Journal of Electronic Business & Digital Economics

Third-party application developers and the liminal space experience during digital entrepreneurship development

Emmanuel Okoro Ajah
Department of Information Systems, American University of Nigeria, Yola, Nigeria

Received 29 January 2024
Revised 26 April 2024
Accepted 6 June 2024

Abstract

Purpose – The study aims to embrace the lingering call for more empirical studies that can theorize the role of digital platforms in digital entrepreneurship. Hence, this study seeks to reveal the liminal space entrepreneurial experience of third-party application developers, by investigating how the platform boundary resources promote third-party entrepreneurial actions, as they transition through the disoriented, uncertain and ambiguous processes of digital entrepreneurship development.

Design/methodology/approach – To conduct this investigation, an expert interview qualitative method was used. This approach is a well-established technique in the field of social sciences, which allowed a detailed exploration of the theory of liminality. Liminality refers to the transitional phase that individuals or groups experience when moving from one social or cultural context to another. The expert interview method is appropriate for this study because it involves engaging with knowledgeable individuals who have extensive experience and expertise in the subject area being investigated. Through in-depth and unstructured interviews, the experts were able to provide valuable insights and perspectives about the phenomenon investigated.

Findings – The research findings demonstrate that digital platform boundary resources play a significant role in the behaviour of third-party developers' who engage in the development of digital entrepreneurship in today's market. The study highlights three ways that show how these resources (software development kit (SDK), API, integrated development environment (IDE), libraries, frameworks) enable third-party developers to create new applications that are used to pursue entrepreneurship in a digital platform, leading to increased user engagement and revenue generation.

Originality/value – The research addresses the critical roles of digital platform boundary resources in digital entrepreneurship development processes. Also, using liminality theory, the research explicated the core experiences of third-party developers as they navigated the challenges and ambiguities experienced in the pursuit of entrepreneurship. Thus, contributing to the existing body of knowledge in literature and practice.

Keywords Digital platform, Platform boundary resources, Digital entrepreneurship,
Third-party application developers, Digital business, Digital start-up

Paper type Research paper

1. Introduction

The emergence of digital platform boundary resources has provided a significant opportunity for third-party application developers to achieve new business development by leveraging digital platforms. With these resources, third-party application developers can easily interact with the platform and unlock new avenues to pursue entrepreneurship (Bianco, Myllarniemi, Komssi, & Raatikainen, 2014; de Reuver, Sørensen, & Basole, 2017; Mohagheghzadeh & Lindman, 2022; Rubleske, 2020; Tiwana, 2013; Tiwana, Konsynski, &

Journal of Electronic Business & Digital Economics
Emerald Publishing Limited
e-ISSN: 2754-4222
p-ISSN: 2754-4214
DOI 10.1108/JEBDE-01-2024-0004

Bush, 2010). Thus, "Digital entrepreneurship is the development of a new economic activity that is either embodied in or enabled by digital technologies [whose outcome is a digital start-up]" (Foisal, Alam, & Abedin, 2023, p. 46). Digital start-ups are new businesses that utilize digital technology and innovation to create new products/services, streamlining traditional entrepreneurship processes to gain a competitive edge in any target market (Kraus, Palmer, Kailer, Kallinger, & Spitzer, 2018). The early stages of a digital start-up's lifecycle (i.e. digital entrepreneurship development) are crucial, as they involve the development of a product/service that is unique and valuable to potential customers. This process requires a high level of interaction between entrepreneurs and target customers through digital technology (e.g. digital platforms), as they work to identify opportunities, refine ideas and create prototypes. Digital platform boundary resources are "the software tools and regulations that serve as the interface for the arm's-length relationship between the platform owner and the application developer ... such resources typically consist of a software development kit (SDK) and a multitude of related application programming interfaces (APIs)" (Ghazawneh & Henfridsson, 2012, p. 3).

Application developers interact with platform boundary resources to contribute to digital platform services by developing complementary applications that can offer economic value to both platform owners and third-party developers. This account suggests that "platform boundary resources constitute the virtual workplace where mediated collaboration among the actors in the platform ecosystem happens" (Farshchian & Thomassen, 2019, p. 559). Because platform boundary resources enable third-party developers to access and leverage the capabilities of the platform core architecture to create new applications that will offer advanced and useful functionalities (Bonina, Koskinen, Eaton, & Gawer, 2021; Ritala, 2024). The new features available not only broaden the range of options for users but also encourage innovation and collaboration among the development community. With the ability to integrate with existing systems and tools, this collaboration offers developers a flexible and scalable environment to build and deploy new applications on the platform architecture (Bianco *et al.*, 2014).

Research on digital platforms has been extensive, with a particular focus on their evolution, architecture and expansion of functionalities through boundary resources engagement (e.g. Bianco *et al.*, 2014; Mohagheghzadeh & Lindman, 2022; Mohagheghzadeh & Rudmark, 2017; Mohagheghzadeh & Svahn, 2016). Hence, most research focuses on how digital platform owners continue to leverage the transfer of design capabilities to third-party application developers to boost innovation and extend the functionalities of the digital platform. Thus, the activities of third-party developers who interact with digital platform boundary resources have facilitated lots of new applications required for digital platform business to be developed, which encourages transactions between different application users, application developers and other market participants (Heshmatisafa & Seppänen, 2023; Rubleske, 2020). However, starting a new business in a digital context requires a deeper conceptual understanding of the underlying processes, the interplay of different causal factors and the complexities arising from technological advancements and the prevailing environmental contextual conditions.

Unfortunately, most third-party application developers who seek to develop new applications representing products for new business development lack this knowledge. Consequently, the number of digital businesses that scale through the ambiguities, disorientations and uncertainties experienced during development and commercialization is few, as many are forced to shut down (Giardino, Bajwa, Wang, & Abrahamsson, 2015; Howarth, 2023; Page & Holmstrom, 2023; Ruby, 2023). This situation has remained a concern to both scholars and practitioners across the globe, most especially in the global south (e.g. Nigeria) where many environmental complexities and resource constraints are overwhelming. Hence the persistent call for in-depth study to help grasp a theoretical

understanding of the development processes of a viable digital entrepreneurship. Corroborating this view, a scholar noted that "[l]imited effort has been made on theorizing the role of specific aspects of digital technologies [e.g. digital platform] in shaping entrepreneurial opportunities, decisions, actions, and outcomes" (Nambisan, 2016, p. 2). This view has been re-echoed by other scholars in the literature on the importance of developing concepts that theorize the behaviour of third-party application developers in digital entrepreneurship development processes (Nambisan, 2016; Shen, Lindsay, & Xu, 2018; Taylor-Wesselink & Teulon, 2021; von Briel, Davidsson, & Recker, 2018; von Briel *et al.*, 2021).

Insufficient knowledge about how third-party developers should navigate through market resistance, competition and the complexities of digital entrepreneurship development is a problem for both scholars and practitioners (Anim-Yeboah, Boateng, Awuni Kolog, Owusu, & Bedi, 2020). This highlights the inadequacy of existing literature on digital entrepreneurship, as past studies pay little to no attention to how digital platform boundary resources affect the behaviour of third-party application developers who drive entrepreneurship development through their actions and practices (Anim-Yeboah *et al.*, 2020; Hein *et al.*, 2020; Rubleske, 2020). There exist a notable gap in the literature that requires investigation to comprehend how third-party application developers move from being complementors of digital platform functionality extensions to becoming digital entrepreneurs who embark on entrepreneurship endeavours. This is particularly important as digital platform boundary resources continue to evolve and encourage entrepreneurial activities that define the process of digital entrepreneurship development (Anim-Yeboah *et al.*, 2020; de Reuver *et al.*, 2017; von Briel, Recker, & Davidsson, 2018; von Briel *et al.*, 2021).

Digital entrepreneurship development is a multifaceted process, embroiled in ambiguity. It involves identifying opportunities that digital platforms offer, developing and evaluating innovative ideas and creating sustainable business models that can capture new economic value. It requires a combination of skills, resources and strategic planning to effectively navigate the challenges of the modern digital landscape to succeed in the marketplace. In digital entrepreneurship, individuals and organizations can leverage digital technology to create new products/services, reach new customers and improve operational efficiency, leading to increased profitability and growth. Thus, digital platform boundary resources provide the tools that influence the entrepreneurial behaviour of third-party application developers to promote digital entrepreneurship gestation. Digital entrepreneurship gestation is a process of new business development, involving a disoriented transitional activity from an act of ideation of a new digital business, development and experimentation of product/service prototype to the commercialization of newly developed products/services.

"In practice, gestation is not an easy process, but a difficult period in the life of a new business; it is full of uncertainties, and concerns, continuously faced with alarming resistance to stakes, and characterized by a phase where risky decisions are continuously made" (Ajah, 2023, p. 1). Hence, having a good knowledge of the required business strategies and competitive market penetration will offer third-party developers the opportunity to develop a viable digital business in the market. Therefore, a new study should be conducted to investigate third-party developers' experiences as they interact with digital platform boundary resources to navigate through digital entrepreneurship development. The study will investigate the disorientations and ambiguities in the process as many third-party developers embarking on digital entrepreneurship are often unaware of what lies ahead and cannot accurately predict the outcome, leading to a constant state of unease, which could lead to failure. Hence, this study investigates the entrepreneurship behaviour of third-party developers, influenced by platform boundary resources, as they transition through the disoriented and ambiguous processes of digital entrepreneurship development (Garrigos-Simon, Alizadeh Moghadam, Abdi,

Pourmirali, & Abdi, 2021; Hanesch & Schallmo, 2022; Zaheer, Breyer, & Dumay, 2019). Proceeding, the researcher poses the following research question:

RQ1. How do digital platform boundary resources influence the behaviour of third-party application developers in the process of digital entrepreneurship development?

To address this research question, the researcher conducted a detailed empirical analysis of data collected from an empirical situation, to discover how digital platform boundary resources influence the entrepreneurial behaviour and experiences of third-party application developers. The researcher collected extensive data by adopting an expert interview qualitative method, where an expert interview was conducted among digital start-up founders across different sectors, who were selected through the snowballing technique, to gather relevant and appropriate data that will inform the study. To better elaborate on the findings, the study further adopted the theory of liminality to provide a detailed explanation of the phenomenon being investigated. Hence, the outcome of this study will extend the literature through the theorization of our findings. In practice, the study will enlighten third-party developers and practitioners on how to navigate the processes to deliver the right applications that will guarantee economic gain. The remainder of this paper is structured as follows. Section 2 is the literature review, Section 3 is the theoretical background for the study, Section 4 is the adopted methodology, Section 5 is the findings, Section 6 is the discussion of the findings, followed by Section 7 which contains the conclusion, implication, limitation and further study.

