entrepreneurship

Given the limitations, this study offers a few recommendations for future research. Since this study was based on a single case in a particular sector, further research is needed to determine the extent to which findings replicate across similar cases and
contexts. Furthermore, it is possible that key steps in the pragmatic model are applicable in traditional new venture creation contexts. For instance, given that virtually all ventures today leverage some form of digital growth marketing, research could seek to determine if, how or why the concurrent enactment of digital growth marketing and traditional product development drives venture performance in other contexts.

    Likewise, the pragmatic process model developed in Chapter Eight could be applied and tested in real life contexts of digital new venture creation, with a view towards developing context-specific adaptations. These adaptations could inform new frameworks, models or theories of practice which are new contributions in their own right. Thus, this study presents a departure point for assisting similar research efforts. Such research efforts need to be within the timeliness of the current digital entrepreneurial context for triangulation and cross-comparisons to be meaningful.

    Secondly, the field of entrepreneurship continues to grapple with the question – What makes entrepreneurship a distinctive domain of scholarship? Accordingly, scholars like Bygrave (2007) bemoan the uncritical borrowing of research methods from mature disciplines which may be ill-suited to the non-linear and messy nature of the entrepreneurship phenomenon. Accordingly, Davidsson (2002) cautions that the field of entrepreneurship risks producing knowledge that is either misleading or harmful to practice and non-academic stakeholders. As Frank and Landstrom (2016) argue, entrepreneurship research requires ‘interestingness’. Whereby, interestingness hinges on undertaking challenging research in the ‘swampy lowlands’ of entrepreneurial practice (Dimov, 2016) in meeting the needs of multiple stakeholders. Scholars warn that as the discipline matures, it risks becoming institutionalised, at a time when the mature disciplines it often borrows research designs from are de-institutionalising (Landstrom et al., 2016; Berglund & Wennberg, 2016). This research follows similar recommendations.
in calling for research designs that achieve fit with the PDE phenomenon. It recommends that similar studies be conducted in other technology contexts and cross-analysed with findings of this study to expand the body of knowledge.

This study acknowledges the arguments against researching the entrepreneurial process in a challenging manner that achieves phenomenon-methodology fit (Edmondson & McManus, 2007). The argument usually hinges on the risky and demanding approach to inquiry within the constraints of short-term academic studies. Event-driven longitudinal studies require researchers to follow the entrepreneurial process from inception and record events ‘as they happen’ (Davidsson et al., 2011). While such studies may not often be feasible in a traditional entrepreneurship context, this study calls for a rethink of this argument in a PDE context. The reason being, PDE ideas can rapidly be enacted and studied, thereby making it less challenging and risky to study a process of digital entrepreneurial change (Nzembayie et al., 2019). Thus, it lends itself to pragmatic research designs and inquiry which is sustained by the researcher’s interest. Such studies are currently a rarity in the entrepreneurship discipline which to some, is somewhat ironic.

Researchers could be practitioners or students of entrepreneurship looking to critically reflect in action against a backdrop of theory as part of self-development. As I will articulate subsequently, the challenge is worth the effort from the perspective of self-development. Secondly, challenging research is analogous to real-world entrepreneurship and its accompanying risks and uncertainties. Thus, enormous potentials exist for developing skills and capabilities that increase the odds of developing scalable digital ventures through an IAR approach to inquiry. Lastly, not all studies need to be based on the entirety of the digital entrepreneurial process. Limited change projects could address an aspect of the new venture creation process and may be more suitable to researchers at master’s and undergraduate levels.
Finally, while it may be tempting to evaluate such research projects based on successful venture outcomes, this study recommends that examiners refrain from doing so. Although the current project’s outcome was a scalable business model, it should be remembered that it risked failing on several occasions. Projects which fail provide enormous potential for significant insights regarding the vicissitudes of new venture creation. The focus should be on knowledge of the process and the actions which insider action researchers take in the face of adversity. Such studies have the added benefit of revealing what really goes on in the ‘swampy lowlands’ of entrepreneurial practice (Schon, 1987; Dimov, 2016). Indeed, a well-known limitation of existing entrepreneurship studies is survivor bias, originating from a tendency for cross-sectional studies to collect data through interviews solely from successful or surviving entrepreneurs - since failed entrepreneurs often vanish from the spotlight. In the Irish context, for instance, it is well-known that unfortunately, entrepreneurial failure carries a stigma. The implications for knowledge production is the potential skewing of findings towards the often-embellished stories of ‘winners’, which Davidsson (2002) warns, potentially leads to misleading or downright harmful knowledge for practice. This study recommends that researchers with the right motivation be encouraged and guided to engage in a similar approach to inquiry, documenting the successes and pitfalls that occur in the real-time process of emergence.