2. Literature review

With digital technology as the engine for new business development (Zhou, Dong, Feng, & Wu, 2024), digital platforms have greatly impacted entrepreneurship, especially in the realm of developing digital businesses and creating innovative products/services (Esteban, Ács, & Szerb 2024; Jiang, Jingxuan, & Gai, 2023; Lehmann & Recker, 2021; Täuscher & Laudien, 2018). This is evident in the market as "[d]igitalization has created new value and business opportunities for entrepreneur-driven firms" (Ojala, Fraccastoro, & Gabrielsson, 2023, p. 858). It has made the process of creating new products/services much simpler by breaking down industry boundaries and facilitating collaboration and partnership among individuals and organizations (Agustian, Mubarok, Zen, Wiwin, & Malik, 2023; Ajah, 2024; Suuronen, Ukko, Saunila, Rantala, & Rantanen, 2024). This new wave in business creates a new form of economy known as the digital economy and it has boosted the economies of different nations globally (Melinda, Anjani, & Ridwan, 2023). Thus, "[t]oday's digital technologies have a significant impact on how new business ventures are imagined and created" (Fernandes, Ferreira, Veiga, Kraus, & Dabić, 2022, p. 5). Consequently, this has given rise to the emergence of socio-technical ecologies that go beyond boundaries, fostering new business innovation, development and growth in the digital landscape (Ajah, 2023; Lyytinen, Yoo, & Boland, 2016; Suuronen *et al.*, 2024). Also, digital platforms have contributed to the entrepreneurship process by providing a platform that drives the co-creation of products/services that are sustainable and can generate economic value for the parties involved (Böttcher, Empelmann, Weking, Hein, & Krcmar, 2023; Giang, Hai, Quyen, & Hoang, 2024; Hein *et al.*, 2020; Zeng, Yang, & Lee, 2023).

This suggests that digital platforms act as a " force of creative construction" (Acs, Song, Szerb, Audretsch, & Komlósi, 2021, p. 1629) and a context for digital entrepreneurship development. For instance, digital platforms like "Uber has transformed the taxi business without owning taxis, Airbnb has transformed hospitality without owning hotels, and Kickstarter has channelled funding to creative projects that would have otherwise struggled to get the attention of traditional investors" (Haki, Blaschke, Aier, Winter, & Tilson, 2024,

p. 181). However, not much has been investigated on how it impacts and disrupts traditional entrepreneurship processes. In the current digital landscape, digital platform offers boundary resources that leverage advanced digital technologies and interconnectedness to effectively harness and manage digitized resources that are not limited to their operations. The digital platform enables connections between various actors especially third-party developers to generate value through cross-side network effects, which in turn lead to mutually beneficial outcomes for all stakeholders involved (Capello, Lenzi, & Panzera, 2022; Cuvero1 *et al.*, 2023; Gawer, 2021; Suuronen *et al.*, 2024). Digital platforms drive the digital business ecosystem of multiple actors, constituted by platform owners, third-party application developers and application users (Bianco *et al.*, 2014; Eaton, Elaluf-Calderwood, Sorensen, & Yoo, 2015; Ghazawneh & Henfridsson, 2012). These three groups of actors are critical for the evolution and advancement of digital platforms, more so, promoting entrepreneurship development processes. In particular, they enable varied viable functionalities to continuously extend the existing functions of the digital platform to meet the pressing needs of users (Ghazawneh & Henfridsson, 2012; Hein *et al.*, 2020; Lukita, Chakim, Supriati, Santoso, & Kamil, 2023).

In practice, digital platforms offer an "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" (Tiwana *et al.*, 2010, p. 676). Such extension in a platform functionality is driven by platform boundary resources, which enable, facilitate and control an arms-length relationship between platform owners and third-party developers (Bianco *et al.*, 2014; Karhu, Gustafsson, Eaton, Henfridsson, & Sørensen, 2020; Karhu, Gustafsson, & Lyytinen, 2020; Rubleske, 2020). The utilization of digital platform boundary resources enables external application developers to cascade related actions from different developers, thereby fostering a generative process within the digital ecosystem for digital business development and benefits (Kovacevic-Opacic & Marjanovic, 2024). This results in a flourishing digital ecosystem while also empowering platform owners to govern the actions of third-party developers on the platform (Eaton *et al.*, 2015; Ens, Hukal, & Jensen, 2023; Ghazawneh & Henfridsson, 2012). A good example of digital platform boundary resources that have attracted many third-party application developers, who seek to pursue digital entrepreneurship include application programming interfaces (APIs), SDKs, integrated development environment (IDE), libraries, App. stores and platform governance. These boundary resources are offered by digital platforms like "Apple's iOS and Google's Android [that] have each managed to attract over two million apps that are built on top of the platforms" (Karhu, Gustafsson, Eaton *et al.*, 2020; Karhu, Gustafsson *et al.*, 2020, p. 105).

In literature, some groups of scholars studied digital platforms that leverage the expertise of third-party developers through platform boundary resources to drive innovation and development of new applications that extend the functionalities of the digital platform (Bianco *et al.*, 2014; Eaton *et al.*, 2015; Kovacevic-Opacic & Marjanovic, 2024; Mohagheghzadeh & Rudmark, 2017). This study shows that well-designed platform boundary resources influence platform owners to shift platform design responsibility to third-party developers, to enable the platform to access the right capabilities that are not available among the platform's original designers (Mohagheghzadeh & Lindman, 2022; Mohagheghzadeh & Svahn, 2016; Tiwana *et al.*, 2010). This shift in responsibility has created numerous entrepreneurship opportunities for third-party application developers and nascent entrepreneurs who are interested in pursuing digital business to create and capture economic value. Consequently, digital platforms' intention to evolve in their functionalities has unknowingly promoted digital businesses among third-party application developers within the ecosystem.

For instance, Petrik, Model, Drebinger, and Herzwurm (2021) explored how third-party developers access platform boundary resources to develop complement applications that can satisfy the needs of application users. The study shows that complementary orientation in

digital platforms influences the satisfaction of third-party developers who are seeking to develop complements to meet the needs of application users. In another study, Skog, Wimelius, and Sandberg (2018) investigated how digital platforms promoted entrepreneurship by investigating how Spotify leveraged the potential of platform boundary resources to emerge as a global business in music streaming. The result of the study shows that Spotify focuses on the scaling of platform functionalities, which enables the development of complements that satisfy the yearning needs of the customers that are in the ecosystem. Thus, the interesting perspective in literature toward the impact of digital platform boundary resources in digital entrepreneurship is the promotion of innovation and creativity through the co-creation of viable market offerings (Karhu, Gustafsson, & Lyytinen, 2018). However, another set of studies focus on platform governance (e.g. Farshchian & Thomassen, 2019; Ghazawneh & Henfridsson, 2012; Huber, Kude, & Dibbern, 2017; Karhu, Gustafsson, Eaton *et al.*, 2020; Karhu, Gustafsson *et al.*, 2020; Karhu *et al.*, 2018). These studies aim to examine how platform owners exercise control over third-party application developers who utilize the platform boundary resources. The platform owners regulate the platform resources by establishing rules and policies that promote and enforce specific behaviours among third-party developers involved in developing complementary products (Farshchian & Thomassen, 2019).

For instance, Ghazawneh and Henfridsson (2010) investigated how platform boundary resources govern the activities of third-party application developers in the Apple iPhone developers program. The study developed a framework that describes how platform boundary resources (APIs, SDKs, IDE, libraries and open-source licenses) can be used to govern the activities of third-party developers. This is especially important as they promote distributed coordination and control of the platform resources (Ens *et al.*, 2023; Ghazawneh & Henfridsson, 2010; Vargo, Fehrer, Wieland, & Nariswari, 2024). Karhu *et al.* (2018) emphasize that some digital platform owners utilize open-source licenses to encourage collaboration and innovation, hence, allowing third-party developers to access and modify the platform's core (Heshmatisafa & Seppänen, 2023; Karhu *et al.*, 2018). However, some scholars cautioned against being too open to prevent third-party developers from strategically exploiting core resources of the digital platform through platform forking (Karhu *et al.*, 2018). Karhu *et al.* (2018) describe platform forking as a process where "a forker, bypasses the host's controlling boundary resources and exploits the platform's shared resources, core and complements, to create a competing platform business" (Karhu *et al.*, 2018, p. 479). A good example of platform forking is the "case of Google, which established the Android Open Source Project (AOSP) to attract more device manufacturers to the Android platform. However, Amazon exploited the openness of Android to build its competing Android-like platform, Amazon Fire . . . Amazon monetizes Amazon Fire content and apps in a way that provides no revenue or benefit to Google" (Karhu, Gustafsson, Eaton *et al.*, 2020; Karhu, Gustafsson *et al.*, 2020, p. 106).

Therefore, Karhu *et al.* (2018) suggest that platform owners must be cautious of the level of open policy they offer to third-party developers, by enforcing some piece of regulations, policies and APIs, to ensure forking and multi-homing activities are minimized and possibly mitigated. This suggestion was further emphasized by Karhu, Gustafsson, Eaton *et al.* (2020) and Karhu, Gustafsson *et al.* (2020) in their recent study where they aver that platform owners must engage a strategy that "deploy four tactics – leverage, control, exploit, and defence to make the necessary trade-offs between variety and unity, and open and closed [as the platform evolves]" (Karhu, Gustafsson, Eaton *et al.*, 2020; Karhu, Gustafsson *et al.*, 2020, p. 105). Hence, owners of digital platforms need to retain certain command over the third-party developers they allow into their systems to maintain coherence and consistency. This includes monitoring the level of freedom granted to these developers to ensure they function within pre-established limits. Therefore, the existing literature discusses the architecture and evolution of digital platforms, as well as ways to secure them from third-party interference.

However, there is a paucity of research on how platform boundary resources influence the behaviour of third-party developers who pursue digital entrepreneurship. It is crucial to examine this aspect to understand the dynamics of developing digital entrepreneurship and the impact of platform boundary resources on entrepreneurs and third-party developers. By doing so, we can gain a better understanding of how digital platform boundary resources drive individuals' interest in creating complementary applications that are pivotal to engaging in entrepreneurial processes for economic value capturing.