In challenging scholars to re-examine the future of entrepreneurship research, Sarasvathy and Venkataraman (2011) call for an ‘Entrepreneurial Method’. This study demonstrates that an IAR approach to inquiry operationalises such a method effectively. Thus, this research may very well provide a much-needed blueprint for a ‘Pure Digital Entrepreneurial Method’ of inquiry.
9.5 Reflexivity

Since this research began with the assumption that ‘all good research is for me, for us and for them’ (Reason & Marshall, 1987, p. 112), a conclusion would be incomplete without my reflexivity as researcher. As a reminder, the research question ‘for me’ as the researcher was:

*How can a more conscious and self-aware enactment of digital new venture creation, develop my knowledge and confidence in leading the development of scalable digital new ventures?*

I can begin by saying with certainty that I feel more confident in my ability to lead the development of scalable digital new ventures and purged of my imposter syndrome when referring to myself as entrepreneur. As noted in Chapter One, despite many successes as a portfolio digital entrepreneur, I suffered from impostor syndrome and had self-doubts given the accidental nature of my entrepreneurial entry. By grounding my thinking in theory, I have emerged with a clearer understanding and articulation for what seems to work or does not work, when, how and why. When I began this journey, I was unsure of the lessons which may arise along the way. However, I have learned that the research process is an entrepreneurial process, and only by taking action and reflecting on it, can critical insights emerge.

Indeed, the wealth of theoretical knowledge that the research has compelled me to review has provided the vocabulary for articulating my tacit knowledge and actions. I have learned that articulating one’s thoughts is essential for crystallising understanding. In many ways, it is rather emancipatory. Hence, I continue to muse over the genius of Schon (1983, p. 243) who identified the problem of accidental but successful entrepreneurs like myself. He notes that practitioners do reflect in action but seldom reflect on their reflection in action, thereby making their knowledge tacit and difficult to articulate even to themselves. Schon argues that the lack of articulation means that
practitioners struggle to translate their tacit knowledge into efficient and effective strategies which they or others can adopt and formalise. What an epiphany! Indeed, through a research process that allowed me to live, reflect and articulate my actions in the world, an unprecedented clarity and direction has emerged. Clearly, if I could turn back the hands of time, I would be in a better position to offer valuable advice to the ‘failed’ entrepreneurs whose stories partly motivated this research.

Therefore, going forward, I see myself filling multiple roles as a scholar-practitioner. As a digital entrepreneurship educator, I hope to continue passing on valuable insights from my research to students of business and entrepreneurship. More importantly, I hope to make significant contributions to practice-based entrepreneurship education. Likewise, through two ‘Best Paper’ awards and journal publications, I have learned that the same capabilities which drive entrepreneurial performance can be transferred into a research context, delivering similar results. Thus, my confidence as a researcher has also grown. As such, I hope to continue conducting research and publishing findings that the wider community of entrepreneurship scholarship and practice find useful.

Finally, in my role as a practitioner, I look forward to offering valuable counsel which assists in nurturing the growth of pure digital new ventures. I suppose the challenge, therefore, is to determine how best to balance the multiple roles based on new capabilities. Ultimately, I can attest to the truism of the assertion that ‘all good research is for me, for us and for them’ (Reason & Marshall, 1987, p. 112).