3. Theoretical background

3.1 Theory of liminality

The concept of liminality is an ambivalent experience in a transitional process across boundaries or borders of margins and threshold (Darveau & Cheikh-Ammar, 2021; Rose, Leisyte, Haertel, & Terkowsky, 2018). It is experienced by an individual or a group of people who set out a separation to lose their identity of who they are, to engage in an adventure that will enable them to emerge with a new identity in a new reality that is guided by new norm and orientations (Gibbons, Ross, & Bevans, 2014; Leeming, 2014). The experience of the individual or group of people involved is referred to as the liminar (Darveau & Cheikh-Ammar, 2021). "The concept of liminality refers to the transitional phases in a human's life; phases that involve ambiguity and the dissolution of order that open a fluid or malleable space in which new ideas, practices and identities may emerge and develop" (Liedgren, Desmet, & Gaggioli, 2023, p. 1).

This suggests that liminality is characterized by disorientation, complexity and uncertainties, where an individual/group has separated themselves from their initial status but has not yet attained a prospective status, as they are still conducting activities in transition to fulfilling all necessary rites of passage (Gibbons *et al.*, 2014; Liedgren *et al.*, 2023; Pentikäinen, 1979). The liminality concept originated from the field of anthropology (Darveau & Cheikh-Ammar, 2021), developed by Arnold van Gennep in his study of rites of passage (Malksoo, 2012; Mueller-Greene, 2022; Söderlund & Borg, 2017). He identified three phases of activities that individuals/groups undergo when participating in the rite of passage, and he described the phases as "the preliminal (rites of separation from the previous world), the liminal (rites of the threshold stage), and finally the postliminal (rites of incorporation into the new world)" (Mueller-Greene, 2022, p. 268).

The preliminal phase is the separation or isolation phase of the individual or group of people from their known identity or form, it is a process of detachment from who they used to be, as they now pursue a new reality without any known identity (Ratiani, 2012; Söderlund & Borg, 2017). The liminal phase is the transition phase where the individual/group cannot be identified with any concrete identity or form, a space where structure and norm are suspended as activities become complex and disoriented (Stenner & De Luca Picione, 2023; Stephenson, 2020). This phase is the actual focus of the theory of liminality (Willson, 2019). The third phase is the incorporation phase, which corresponds to the phase where reaggregation of form is carried out to give a new stable identity or form to the individual/group of people involved, with new obligations and norms that are different from the liminal phase experiences (Söderlund & Borg, 2017). However, the concept was further improved in the work of anthropologist Victor Turner in the 1960s to expand the views for better understanding (Alkhaled & Sasaki, 2021; Beech, 2010; Söderlund & Borg, 2017; Wels, van der Waal, Spiegel, & Kamsteeg, 2015). During the transitional phase, the experiences may seem ambiguous and disorienting. Because it can be difficult to adjust to this unfamiliar space, where norms are absent and expectations are difficult to meet. Yet, it is important to remember that this is a real and tangible process individuals/groups are going through, and they have the ability to navigate through it (Rose *et al.*, 2018).

Therefore, the theory of liminality helps to explain the reconstruction process of the identity of an individual or a group of people pursuing a new identity or status. Alkhaled and Sasaki (2021, p. 1585) "argue that the concept of liminality is useful for understanding the uncertainties experienced by the forcibly displaced who are forced into the liminal space at the boundary of two dominant spaces, which is not fully part of either". A good example is a third-party developer who abandoned their original task of extending the functionality through the extension of a digital platform extendable core, to now seeking to become a digital entrepreneur who pursues entrepreneurship by developing user-centred applications as products/services that can meet the needs of a target market. Third-party developers undergo complex, ambiguous and uncertain gestation processes to develop new and innovative digital businesses for revenue generation (Rose *et al.*, 2018; Rubleske, 2020). In the current investigation, digital platform boundary resources (API, SDK, IDE, flexible control governance) and other environmental structures triggered the liminal space activities that permeate the gestation process of a new digital business. They influence the behaviour and desire of third-party developers to pursue the development of a new application that provides functionalities that satisfy the specific needs of an application user.

Most importantly, third-party developers operating in the liminal space, do this by suspending what they know, suspending disbelief and embracing ambiguity and uncertainty, to enable them to orchestrate appropriate ways of acting to change the narrative through innovative engagement (Liedgren *et al.*, 2023). This suggests that digital entrepreneurship gestation presents a situational process that is characterized by a region of ambiguity, moments of creativity, experiences of disruption, uncertainties and hierarchy reversal as actions and practices are conducted to earn the necessary rites of passage for the emergence of a new and viable digital business (Malksoo, 2012; Willson, 2019). In the phenomenon investigated, third-party developers usually experience profound vulnerability, disorientation and confusion as gestation proceeds, which keeps them in a constant change of views and iteration of actions that are driven by the confusing decisions that arise from the experiences of unanticipated contingencies and feedbacks from target application users and market forces, as prototype experimentation is conducted. However, the moment is also a time for creativity and innovation for third-party developers who strive for a viable and acceptable new application. Therefore, the liminal space in a digital entrepreneurship development process is the region between new business idea creation/identification and the emergence of a new product/service in a target market for its first sale.

In literature, the theory of liminality is a theory used to explicate meaningful transformational events and experiences of people about an investigated phenomenon of interest (Darveau & Cheikh-Ammar, 2021). It "has become a 'master concept' through which all that the term connotes—a position of marginality, critical subversion of rules and norms, transgression, generative creativity, parody and satire, fusion experiences—are unquestionably taken as inherently positive social-cultural goods" (Stephenson, 2020, p. 4). This is a theory that has been adopted in different studies to explain any phenomenon being investigated (Darveau & Cheikh-Ammar, 2021). Scholars adopt the theory to provide a transformational or transitional explanation of an entity transiting from one state to another. Examples include the career of academics (Willson, 2019), the development of a conceptual framework for the technology that delivers transcendence and deeper experiences (Liedgren *et al.*, 2023), the study of memory in Salman Rushdie's Midnight Children (Mueller-Greene, 2022), in identity reconstruction of people (Beech, 2010), and the understanding of family caregiving rite of passage (Gibbons *et al.*, 2014). Other studies include the experience of cancer survival (Blows, Bird, Seymour, & Cox, 2012), as a cultural change (Howard-Grenville, Golden-Biddle, Irwin, & Mao, 2011), in entrepreneurship education (Rose *et al.*, 2018), and in management and organizational studies (Söderlund & Borg, 2017). Therefore, liminality is a powerful lens that has been adopted to study entities and structural transformation to

understand rising resistances, dominations and unwavering disorientation of processual events characterizing a phenomenon of interest (Malksoo, 2012; Willson, 2019).

4. Methodology

The objective of this study is to examine how third-party developers engage with digital platform boundary resources to facilitate the pursuit of digital entrepreneurship development. Especially, to understand how third-party developers navigate through the rising resistance from the market forces, dominations of the competitors and unwavering disorientation of the processes involved in digital entrepreneurship development. Although the process of entrepreneurship development has been widely researched, this investigation aims to comprehend and theorize the influence of digital platform boundary resources. Especially, to understand the behaviour of third-party developers who are striving to create and capture value through developing new digital applications as a new business product/service for a target market. To conduct this investigation, the researcher adopted an expert interview qualitative research method, as the research design methodology for the study.

This study seeks to address the research question presented in the introduction section of this article by delving into investigating the behavioural patterns of third-party developers during the process of digital entrepreneurship gestation. Because the phenomenon the researcher investigated involves human behaviour, it is complex and contextually driven, and it is impacted by the sociocultural environment where such entrepreneurial activities are conducted (Fredriksen & Hadjerrouit, 2019). The expert interview qualitative research approach (Bogner & Menz, 2009; Döringer, 2021; Libakova & Sertakova, 2015) is a type of qualitative research methodology that guarantees "[an] empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context" (Yin, 2009, p. 18). This method of qualitative research "aims at exploring or collecting data about a specific field of interest" (Döringer, 2021, p. 265), by focusing on the experts who are deeply immersed in the development and operation of the phenomenon being investigated. To gain valuable insights into the process of digital entrepreneurship development, the researcher will be seeking the knowledge and experiences of third-party application developers who are considered experts in this field (Bogner & Menz, 2009). To understand the entrepreneurial behaviour of third-party developers, the researcher was enlightened by the interpretive paradigm, which is commonly adopted in qualitative research (e.g. Bogner & Menz, 2009; Boudreau & Robey, 2005; Döringer, 2021; Kim, Kim, & Lee, 2009; Levina & Vaast, 2008; Moe, Dingsøyr, & Dybå, 2010). This philosophical paradigm offers valuable insights into the behaviour of third-party developers as they engage in activities that promote ideation and product/service development in the digital entrepreneurship processes.

4.1 Context of the investigation

This study focuses on Nigeria's digital start-up ecosystem because it is a context in the global south that has been understudied in literature, perhaps, there is a need to understand how third-party developers navigate the digital divide/gaps experienced in Nigeria due to inadequate digital infrastructure. Nigeria possesses a digital start-up ecosystem, in its early stage, which constitutes a community of interactive actors involving third-party developers, digital entrepreneurs, mentors, investors, support organizations and government institutions (Motoyama & Knowlton, 2017). It is on record that it has "produced three exits, which are over USD 100 million: namely Andela, Konga, and Jumia. For instance, the online marketplace Jumia, which was launched in Lagos in 2012, has 3 million customers, 3,000 employees, and operates in 23 countries. Jumia group became the continent's first 'unicorn' with a 1 billion USD [plus] valuation in 2016" (OC&C, 2018, p. 10). However, the limited number of digital

technology skilled individuals, limited financing, unhealthy government policies and low levels of digital technology infrastructure awareness across the country continue to affect the performance of digital start-ups during commercialization. Corroborating this view, Abubakre, Faik, and Mkansi (2021, p. 4) "linked the success of [individual] digital enterprises to individuals' positive IT attitude, high personal innovativeness, and experience with IT" in a place like Yabacon Valley, Nigeria's own Silicon Valley (Lixi *et al.*, 2019). However, Nigeria's large population continue to breed an attractive market that is ranked among the top three countries in sub-Sahara Africa (Taura, Bolat, & Madichie, 2019). The other two countries include Kenya and South Africa, which all have recorded the highest investment in digital start-ups and possess a large start-up ecosystem in sub-Saharan Africa (David-West, Umukoro, & Onuoha, 2018; Taura *et al.*, 2019). A study presents a record showing that "Nigeria is the most popular investment destination on the continent. Between 2015 and 2022, 383 tech start-ups raised a combined US$2,068,709,445 – a higher total than any other country" (Disrupt Africa, 2022, p. 14). This suggests that Nigeria's digital start-up ecosystem remains a strong market for digital venture investors, irrespective of the digital infrastructural deficiencies persistently experienced.