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Evidence supporting statements made in Chapter One on researcher's background

- Experienced with app's web platforms model
- Successfully bootstrapped ventures from scratch
- Researcher's prior new venture creation successes
APPENDIX 2. VISUAL COLLAGE OF EVENTS BY CYCLES – SUPPORTING CH.6

Game Coding & Testing Intensive

1st Cycle

1. Plan
2. Act
3. Evaluate
4. Construct

Supporting CH.6
Game Editing & Digital Growth Marketing Intensive
Game Coding & Testing Intensive

3rd Cycle

Plan

Act

Evaluate

Construct

Outcomes

Evaluating Product Development

Brainstorming, Sketching & designing

New Project Manager

Skype Introduction Meeting

Negotiating
Game Edliting & Digital Growth Marketing Intensive
### APPENDIX 3. NVIVO CODEBOOK – SUPPORTING CH. 7

Nvivo Codebook of Categories Called Nodes, Definitions & Counted References

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Cycles</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENABLERS &amp; CAUSAL SCENARIOS</strong></td>
<td>This category contains references to external and internal (actors/collaborators) factors that enabled and generated the mechanisms that drove process in this case.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborators</td>
<td>This category contains references to the causal roles played by collaborators. Collaborators bring actor enablers such as new means (knowledge and resources) that reduce uncertainty (Sarasvathy, 2001) - but their independence may also introduce uncertainty.</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>Knowledge</td>
<td>This category contains references to the causal role of knowledge and skills originating from collaborators.</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Resources</td>
<td>This category contains references to the causal role of collaborator resources in the form of available new means that are not knowledge related.</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>This category contains references to the role of uncertainty originating from key collaborators.</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td><strong>DIGITAL TECHNOLOGIES</strong></td>
<td>This category contains references to digital technologies as external enablers - i.e., their role as operand and operant resources (Nambisan, 2013).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Artifacts</td>
<td>This category contains references to the enabling role of reprogrammable, editable and distributable digital artifacts.</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Digital Infrastructures</td>
<td>This category contains references to the enabling role of digital infrastructures.</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Digital Platforms</td>
<td>This category contains references to the enabling role of digital platforms.</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>FOCAL ACTOR</strong></td>
<td>This category contains references to causal factors that originate from the focal actor.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Emergent Knowledge</td>
<td>This category contains references to the role played by emergent knowledge that actors gained, which was beneficial in driving the process.</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td><strong>PRIOR KNOWLEDGE</strong></td>
<td>This category contains references to the role played by the focal actor's prior knowledge.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>This category contains references to prior knowledge coming from higher education in a more immediate past.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sectoral Knowledge</td>
<td>This category contains references to the role of prior sectoral knowledge.</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Cycles</td>
<td>References</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Upbringing</td>
<td>This category contains references to prior knowledge that is the result of upbringing and therefore situated further back in time.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Resources</td>
<td>This category contains references to the focal actor's resources that helped drive process. These resources are distinct from knowledge resources. Hence, references are made to owned material means such as funds and physical devices.</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Serendipity</td>
<td>This category contains references to unintended turn of events that helped to move the process forward.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>TECHNOLOGY-DRIVEN CHANGE</td>
<td>Refers to changes in behaviour at the societal level that are the consequence of digital technologies.</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MECHANISMS</td>
<td>These are references to causes that underlie events, but which may not be directly observable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTIONABLE MECHANISMS</td>
<td>This category contains references to actionable mechanisms, which are social mechanisms grounded in human action (Gross, 2009; Berglund &amp; Korsgaard, 2017).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concurrent Enactment</td>
<td>It refers to the simultaneous forking, initiation and execution of diverse activities.</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Data-driven Operation</td>
<td>It is the process by which mainly quantitative data from analytics is combined with qualitative data from users to drive product innovation and optimise new venture growth.</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Flexibility</td>
<td>It is a mechanism by which actors stayed open to new information and acted on it.</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Leaderful Practices</td>
<td>It is a leadership strategy whereby the focal actor steps back to allow more capable individuals the opportunity to lead specific tasks. It is in turn driven by strong metacognition.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Means-driven Development</td>
<td>It is a mechanism by which action is made possible by what is already owned.</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Piecemeal Co-creation</td>
<td>It is related to concurrent enactment and is a process of breaking down tasks into modular bits that can be carried out by diverse actors. Its expected effect is the speeding up of new venture enactment.</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Pre-emption</td>
<td>Pre-emption is a preventative measure designed to stave off a potential problem or disaster. It is driven by current signals and prior knowledge.</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Rapport Strengthening</td>
<td>It involves the building and nurturing of trust with collaborators in an effort towards motivating them to become more committed to new venture creation. It usually includes a discussion on matters that are unrelated to the</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Cycles</td>
<td>References</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Serendipity Leveraging</td>
<td>It involves maximising an unexpected turn of positive occurrences that potentially solve previously identified problems.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Task Automation</td>
<td>It is a mechanism by which actors assign tedious and routine tasks to software agents that can handle them more efficiently.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ACTOR MECHANISMS</td>
<td>This category contains references to actor mechanisms, which are rooted in cognitive and behavioural theories of decision making and action (Baron, 1998).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metacognition</td>
<td>An awareness of what one knows about their capabilities</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Perceived Self-efficacy</td>
<td>Perceived self-efficacy is an entrepreneur’s belief in their ability to muster the motivation, cognitive abilities and plan of action essential to controlling events in their life (Gist &amp; Mitchell, 1992; Bandura, 2012).</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Perceptual Processes</td>
<td>Perceptual processes focus on pattern or object recognition, as mechanisms driving the formulation and reformulation of new venture ideas into new narratives that guide action. Baron (2002, 2004) describes pattern recognition as the identification of a complex array of stimuli, which collectively allow perceivers to recognise an object or a complex pattern. The model suggests that past experiences help entrepreneurs construct prototypes which represent patterns or categories of objects.</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Persistence</td>
<td>Persistence is concerned with self-regulation of processes that extend over long periods. Baron and Henry (2010) maintain that ‘outstanding performance derives largely from participation in intense, prolonged, and highly focused efforts to improve current performance’ in new venture creation.</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Self-control</td>
<td>Self-control involves resisting strong impulses to engage in actions deemed harmful or out of line with significant goals (Baumeister &amp; Alquist, 2009). Alternatively, it involves resisting impulses to stop performing actions that may be beneficial but not intrinsically enjoyable (Forgas, Scholar, Baumeister &amp; Tice, 2011).</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>ACTOR-INDEPENDENT MECHANISMS</td>
<td>This category contains references to actor-independent mechanisms. They are the specific ways in which external enablers facilitate the initiation, development and performance of new ventures – i.e., how they are helpful (Davidsson et al., 2017, 2018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Description</td>
<td>Cycles</td>
<td>References</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Combination</td>
<td>Combination is coupling with external artifacts or resources to provide new functionality.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Compression</td>
<td>Compression refers to the reduction in the amount of time required to perform an activity.</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Conservation</td>
<td>Conservation refers to reduction in the amount of resources needed to perform an activity.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Generation</td>
<td>It refers to the capacity of digital technologies to allow for the creation of new artifacts.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Reach</td>
<td>The ability of a technology to be instantly accessible by end users.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Resource Expansion</td>
<td>Resource expansion refers to an increase in the amount of a resource that is accessible.</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Resource Substitution</td>
<td>Resource substitution refers to the replacement of one resource with another.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Uncertainty Reduction</td>
<td>It refers to the reduction in the level of perceived uncertainty of any business decision of buyers or sellers.</td>
<td>4</td>
<td>11</td>
</tr>
</tbody>
</table>
## APPENDIX 4. TOOLSETS - SUPPORTING CH. 8