Nigeria's digital start-up ecosystem is an evolving ecosystem, with over 100 technology hubs (i.e. tech hubs) known as support organizations across Nigeria (David-West *et al.*, 2018; Lixi *et al.*, 2019; Taura *et al.*, 2019). However, a recent study in Nigeria emphasizes that the number of tech hubs and co-working spaces has risen to about 300 across the country, with Lagos having the largest number, followed by Abuja, while few numbers are scattered across other parts of the country (Disrupt Africa, 2022). For instance "Co-Creation Hub (CcHub), Vatebra Tech Hub, Wennovation Hub, 360 Creative Hub and Leadspace (all in Lagos); Aiivon Innovation Hub, Ventures Park, and Work AND Connect (all in Abuja); and LPI Innovation Hub (Ibadan)" (Disrupt Africa, 2022, p. 44). These statistics present an overview of the number of technology hubs in Nigeria. The technology hubs provide networking resources and third-party developers' collaboration, accommodate and incubate third-party developers who seek to pursue entrepreneurship, to nurture their ideas towards metamorphosising into digital start-ups (Lixi *et al.*, 2019; OC&C, 2018). "World Bank defines tech hubs as spaces mainly focused on developing a digital entrepreneurship ecosystem, or a network of engagement between digital entrepreneurs, designers and potential investors" (Frontier Economics, 2018, p. 7). Tech hubs are promoters of digital entrepreneurship, provide accelerator services, incubator services, mentoring assistance, workspaces, digital infrastructures, digital entrepreneurs collaboration and provide access to finance by connecting digital tech start-up founders with partners like angel/seed investors and venture capitalists during gestation (David-West *et al.*, 2018; Quinones, Heeks, & Nicholson, 2021; Roshan Kokabha, Hekkala, & Tuunainen, 2018; Taura *et al.*, 2019). Most of the tech hubs are located in Lagos (Disrupt Africa, 2022), the commercial city of Nigeria, because most third-party application developers and digital start-ups are situated in Lagos Nigeria.

4.2 Negotiating entry to technology hubs in Nigeria's digital start-up ecosystem

Gaining access to suitable digital start-up founders for this investigation is critical, it requires formal approval from the technology hub (tech hub) management (Walsham, 1995, 2006). The researcher sent an official email to different tech hubs, informing them of his intention to carry out a research study on their premises, detailing the content of the research, and the expected benefit of the research outcome. A response from the tech hubs requested further details regarding the expected research, which include the reason for the research, the expected role of the researcher, the tech hub level of involvement in the research to be conducted, the confidentiality of digital start-up founders/co-founders to be selected, kind of information to be provided and the duration of the research study. Having responded to the

above request from the tech hub management, an approval email was received, granting the researcher access to the tech hub's premises. Following the approval, an office space was given to the researcher and the researcher was further introduced to the tech hub management team. This process was carried out in different tech hubs; however, due to funding needed to visit many tech hubs, only three tech hubs were selected as empirical situations for investigation.

4.3 Data collection

When conducting scientific research studies that involve human activities, the primary source of data collection is the participants who are purposefully selected to take part in the investigation (Layder, 1998; Naderifar, Goli, & Ghaljaie, 2017). In this study, interview participants are the primary source of data collection and they are chosen based on specific criteria that are relevant to the research question being investigated. Only founders of digital start-ups who were third-party developers and eventually transitioned to digital entrepreneurs were considered for the interview. The participants are the selected portion representing the whole population that is been investigated (e.g. Marton, 2013; Naderifar *et al.*, 2017; Onwuegbuzie & Collins, 2007; Onwuegbuzie & Leech, 2007). Therefore, a sampling technique known as purposeful sampling/snowball technique or even "gradually determined sampling structures" (Marton, 2013, p. 20) was adopted by the researcher to conduct this qualitative study (Naderifar *et al.*, 2017). This method of data collection offers the right selection of appropriate/relevant participants who possess the right knowledge and experience about the investigated phenomenon within our investigative context of interest (Flyvbjerg, 2006; Onwuegbuzie & Collins, 2007). A snowball method of sampling is described as a process where "[t]he researcher first identifies a group of people, and after gathering data, he/she asks them to recommend similar cases for the study" (Naderifar *et al.*, 2017, p. 2).

Thus, the researcher recruited participants who demonstrate maximum variation in experiences by involving different third-party application developers who are pursuing digital entrepreneurship development and are situated in technology hubs (i.e. tech hubs). These participants cut across different sectors, to help achieve heterogeneity in the data collected. As such, earlier selected participants who were recommended by the tech hub management help to introduce the researcher to other participants with relevant knowledge and experience within the investigative context to ensure the right sampling with target characteristics is accessed (Naderifar *et al.*, 2017). As part of the interview process, a group of 10 third-party application developers were carefully chosen through snowballing to participate in the study. These individuals are the founders and co-founders of a range of digital start-ups that were investigated. The selected number of participants was recorded to be 10 because the researcher experienced saturation when the tenth respondent was interviewed. This point of saturation is a point at which the inclusion of additional data from new participants does not yield any further relevant information (Braun & Clarke, 2019; Francis *et al.*, 2010; Fusch & Ness, 2015; Lowe, Norris, Farris, & Babbage, 2018). In this study, the researcher interviewed 10 participants; each of the interviews took an average of 46 minutes. The questions asked during the interview were open-ended. The nature of the questions encouraged the interviewees to express in detail their experiences, views and challenges encountered. They gave an account of their engagement with digital platform boundary resources in the development process, as a series of actions were taken and tasks were executed continuously (Walsham, 1995). Some of the questions asked include:

> What motivates you to engage in the process of creating a digital start-up? What role/impact did the digital platform play in the development process? How did you handle the complexities and uncertainties that ravage the development process? How were you able to develop an acceptable digital product/service that represented your digital start-up in the market? How did you acquire the

necessary resources needed for the development of the application that represented your product/services? What are the challenges experienced in the process of developing digital products/services? How did you resolve these challenges to enhance the development process? How has digital technology impacted the decision to engage in digital entrepreneurship?

Hence, at the point of saturation, sampling more participants to further stretch data collection makes no difference to the already collected but could be counterproductive to the themes/categories of the descriptive evidence already developed (Francis *et al.*, 2010; Fusch & Ness, 2015). However, "[f]ailure to reach data saturation has an impact on the quality of the research conducted and hampers content validity" (Fusch & Ness, 2015, p. 1408). Therefore, the researcher ensured that while collecting data, the data collection exercise reached a point where no new data was discovered from the next participant interviewed. Table 1 depicts the participants interviewed in the investigation. However, the names of the third-party application developer and their digital business name were replaced with letters for participants' privacy.

4.4 Data analysis

The study aimed to gain insights from different perspectives offered by third-party developers who are interested in pursuing digital entrepreneurship. The researcher focuses specifically on actions, practices and experiences of the third-party developers with digital platform boundary resources, and their interactions with other application developers. Hence, voice recording and detailed notes and memos were taken throughout the interview process, which requires a rigorous and thorough analysis of data, having triangulated the written and voice data collected. To commence the data analysis, the researcher first transcribed the collected interview audio data into English and then made sure to get it validated by the interview participants to ensure that there were no errors or misunderstandings. This

Table 1.
Sample respondents of third-party application developers in the empirical situation

Respondent details	Third-party digital applications	Primary role of respondent	Number of years	Number of meetings for interview & clarification	Time used during interview
B1	Gaming Application	Founder	3	2 meeting	48min & 25min
B2	Aggrotech Application	Founder	4	2 meeting	43min & 27min
B3	E-commerce Application	Founder	4	1 meeting	55min
B4	E-Health Application	Founder	3	2 meetings	35min & 40min
B5	Digital Media Application	Co-Founder	4	1 meeting	40min
B6	Fintech Application	Founder	4	1 meeting	58min
B7	Advertising Application	Founder	3	2 meetings	43min & 33min
B8	Prop-Tech Application	Co-founder	2	2 meetings	38min & 20min
B9	E-Health Application	Co-founder	3	1 meeting	50min
B10	Fintech Application	Founder	4	2 meetings	46min & 30min

Source(s): Table 1 developed from Ajah's fieldwork

approach enables the researcher to completely understand the data collected. Then, the transcribed data is triangulated with the notes and memos that were taken during the interview.

To analyse the data collected from the empirical situation, the researcher employed a rigorous methodology, which involved a series of structured coding procedures (Charmaz & Belgrave, 2018; Corbin & Strauss, 1990; Glaser & Strauss, 1967). These structured procedures consisted of open coding, which allowed for the initial exploration and identification of patterns in the data, thereby creating labels representing different patterns identified in the data collected. Axial coding was then used to establish the relationships between these patterns, while selective coding helped to refine the analysis by focusing on the most significant concepts and themes representing the patterns (Corbin & Strauss, 1990; Glaser & Strauss, 1967). Throughout the analysis process, the researcher made sure to constantly switch back and forth between the data and the emerging propositions, to ensure that the analysis was firmly grounded in the evidence that was collected. During the analysis, to achieve abstraction and generalization (Klein & Myers, 1999), the researcher skilfully highlighted similar descriptions and meticulously coded the descriptions using the NVivo analytic tool to identify clear explanations for the various codes that were used. This is illustrated in Figure 1.

To begin with the coding process, the researcher openly coded the interviews, identifying 87 codes that represented various instances and practices of the third-party developers' engagement with digital platform boundary resources. These codes were then grouped into 23 subthemes for different digital entrepreneurship development activities through axial coding. The next step involved selective coding, which involved integrating different activities of the third-party developers that were presented as sub-themes to form the themes. This process continued until an overarching theme, the core theme that best represents the phenomenon under investigation was identified and depicted in Figure 1. Throughout this process, the researcher iterated between the identified codes to ensure that higher-level codes (i.e. themes) were identified and aligned with the underlying data. This thorough approach allowed the researcher to gain a comprehensive understanding of the third-party developers' engagement with digital platform boundary resources and their implications for digital entrepreneurship development activities. Overall, this analysis provides valuable insights into the behaviour of third-party developers in the digital entrepreneurship space, shedding light on their experiences and interactions with digital platform boundary resources.