<table>
<thead>
<tr>
<th>Phase 1 Tools</th>
<th>Digital Growth Marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proactive Scanning</strong></td>
<td></td>
</tr>
<tr>
<td>Traditional Business Frameworks</td>
<td><strong>Branding &amp; IP</strong></td>
</tr>
<tr>
<td>• STEEPLE &amp; VUCAH Analyse environmental changes</td>
<td>• uspto.gov &amp; others - Research trademarks &amp; IP</td>
</tr>
<tr>
<td>• Google Trends – Search to determine how ideas have been trending over time</td>
<td>• whois.icann.org – Conduct domain name research to determine availability before logo design</td>
</tr>
<tr>
<td><strong>Articulation</strong></td>
<td>• Fiverr.com – Ideal for minor tasks such as brand identity design &amp; promotional material</td>
</tr>
<tr>
<td>• Lean canvas (Maurya, 2012)</td>
<td>• Placeit.net &amp; canva.com – Design promotional materials</td>
</tr>
<tr>
<td>• Problem canvas (Aulet, 2013)</td>
<td><strong>SEO/SMO &amp; Content Creation</strong></td>
</tr>
<tr>
<td>• Business Model Canvas (Osterwalder &amp; Pigneur, 2010)</td>
<td>• Upwork.com – Hire bloggers and content creators</td>
</tr>
<tr>
<td><strong>Preliminary Evaluation</strong></td>
<td>• Google Keyword Planner - Optimise web pages for search using keywords</td>
</tr>
<tr>
<td>• Google Keyword Planner – Estimate market size through keyword research</td>
<td>• Ahrefs.com – Keyword research, competitor position etc</td>
</tr>
<tr>
<td>• Similarweb.com – Obtain data on competitors &amp; potential partners</td>
<td>• SEMRUSH – Optimisation, backlink audit, site diagnostics, brand mentions etc.</td>
</tr>
<tr>
<td><strong>Strategic Partnership Formation</strong></td>
<td>• Hootsuite – Manage social media campaigns</td>
</tr>
<tr>
<td>(with dynamic collectives)</td>
<td><strong>UX Design &amp; Optimisation</strong></td>
</tr>
<tr>
<td>• Linkedin.com – Search &amp; research partner backgrounds</td>
<td>• Crazyegg.com – Identify where users are clicking on page</td>
</tr>
<tr>
<td>• Upwork.com &amp; other talent platforms – Find collaborators</td>
<td>• Optimizely.com – Run A/B tests on web pages to determine which has higher conversions</td>
</tr>
<tr>
<td><strong>Final Evaluation</strong></td>
<td>• Google Page Speeds Insights - Determine why web pages are slow across devices</td>
</tr>
<tr>
<td>• Google Keyword Planner – Detailed keyword research of market size &amp; estimate cost of acquiring users</td>
<td>• Google Search Console – Submit URLs &amp; sitemaps for Google search indexing etc.</td>
</tr>
<tr>
<td>• Canvases – Make changes to the canvases developed at the Articulation step</td>
<td><strong>Digital Ad Campaigns</strong></td>
</tr>
<tr>
<td>• Digital Business Plan – pull all the market research together and develop an evidence-based digital business plan</td>
<td>• Google Ads – ads.google.com – targeted PPC ad campaigns</td>
</tr>
<tr>
<td>• Dropbox.com – Create shared folders for remote collaboration</td>
<td>• Facebook Ads – Run targeted ad campaigns</td>
</tr>
<tr>
<td>• Teamviewer – Troubleshoot coding &amp; design issues remotely</td>
<td>• WordStream – Optimise Google ad campaigns</td>
</tr>
<tr>
<td>• Google Docs - Edit documents collaboratively</td>
<td><strong>Analytics &amp; Conversions</strong></td>
</tr>
<tr>
<td>• Skype – Remote demos, video calls and text messages</td>
<td>• Google Analytics – Track funnels; integrate with Google Ads; test, experiment and react to insights</td>
</tr>
<tr>
<td>• Unbounce.com – Improve landing page conversions</td>
<td><strong>Email Marketing</strong></td>
</tr>
<tr>
<td>• Mailchimp – Embed sign up forms &amp; grow mailing lists</td>
<td>• AddThis – Make it easy for users to share your web content</td>
</tr>
<tr>
<td>• Aweber – Same functions as Mailchimp</td>
<td><strong>Social Bookmarking</strong></td>
</tr>
<tr>
<td>• DropBox – Remote demos, video calls and text messages</td>
<td></td>
</tr>
</tbody>
</table>

*Disclaimer – Some tools require paid access but usually allow a free trial. As researcher I am not endorsing any paid products. This table is strictly for information purposes. Likewise, the list of tools is by no means exhaustive.
To continuously engage with the wider scholarly community and achieve ‘validation as a process’ (Leitch et al., 2010), this study published its findings in peer-reviewed journals and participated in several academic conferences as part of the PhD journey.

**Journal Publications**

- **Journal of Business Venturing Insights**

  ![Journal of Business Venturing Insights](image)

  *Researching Pure Digital Entrepreneurship – A Multimethod Insider Action Research approach*

  Kistof Futonge Nzembayie, Anthony Paul Buckley, Thomas Cooney

- **Electronic Journal of Business Research Methods (EJBRM)**


  **Forthcoming Publication**

  Digital Entrepreneurship – Why the ‘Digital’?

  Currently being considered by the *Journal of Strategic Information Systems* – Revise and Resubmit Request
Best Paper Awards

- Best PhD Paper & Presentation – 16th ECRM, 2017

![Certificate of Merit for ECRM 2017](image1)

- Best Track Paper in Technology Entrepreneurship – 41st ISBE Conference, 2018

![Certificate for ISBE 2018](image2)
Conferences with Paper Presentations

1) 16th European Conference on Research Methodology for Business & Management Studies, Dublin, June 2017

2) 31st RENT Conference Lund, Sweden, November 2017
   - Paper & Presentation – Researching Digital Entrepreneurship – An Insider Action Research Approach

3) 22nd Annual Interdisciplinary Conference on Entrepreneurship, Innovation & SMEs, Stuttgart, October 2018

4) 41st Institute for Small Business & Entrepreneurship Conference, Birmingham, November 2018

5) 4th International Conference on Innovation & Entrepreneurship, Canada, 2016
   - Teacherpreneurs – From Vocation to Innovation

Conferences & Colloquia with Abstracts Only

1) 21st McGill International Entrepreneurship Conference, Galway, August 2017
   a. Presentation – Abstract on the PhD Thesis Project & Proposed Methodology

2) 8th Action Research Colloquium, UCD, Dublin, 2018

3) 7th Action Research Colloquium, UCD, Dublin, 2017

Conferences Retreats – Confreat

1) Confreat, DCU, Dublin, 2018

Discussion – Conference Retreat with Leading Scholars in Entrepreneurship on Getting Published – William Gartner, Candida Brush, Richard Harrison & Maura McAdam
The research plans to publish final outputs of this research and future research in one of the following journals:

**Entrepreneurship**

- Journal of Business Venturing (JBV)
- Journal of Business Venturing Insights (JBVI)
- International Journal of Entrepreneurial Behavior & Research (IJEBR)
- Journal of Business Research (JBR)
- Journal of Technological Forecasting & Social Change (TFSC)

**Management Information Systems**

- Journal of Strategic Information Systems (JSIS)
- Journal of Management Information Systems (JMIS)

**Practitioner Journals**

- Journal of Business Horizons
- Management Information Systems – Executive (MISQ-E)

**Methodology Journals**

- Journal of Management Inquiry
- International Journal of Action Research

**Book Publication**

- *Title being pondered*: A Pragmatic Guide to Pure Digital Entrepreneurship
APPENDIX 7. ETHICAL APPROVAL

This is a screenshot of the ethics approval for this study. It was obtained when the working title was in its second iteration but still refers to this study.