5. Findings

This section provides a detailed result of the analysis of the data, revealing a fascinating pattern that sheds light on the role of digital platform boundary resources. The findings demonstrate how these resources influence, motivate and attract multiple third-party developers to help navigate the ambiguities, disorientations and uncertainties experienced during digital entrepreneurship development. With the help of these platform boundary resources, such as APIs, SDKs, IDEs, Libraries and Platform policies, third-party developers could navigate the complex and often disoriented landscape of digital entrepreneurship development, ultimately leading to successful outcomes. This is discussed following.

5.1 Access to resources and flexible control influencing new business opportunity and ideation

Our research findings suggest that digital platforms offer third-party application developers a high degree of autonomy, ensuring access to resources and enabling loosely coupled engagement with various tasks, ultimately resulting in the co-creation of new business

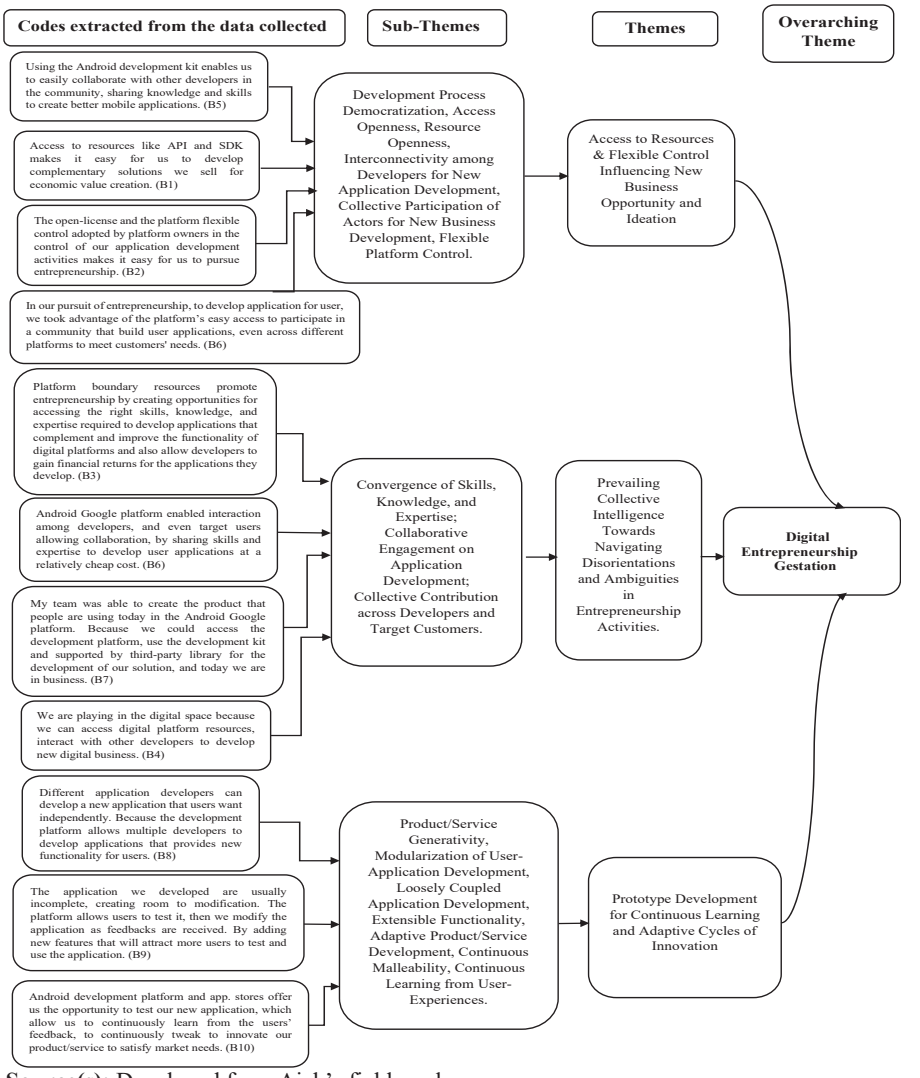


Figure 1.
Coding and theme development process

Source(s): Developed from Ajah's field work

products and services. This autonomy motivates third-party developers to pursue new business ideas and entrepreneurial activities by creating modular complements that meet the immediate needs of a specific market. The emergence of digital platforms and open access to its boundary resources has transformed traditional entrepreneurship from an individual-based approach to a group-based model. It has created opportunities to mitigate various forms of challenges encountered during new business development. Digital platforms changed the dynamics of entrepreneurship by altering the behaviour of entrepreneurs from thinking individually to having a collective imagination of different actors who are in collaboration. This technological infusion has revolutionized the way entrepreneurs develop

and conduct new business activities, as digital platforms offer open access and provide loose or flexible control among multiple actors, such as third-party application developers during their engagement.

The digital platform creates a complex web of interactions among different actors and can be challenging to navigate. As a result, third-party developers have a high degree of autonomy in their activities but often face ambiguity in their decision-making processes. They are required to consider multiple factors and perspectives during the process. Also, technological advancements introduce new forms of uncertainties, which keeps third-party developers continuously seeking collaborative support to resolve such uncertainties. Third-party developers continuously interact with the platform boundary resources, as user demands keep changing, which makes them develop applications with functional diversification to ensure that products and services developed meet the requirements to conduct new digital businesses.

Despite these challenges, digital platforms offer significant opportunities for third-party developers to operate as entrepreneurs and to expand their reach and access to new markets, making it an essential tool for success in today's business landscape. This unique feature encourages the development of new business ideas and the co-creation of products/services that can foster success for digital entrepreneurs. The platform owners guarantee flexible control among third-party developers as a key feature and are predominantly practised among the founding team in our investigated context. This control pattern empowers every team member to make independent decisions that contribute to the effective development of digital business applications (software products). Our findings suggest that practising flexibility in the control and coordination of the platform activities enhances internal complexity among third-party developers and platform owners and plays a crucial role in influencing the contribution of each participating actor as new business ideas are developed and transformed into viable products/services. By embracing this approach, third-party developers imbibe new behaviour that makes them transform into digital entrepreneurs who leverage the potential of the platform to foster collaborative, innovative and successful new digital business development. Participants B4 and B10 noted

> Digital platforms are very important; it has offered big benefits to developers of applications. For instance, a digital platform used for application development is easily accessible to us, and it allows us to have the opportunity to interact with other actors who support the development of new business ideas.

> Today, digital platform boundary resources have allowed us to tap into a vast resource used for application development, and has made it easy for us to develop our products.

During the interview, the participant discussed how digital platforms play an important role in providing support for entrepreneurial activities, particularly, in the face of challenges and uncertainties. The participant highlighted how such platforms offer boundary resources that help individual actors personalize the tasks of the application developed for the new digital business. This personalization enables entrepreneurs to make adaptive decisions as they encounter opportunities and challenges during task execution, especially in the presence of environmental uncertainty. The participant explained that the personalization of tasks allows entrepreneurs to tailor their approach to the specific needs of their business, adapting to changing circumstances and leveraging the unique strengths of their team. This approach also enables third-party developers to participate in decisions independently, promoting collective involvement, unity and a shared purpose without undermining the established goals of the digital platform. Overall, the participant emphasized how digital platforms can serve as powerful tools for entrepreneurs, providing them with the resources and flexibility they need to drive innovation, growth and success in their ventures.

5.2 Prevailing collective intelligence toward navigating disorientations and ambiguities in entrepreneurship activities

The feedback received from the participants interviewed has provided valuable insights into the crucial role played by digital platform boundary resources in promoting entrepreneurship. These resources have facilitated the connectivity of application developers from different geographical locations and as a result, allow them to collaborate and share their expertise and knowledge. This collaboration has led to the acquisition of essential human resources such as intelligence, skills and expertise, which are critical for the development of digital products and services. Hence, the digital platform served as a meeting point for these actors, providing a space for the aggregation and sharing of resources, ultimately leading to digital business development and the success of numerous digital ventures. As participant B7 noted

> As a digital entrepreneur, you focus on platform boundary resources to enable you to have access to resources and the right developers, especially to gather critical skills and knowledge needed to carry out tasks that will drive successful product/service development.

In the digital age, entrepreneurs face significant challenges when trying to establish new businesses due to the unpredictability of the business environment, commonly referred to as environmental uncertainty. This challenge can be reduced by collective intelligence and expertise gathering from various stakeholders. This means involving different actors, including programmers, entrepreneurship experts and end-users during the development process. By leveraging the knowledge and expertise of these actors, entrepreneurs can gather critical insights and information to make informed decisions about their business development process. This is exceptionally important as feedback obtained from application users provides valuable information about the specific needs of the market and the performance of the new product or service in the market. Digital platforms play a crucial role in facilitating this process by providing third-party application developers with access to vital resources required for the development process. These resources include development tools, software libraries, APIs and app stores, enabling them to develop and experiment with the prototype of a product/service for gathering feedback from application users. By having access to these resources, third-party application developers can develop new digital businesses more efficiently and effectively, thus increasing their chances of success during market entry.

5.3 Prototype development for continuous learning and adaptive cycles of innovation

Digital platforms have revolutionized product and service development by enabling adaptive cycles of innovation through the creation of prototypes that undergo regular testing by application users. This is driven by digital technology's generative and specificity characteristics. Thus, it facilitates the modification of the prototypes based on user feedback to cater to the immediate specific needs of the market. The generative and malleable nature of digital platforms motivates third-party application developers to pursue entrepreneurship, even making them experiment with new ideas, as it allows them to learn from user feedback to determine the actual need for adjustments. As a result, digital applications remain intentionally incomplete in their development to cater to the ever-evolving user needs. Our research confirms that digital technology, particularly, digital platforms, relies on its generative and specificity characteristics to drive and guarantee the adaptability and malleability of new market offerings in any market of interest. This feature enables application developers to modify, streamline and expand value propositions from time to time, to meet the needs of a specific market. Therefore, digital entrepreneurs continuously push to modify prototypes based on user feedback, ensuring that their products meet market needs and remain relevant.

Developers have the opportunity to experiment with new applications in the market by utilizing app stores and other digital platforms, which allows them to gather direct information from users' reviews. This enables continuous experiential learning and further development of the application to easily meet user needs. As an aspiring entrepreneur, it is critical to remain agile and adaptable when it comes to your product/service offerings. Gathering feedback from users and analysing the competitive landscape can help you make informed decisions about how to improve your market position. According to the participants in this research, digital entrepreneurs consider the testing phase as a crucial aspect of the application development and digital entrepreneurship processes. Building a prototype allows for modifications and adjustments, which can help you navigate any challenges that arise. Utilizing app stores can also speed up the process of adapting your application to meet your users' needs. By consistently gathering feedback and analysing performance, you can identify opportunities for growth and address any potential roadblocks. This enables ongoing strategic decision-making that can help ensure the continued success of your new digital business. For instance, Participant B1 and B9 noted,

> To understand the mind of our target customers towards our new application that is being developed, we usually engage App. Stores to test our MVP (i.e. minimum viable product).

> With the introduction of our MVP in the app. store, we presented our application prototype in the market. Application users engage with the review system to convey the merits or defects of our new application, they sometimes ask for new features. Also, they report any bugs noticed and even ask for support when necessary. Then, we recorded lots of responses from the target users, which has helped our decision-making process.

Therefore, this research highlights how third-party developers are encouraged to pursue entrepreneurship development processes. It explains how important it is for developers to seek feedback from application users through ongoing experimentation of incomplete prototypes. This feedback provides valuable insights needed to refine prototypes and optimize the expected products/services for a first sale in a target market. Digital platform boundary resources serve as a crucial tool for third-party developers to stay informed about the latest information and enhance their knowledge and expertise to continuously innovate their offerings. Moreover, these resources equip them to proactively address external challenges and contingencies arising from stakeholders and market force dynamics.

6. Discussion

This study investigated the entrepreneurship behaviour of third-party developers influenced by digital platform boundary resources, as they transition through the disoriented and ambiguous processes of digital entrepreneurship development (Garrigos-Simon *et al.*, 2021; Hanesch & Schallmo, 2022; Zaheer *et al.*, 2019). Thus, the findings from the study support existing studies (e.g. Mainela & Puhakka, 2008; Naudé & Liebregts, 2020; Sanz-Velasco, 2006; Standing & Mattsson, 2016). However, the outcome of the study extends knowledge by identifying and providing a liminality perspective on how digital platform boundary resources influence the behaviour and experiences of third-party developers as they digitally engage in different entrepreneurial activities. They do it by simplifying tasks through the collaborative input of multiple actors. So, having identified an opportunity and further confirming its viability, collaborative third-party developers subsequently develop an innovative business model that represents a feasible hypothesized assumption of the value proposition to be developed and experimented. This is a supportive finding that corroborates some past studies (e.g. Standing & Mattsson, 2016).

The outcome of the present study indicates that the development of digital entrepreneurship is a transitional process, where third-party developers shift their focus

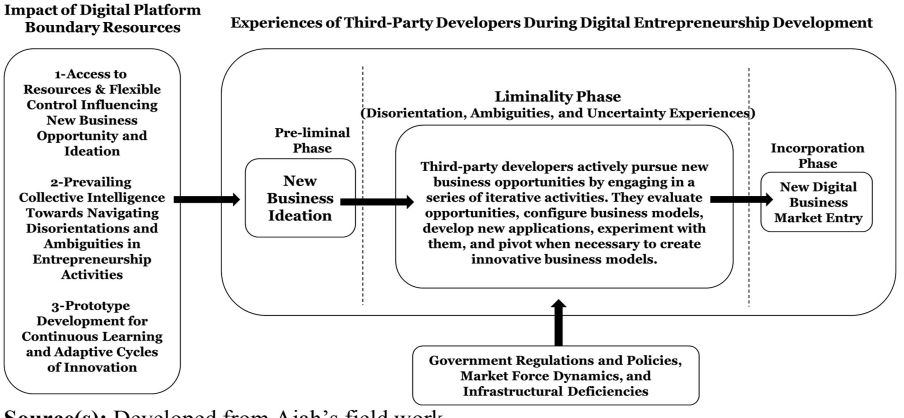
from developing complementary applications for digital platforms to becoming digital entrepreneurs who are interested in pursuing entrepreneurship. The researcher discovered that this shift is driven by the interaction between third-party application developers and digital platform boundary resources. The process involves third-party developers identifying market needs, creating a new business idea, evaluating it and eventually transforming it into a product or service that they can sell in a specific market. This process involves multiple actors and typically includes several recursive events, such as ideation, configuring a business model, acquiring resources, developing a product or service and entering the market for the first sale. Thereby corroborating earlier studies in entrepreneurship development (e.g. Chen, Cui, Hunt, & Li, 2020; Davidsson, 2015; Davidsson, Recker, & von Briel, 2020; Nzembayie & Buckley, 2022). However, the current study extended the literature by presenting a view that explicates how digital platform boundary resources influence the interest and behaviour of third-party developers who pursue entrepreneurship. The current study elaborates on the process by describing the development process as occurring in a liminal space, involving many complications characterized by ambiguous activities, hence, it is a period of crisis for third-party developers who became entrepreneurs (Daniel & Ellis-Chadwick, 2016).

Third-party application developers emphasize that the period involves making risky decisions, where structure and orderliness remain suspended, however, digital platform boundary resources enable third-party developers to navigate through these complexities. So, the process of digital entrepreneurship development exists in a liminal space, whose activities involve a complex and multifaceted process, characterized by creativity and innovative performances that are not bounded by any traditional bureaucratic structures or controls that cause the emergence of a new viable digital business. Therefore, application developers pursuing digital entrepreneurship are considered to be operating in a space of uncertainty and chaos. They engage with the perceived affordance of digital platform boundary resources to enable them to transition from being application developers who develop complementary applications for the extension of digital platform functionality to becoming digital entrepreneurs who develop and launch a new product or service through a digital platform for a target market for financial returns. The study reveals that throughout the development process, third-party developers find themselves in a transitional space where they must make important decisions regarding entrepreneurial actions and practices. These developers must overcome the challenges of this transitional phase by creating innovative and attractive products or services that meet the demands of the market and are financially viable (Stenner & De Luca Picione, 2023; Turner, Abrahams, & Harris, 1969).

The study emphasizes the challenges faced by third-party developers during the process of digital entrepreneurship. These challenges arise when new business ideas are being explored, refined and tested, which can create uncertainties and risks. This experience can be stressful for application developers as they try to validate their business model, target market and product/service offering. To navigate through these challenges successfully, they need to be agile, responsive and adaptive to changing market conditions and customer needs. Digital platform boundary resources make navigation easy by providing a platform where a talented and dedicated team can work collaboratively to achieve their goals. The study suggests that third-party application developers should explore the openness of digital platform boundary resources to attract and collaborate with multiple third-party developers to enable them to navigate the complexities, limitations and uncertainties experienced in conducting application development activities for entrepreneurship. Digital platform boundary resources enable third-party application developers pursuing entrepreneurship to navigate the challenges that arise when operating in an environment that lacks orderliness, structures and bureaucracies. By taking continuous action to resolve various complexities and

dynamics, such as government regulations and policies about the market offering (e.g. fintech solution), market forces and technological advancements. Digital platforms help to create a more constructive and supportive environment for developers pursuing entrepreneurship. This ultimately leads to a more efficient and productive digital entrepreneurship ecosystem for all stakeholders involved. In the liminal space of digital entrepreneurship development, the activities are spontaneous and challenging, yet, drive a rewarding experience, as they offer immense opportunities that can create a viable and innovative product/service that is attractive to the market (Wels *et al.*, 2015; Willson, 2019). Figure 2 illustrates the three phases of liminality experienced by third-party application developers who are pursuing digital entrepreneurship development. These three phases are the pre-liminal phase (separation), the liminal phase (liminal space) and the post-liminal phase (incorporation/aggregation). Figure 2 is a visual representation of the constructive journey that a third-party application developer takes to become a successful digital entrepreneur. It details the different stages starting from the conception of a new business idea to the development of a viable digital business in a specific market niche.

The framework in Figure 2 shows that digital entrepreneurship development is characterized by iterative activities that arise from the actions and practices conducted through the interaction of third-party developers with the digital platform boundary resources within a given environmental conditions (Bianco *et al.*, 2014; Bonina *et al.*, 2021). Especially as the third-party developers who participated are loosely controlled by the platform owners. In this process, new applications developed to meet users' needs are usually influenced by the flexible platform governance structure offered by the digital platform, in addition, the ease of access to application users (i.e. target users) helps third-party developers in gathering information about the current needs and expectations of the market (Ghazawneh & Henfridsson, 2012). For individuals aspiring to become digital entrepreneurs, it is crucial to develop applications that cater to the needs of their intended audience and adapt to the regulations and policies guiding such market offerings. The current study further extends knowledge in literature by revealing that while creating an application can enhance the functionality of a digital platform, it alone does not suffice to establish oneself as an entrepreneur. Entrepreneurs should consider the market forces and the product/service suitability by prioritizing the modelling and creation of a sustainable and gratifying application for particular market conditions. To overcome the hurdles of digital entrepreneurship especially in an uncertain and complex environment experiencing unstable regulations and policies, third-party developers take advantage of the digital



Source(s): Developed from Ajah's field work

Figure 2.
Liminal space experience of third-party developers during digital entrepreneurship development

platform by utilizing the resources available on the platform to collaborate with others. This cooperation fosters uncertainty mitigation, innovative products/services, ingenuity and the emergence of new applications, ultimately leading to exciting entrepreneurial prospects for value generation and capture. The following sub-sections elaborate on the different phases experienced by third-party developers as they engage in digital entrepreneurship development.

6.1 Pre-liminal phase (ideation)

The pre-liminal phase is considered a period where third-party developers get disjointed with their personalities and the primary task of developing new applications that will extend the functionality of a digital platform. In this phase, they focus on exploring the prospects of pursuing entrepreneurial activities. This new pursuit keeps the developers conducting non-routine activities (Söderlund & Borg, 2017) because they no longer focus on the task of enhancing the features and functionality of a digital platform's extendible core architecture and performance. They are brainstorming a new business idea and figuring out how to make it profitable. Hence, third-party developers become inclined towards identifying or creating ideas that can solve specific market problems and developing applications as a product/service to solve identified needs. So, third-party developers take advantage of platform boundary resources to pursue entrepreneurship. This is that phase where some critical questions are asked and answers are sought. The questions include "*What is a pressing market unmet need that needs to be solved? What is a solution to this problem? What has to be done for this solution to work? What are the minimum resources or possible effort required? What is the simplest way to gather resources and capture value? Who is the target market or customer segment? What is the channel needed to deliver this market offering? Who is my competition?*" These questions are pondered upon by the third-party developers to help prepare them for the task ahead and the validation of the market needs.