Research Ethics and Integrity Committee,
Dublin Institute of Technology,
Dublin 8.

12/11/2018

Dear Mr Futonge,

The Research Ethics and Integrity Committee of the Dublin Institute of Technology has reviewed your application entitled ‘Digital Entrepreneurship: An Event-driven Study of the Digital Entrepreneurial Process’ (our ref REC-17-134). I can confirm your project is approved to proceed, conditional on your project adhering to the stipulations previously provided by the committee.

Best of luck with the research.

Yours sincerely,

Steve Meaney, PhD
Chair - DIT Research Ethics and Integrity Committee
APPENDIX 8. STANDARD CONSENT FORM SAMPLE

This is a standard consent form that was signed by key participants. However, the reader should note that it was only one of several measures taken to prevent harm to participants. The title of the project was in its second iteration at the time.

**CONSENT FORM**

<table>
<thead>
<tr>
<th>Researcher's Name</th>
<th>KISITO FUTONGE NZEMBAVIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Unit</td>
<td>COLLEGE OF BUSINESS, SCHOOL OF MARKETING, DUBLIN INSTITUTE OF TECHNOLOGY, IRELAND</td>
</tr>
<tr>
<td>Title of Study</td>
<td>DIGITAL ENTREPRENEURSHIP: A REAL TIME STUDY OF THE DIGITAL ENTREPRENEURIAL PROCESS</td>
</tr>
</tbody>
</table>

The following section should be completed by the research participant

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you been fully informed of the nature of this study by the researcher? (Note that this would typically include use of a participant information sheet.)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have you had an opportunity to ask questions about this research?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have you received satisfactory answers to all of your questions?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have you received sufficient information about the potential health and/or safety implications of this research?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have you been full informed of your ability to withdraw participation and/or data from the research?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have you been fully informed of what will happen to data generated by your participation in the study and how it will be kept safe?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Do you agree to take part in this study, the results of which may be disseminated in scientific publications, books or conference proceedings?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Have your been informed that this consent form shall be kept securely and in confidence by the researcher?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>While you have indicated that price quotations for projects be kept confidential, you agree that it may be revealed to academic supervisors and academic evaluation teams on a need-to-know basis only.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Name of Participant

Signature of Participant

Date

Signature of Researcher

Date 08/11/2017
APPENDIX 9. EMPLOYABILITY SKILLS & DISCIPLINE SPECIFIC TRAINING

The following screenshot from the Graduate Research office confirms the Employability and Discipline Specific Training modules attended or passed. In total, the required 40 ECTS credits were attained.

- GRSO 1010 – Introduction to Pedagogy – Passed – 5 ECTS
- BSRM 1001 Business Research Methods – Passed – 5 ECTS
- GRSO 1001 Research Methods – Passed – 5 ECTS
- GRSO 1012 Research Integrity – Passed – 5 ECTS
- MANG 9001 The Effective Manager – Passed – 10 ECTS
- SOC 9005 Organisations: Culture, Change & Learning – Passed – 10 ECTS
- GradCAM XXXX Philosophy of Science & Technology – Attended for Personal Development – Did not sit exams as 40 ECTS credits were already attained.
The following data was collected three months after this study ended to substantiate the claims that the new venture was deemed scalable, as stated at the end of the Fourth Action Research cycle.

Funnel metrics indicate that organic and direct traffic continues to grow and new natural links such as the highlighted one, contributed to natural growth. Further, the revenue model validation (i.e., paid ad removal) tested on an established platform, ended up generating an additional $800. Based on these signals, this study was able to substantiate the idea validation claims and prepare for scaling.