Interestingly, third-party developers continuously shape their experience and behaviour for entrepreneurship through the digital platform boundary resources, which help them collaborate with other developers and experienced entrepreneurs to evaluate new business ideas. They also expand their reach and attract other actors through the boundary resources. Further, third-party developers explore the possibilities of developing applications that can be utilized seamlessly across multiple digital platforms by taking advantage of the freedom to engage in multi-homing. These new proposed applications are expected to serve as complementary products/services, ultimately providing a more enriching experience for users who patronize different platforms (Constantiou, Eaton, & Tuunainen, 2016; Hein *et al.*, 2020). In this phase, the developers carefully analyse the pressing needs of application users across platforms. Then, evaluate current market issues to identify and create new and innovative business ideas that can be pursued and transformed into profitable products/services. This is a motivation that attracts third-party developers to pursue entrepreneurship and drives their intention to develop an application that prioritizes the needs of an application user over the platform's core functionality extension and evolution (Constantiou *et al.*, 2016; Hein *et al.*, 2020; Rubleske, 2020).

6.2 Liminal phase (third-party application developers' entrepreneurial actions and practices)

The process of developing digital entrepreneurship can be described as a process that occurs in a liminal space (Söderlund & Borg, 2017). This is because the activities conducted are transitional, though recursive and move from ideation to commercialization in a target market (Daniel & Ellis-Chadwick, 2016; Kraus *et al.*, 2018; Willson, 2019). During these liminal space activities, third-party developers conceive a new business idea, refine it, develop a product/service and finally launch it in the market for its first sale (Kraus *et al.*, 2018;

Paternoster, Giardino, Unterkalmsteiner, Gorschek, & Abrahamsson, 2014). However, we need to know that "[in] practice, [digital entrepreneurship] gestation is not an easy process, but a difficult period in the life of a new business; it is full of uncertainties, and concerns, continuously faced with an alarming resistance to stakes, and characterized by a phase where risky decisions are continuously made" (Ajah, 2023, p. 1). Then, to better understand the phenomenon investigated, the researcher draws from the liminal space perspective, as he adopts the view of some scholars who consider certain situations as a liminal experience. A scholar described "liminality as the process of going in between two states and the time spent in that transitional zone when one is neither one nor the other but in the process of becoming" (Leeming, 2014, p. 1033). Third-party application developers, who engage in business development activities, become digital entrepreneurs when they introduce new applications to the market.

This view helps to elaborate third-party developers' experiences during digital entrepreneurship development, as product/service is being developed and continuously tested and modified for market fit. In this context of the investigation, Figure 2 depicts the two states that boundary the liminal space of digital entrepreneurship development. The phases boundaring the liminal space include ideation (pre-liminal phase), and the new digital business market entry (incorporation phase) (Leeming, 2014; Mueller-Greene, 2022). What happens between these two boundaries describes the entrepreneurial actions, practices and experiences of third-party developers who seek to develop and refine products/services to meet the needs and demands of the market. However, the actions and practices are seen to happen in a non-structured and unguided liminal space, a space where structure, norms and control are suspended. A space where platform owners do not determine or exhibit full control of the decisions and actions of third-party developers who use the digital platform boundary resources to pursue digital entrepreneurship development and operation.

The liminal space represents an iterative sequence of processual activities engendered by third-party developers who interact with digital platform units that are loosely coupled but engage the affordances of digital platform boundary resources for the transformation of a viable business idea to a new digital business in a target market. This is a threshold region where multiple third-party developers seek collaboration to drive actions and practices necessary to create and transform new innovative business ideas into new applications that represent the product/service of an emerging digital business that is expected to satisfy the needs of the target market. So, it is a period where a flux of entrepreneurial activities is triggered by digital platform boundary resources, where third-party developers lose their identity from being application developers for digital platforms to becoming digital entrepreneurs who are pursuing entrepreneurship for value creation and capturing (Daniel & Ellis-Chadwick, 2016; Gibbons *et al.*, 2014). Figure 2 shows the emerging digital business that arises from the iterative entrepreneurial actions of the actors coordinated by the resource openness of the digital platform, making third-party developers incentivized to undertake actions that foster new digital entrepreneurship development.

The capabilities of digital platforms are inspiring new venture ideas and opportunities, which influences third-party developers. Third-party developers leverage these capabilities to develop application software that can provide innovative solutions for unmet market needs. Thus, the rise of digital technology has provided a valuable platform for the development and testing of the viability of new business ideas, concepts and business models. Most often, application developers can seek input from their intended customers and other stakeholders via social media platforms, app stores and websites. Though the process can be challenging due to inherent ambiguities, it empowers digital entrepreneurs to be resourceful and innovative in addressing feedback, ultimately earning the market's trust, confidence and support.

Today, the process of building digital entrepreneurship involves a series of iterative steps that are subject to uncertainties and various dynamics that arise with the process as continuous efforts are engaged to guarantee the needs of the target audience are met. These steps ultimately lead to the creation of innovative digital products/services through a sequence of emerging events. The dynamic nature of the digital platform, with its open access to its resources, creates a certain level of ambiguity and uncertainty that further complicates the process. However, this experience provides ample opportunities for third-party developers to experiment with and refine the developed prototype of the market offerings. The adjustments made to these offerings reflect the third-party developers' response to complexities and even to customer feedback. Throughout this process, third-party developers track the outcomes of their efforts from target application users' responses, then pivot and reconfigure the business models and value proposition accordingly. Nevertheless, it is important to note that digital entrepreneurship is also influenced by the environment in which it operates, as the conditions of this environment create instabilities that further shape the course of events. Various environmental structures and enabling conditions affect activities in the liminal space, influencing the decision-making and actions of third-party developers. This suggests that liminal space represents a transitional rite of passage that requires careful attention, which every third-party developer must navigate to pursue entrepreneurship development for digital business (i.e. start-up) emergence in a target market (Gibbons *et al.*, 2014).

The outcome of the study demonstrated a critical and significant role played by digital platforms in entrepreneurship. It shows how it changed the way entrepreneurs conduct their activities and enables collaboration among different individuals located in different places. This finding aligns with the views of other scholars in previous studies who emphasized digital technology offers collaborative and co-creation activities for new digital products/services development (e.g. Giones & Brem, 2017; Kraus *et al.*, 2018; Nambisan, Lyytinen, Majchrzak, & Song, 2017; Nambisan, Wright, & Feldman, 2019; von Briel *et al.*, 2021). From the findings of the study, it is evident that the digital platform boundary resources' fluidity and openness are responsible for and drive the activities that led to the interactive actions and practices that culminate in new digital start-up emergence. The influence of platform boundary resources keeps the involvement of multiple actors, empowering entrepreneurs to take steps that overcome certain known challenges like a limitation of required skills and other resource deficits and mitigating the consequences of uncertainties that arise from the government regulations, policies and market forces. Hence, the role played by digital platform boundary resources to mitigate challenges against the progress of the development process becomes especially important in an environment experiencing constrained resources, market force dynamics and unfavourable and inconsistent government policies and regulations that tend to limit the entrepreneurs' performance and success.

Finally, third-party developers look for various resources to turn their business ideas into reality. They frequently use digital platforms to find the expertise and financial resources needed to create new products or services. Thus, crowdsourcing and crowdfunding platforms are especially popular among these entrepreneurs, as they provide access to resources that may not be readily available locally. In an environment with limited investors and few skilled professionals, as we have in our investigation context (i.e. Nigeria's digital start-up ecosystem), these platforms can have a significant influence by helping entrepreneurs overcome resource constraints. Therefore, it enables third-party developers to develop new business ideas and bring them to life. This finding supports prior studies that describe such platforms as critical to new venture development and resource acquisition (e.g. Garrigos-Simon *et al.*, 2021; Nambisan *et al.*, 2019; Smith & Smith, 2021). Therefore, digital platforms play a crucial role in the development and experimentation of new market offerings. Further, digital platforms offer lean start-up/agile methods for product/service development, which enables the co-creation of products/services, and as a result, they can mitigate every

uncertainty and resource limitation experienced. This approach also prioritizes user-centred design, ensuring that application users are involved in every step of the product/service development process. Through experimentation and feedback, third-party developers gain a deeper understanding of their customers' needs. Feedback informs the iterative process of pivoting and modifying the product/service until it perfectly aligns with the market. As the offering becomes more refined, new digital businesses emerge in the market, gaining traction and generating revenue as users become increasingly satisfied. Therefore, the findings from the study corroborate the lean start-up principle, whose approach is to "[c]reate value for the customer . . . Identify the value stream . . . Create flow . . . Produce only what is pulled by the customer . . .. Pursue perfection by continuously identifying and eliminating waste" (Ghezzi & Cavallo, 2018, p. 3).

6.3 Incorporation phase (emerging new digital business)

In the current phase of the digital entrepreneurship journey, the efforts of the individuals and parties involved have resulted in the emergence of a thriving digital business. This business boasts a promising product/service that is capable of generating consistent revenue and can rapidly gain momentum and traction in the market. At this point, the third-party developers involved have successfully transitioned from being third-party developers to becoming established players in the digital market as digital entrepreneurs. In addition, their applications are actively fulfilling the needs and wants of their intended users, effectively meeting the demands of a rapidly evolving digital landscape.

7. Conclusion

This research paper presents an in-depth empirical analysis of how digital platform boundary resources impact the entrepreneurial behaviours of third-party application developers, especially as they transition from third-party application developers of a digital platform to thriving digital entrepreneurs. The research study highlights the ability of these developers to demonstrate resilience in the face of ambiguity, disorientation and uncertainties that are inherent in the digital platform and environmental context. The primary aim of the study is to develop a conceptual framework that explains the role of digital platform boundary resources as third-party developers experience liminality during the process of digital entrepreneurship development. The study examines the various boundary resources provided by digital platforms, such as application programming interfaces, software development kits, integrated development environments, libraries and access to platform data. The research findings demonstrate that digital platform boundary resources play a significant role in the development of digital entrepreneurship in today's market. The study highlights how these resources enable third-party developers to create new applications that expand the functionality of the digital platform, leading to increased user engagement and revenue generation. Therefore, this study contributes significantly to the advancement of theoretical conceptualization and practice in the literature. It provides a better understanding of the role of digital platform boundary resources in promoting digital entrepreneurship and highlights the importance of these resources for both theory and practice.

7.1 Theoretical contribution

This study contributes to theory, its outcome is a conceptualization of the role of digital platform boundary resources in the promotion of digital entrepreneurship. The outcome of this study responds to the call from some scholars who lamented the absence or limited conceptualization of digital platform impact on digital entrepreneurship processes in the existing literature (Anim-Yeboah *et al.*, 2020; de Reuver *et al.*, 2017; Foisal *et al.*, 2023;

Rubleske, 2020). So, this study delves into the experiences of third-party developers involved in digital entrepreneurship development by adopting the theory of liminality. The developed conceptual framework extends the current literature by providing a theoretical elaboration of third-party application developers' experiences and the factors that impinge on them. The framework identifies several factors that contribute to the uncertainties and ambiguities experienced during the process of digital entrepreneurship development. First, digital platform boundary resources play a crucial role in shaping the experiences of third-party developers. Second, government organizational institutions also impact the experiences of these developers. Third, market structures characterized by unmet needs and competitive landscapes also affect the experiences of third-party developers. Finally, the interactions with other stakeholders such as investors, customers and suppliers also play a significant role in shaping the experiences of third-party developers. Hence, the study is distinct from other studies (e.g. Davidsson & Gruenhagen, 2020; McMullen & Dimov, 2013; Moroz & Hindle, 2012; Selden & Fletcher, 2015; Servantie & Rispal, 2018; Zaheer, Breyer, Dumay, & Enjeti, 2022) because it extend literature by demonstrating with a framework in Figure 2 how digital platform boundary resources mediate to provide the resources and context that enables third-party developers to succeed during liminal space activities and experiences. The framework takes into account the contextual dependencies of a specific environment (Gudi & Chinta, 2020; Steininger, 2019) and provides an account of the role of digital platform boundary resources, environmental structures and enabling conditions. These factors have a significant influence on the behavioural actions and activities of third-party developers who are pursuing entrepreneurship in the investigated context. Importantly, the framework developed in this study promotes an un-deterministic perspective on digital entrepreneurship development, which means that it recognizes the importance of various factors that can influence the emergence of new digital businesses in a target market. Hence, the study develops new concepts that explain the role of digital platforms in promoting digital entrepreneurship. The framework provides a deeper understanding of the experiences of third-party developers involved in digital entrepreneurship development and can help in developing policies and strategies that support digital entrepreneurship. Therefore, the framework in Figure 2 provides a new background insight for further studies, which scholars who are interested in the investigation of the role of digital platforms in the process of digital entrepreneurship development research can pursue.

7.2 Practical implication

This research study is a valuable contribution to the field of digital entrepreneurship, especially in regions like the global south where entrepreneurs often face resource constraints, environmental uncertainties and complexities. The study focuses on Nigeria and can be a guide for similar countries where third-party developers interested in digital entrepreneurship development will find it helpful. The study provides a comprehensive guide for practitioners on how to drive different dimensions of events during the development process of digital entrepreneurship. It identifies key roles that digital entrepreneurs should focus on to ensure success in the development process. Therefore, it offers actionable steps that practitioners need to follow to ensure the right actions and practices during digital entrepreneurship development. The outcome of this study reveals three critical impacts of digital platform boundary resources that drive the behaviour of third-party application developers. These impacts include resources and control openness for new business ideation, collective intelligence to navigate disoriented and ambiguous entrepreneurial activities and prototype application development for continuous learning and adaptive cycles of innovation. These impacts promote the activities and practices of the third-party developers as they interact with one another to promote the desire to pursue entrepreneurship processes.

Therefore, the outcome of this study will enlighten and guide third-party developers and other entrepreneurs who intend to pursue the development of new digital businesses on how to engage with the platform boundary resources to make the most of its usefulness.

The framework in Figure 2 guides how to navigate the complexities of the digital entrepreneurship landscape, enabling entrepreneurs to focus on the most critical factors for success. Overall, this research study is an essential resource for anyone interested in digital entrepreneurship because its practical insights and theoretical framework offer a roadmap for success in this challenging field. Next, the study provides an in-depth analysis of the impact of policies and regulations on digital entrepreneurs' activities during digital entrepreneurship development, offering policymakers and regulators valuable insights into how their decisions affect the digital start-up ecosystem in Nigeria. The study shows that creating policies and regulations that support digital entrepreneurs is essential to promoting nascent entrepreneurial activities in the country. Based on its findings, the study recommends that the government provide tax holidays as support to new digital entrepreneurs who are seeking to engage in digital entrepreneurship development. Such incentives will encourage more entrepreneurs to venture into the digital space and help grow the digital economy in Nigeria. Moreover, the study emphasizes the need for government institutions to develop laws that support the activities of the digital start-up ecosystem, for instance, reducing barriers to entry, these policies will help create a conducive environment for digital entrepreneurs to thrive. Hence, it is important for the Nigerian government to fully implement the Nigeria Start-up Act, 2022, to guarantee support, incentives and programs that will encourage digital start-up founders to pursue digital entrepreneurship in Nigeria's digital start-up ecosystem. Overall, the study highlights the importance of developing appropriate policies and regulations and implementing programs to support digital entrepreneurs. Through these measures, Nigeria's digital economy can be revolutionized, and the country can become a hub for digital innovation and entrepreneurship.

7.3 Limitations and future research directions

The findings of this study are highly specific to the experiences of third-party developers who operate in Nigeria and may not be directly transferable to other contexts. Economic policies, regulations and cultural differences can all play a significant role in shaping the opinions and decisions of third-party developers and may have different effects in other environmental contexts. It is important to note that this study was restricted to the perspectives of third-party developers who have digital entrepreneurship experience, and this was achieved through the use of a snowball sampling technique. While useful insights were obtained through this approach, it is important to recognize that other digital business players, such as support service providers, may have different perspectives that could be useful to consider in future research. In addition, it is worth mentioning that due to resource constraints during field visitation, this study focused solely on technology hubs located in Lagos Yabacon. To obtain a more heterogeneous view of the impact of digital platform boundary resources, future research may benefit from broadening the sample to include technology hubs in other Nigerian states. Taken together, it is clear that there is a need for further research to build on the insights obtained in this study and to gain validation or a more comprehensive understanding of the impact of digital platform boundary resources on third-party developers in Nigeria and beyond.

References

Abubakre, M., Faik, I., & Mkansi, M. (2021). Digital entrepreneurship and indigenous value systems: An Ubuntu perspective. *Information Systems Journal*, *31*(6), 838–862. doi: 10.1111/isj.12343.

Acs, Z. J., Song, A. K., Szerb, L., Audretsch, D. B., & Komlósi, É. (2021). The evolution of the global digital platform economy: 1971–2021. *Small Business Economics*, *57*(4), 1629–1659. doi: 10.1007/s11187-021-00561-x.

Agustian, K., Mubarok, E. S., Zen, A., Wiwin, W., & Malik, A. J. (2023). The impact of digital transformation on business models and competitive advantage. *Technology and Society Perspectives (TACIT)*, *1*(2), 79–93. doi: 10.61100/tacit.v1i2.55.

Ajah, E. O. (2023). Investigating the factors fostering early-stage digital start-up survival during gestation in Nigeria market. *Digital Business*, *3*(2), 100069. doi: 10.1016/j.digbus.2023.100069.

Ajah, E. O. (2024). Digital technology affordances reshaping entrepreneurship development process: A systematic review. *The African Journal of Information Systems*, *16*(2), 94–130.

Alkhaled, S., & Sasaki, I. (2021). Syrian Women Refugees: Coping with indeterminate liminality during forcible displacement. *Organization Studies*, *43*(10), 1583–1605. doi: 10.1177/01708406211040214.

Anim-Yeboah, S., Boateng, R., Awuni Kolog, E., Owusu, A., & Bedi, I. (2020). Digital entrepreneurship in business enterprises: A systematic review. In *Responsible Design, Implementation and Use of Information and Communication Technology* (pp. 192–203). doi: 10.1007/978-3-030-44999-5_16.

Beech, N. (2010). Liminality and the practices of identity reconstruction. *Human Relations*, *64*(2), 285–302. doi: 10.1177/0018726710371235.

Bianco, V. D., Myllarniemi, V., Komssi, M., & Raatikainen, M. (2014). The role of platform boundary resources in software ecosystems: A case study. *2014 IEEE/IFIP Conference on Software Architecture*.

Blows, E., Bird, L., Seymour, J., & Cox, K. (2012). Liminality as a framework for understanding the experience of cancer survivorship: A literature review. *Journal of Advanced Nursing*, *68*(10), 2155–2164. doi: 10.1111/j.1365-2648.2012.05995.x.

Bogner, A., & Menz, W. (2009). The theory-generating expert interview: Epistemological interest, forms of knowledge, interaction. Palgrave Macmillan. A division of Macmillan Publishers Limited.

Bonina, C., Koskinen, K., Eaton, B., & Gawer, A. (2021). Digital platforms for development: Foundations and research agenda. *Information Systems Journal*, *31*(6), 869–902. doi: 10.1111/isj.12326.

Böttcher, T. P., Empelmann, S., Weking, J., Hein, A., & Krcmar, H. (2023). Digital sustainable business models: Using digital technology to integrate ecological sustainability into the core of business models. *Information Systems Journal*, *34*(3), 736–761. doi: 10.1111/isj.12436.

Boudreau, M. -C., & Robey, D. (2005). Enacting integrated information technology: A human agency perspective. *Organization Science*, *16*(1), 3–18. doi: 10.1287/orsc.1040.0103.

Braun, V., & Clarke, V. (2019). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health*, *13*(2), 201–216. doi: 10.1080/2159676x.2019.1704846.

Capello, R., Lenzi, C., & Panzera, E. (2022). The rise of the digital service economy in European regions. *Industry and Innovation*, *30*(6), 637–663. doi: 10.1080/13662716.2022.2082924.

Charmaz, K., & Belgrave, L.L. (2018). Thinking about data with grounded theory. *Qualitative Inquiry*, *25*(8), 743–753. doi: 10.1177/1077800418809455.

Chen, J.J., Cui, C., Hunt, R.A., & Li, L. S.-Z. (2020). External enablement of new venture creation: An exploratory, query-driven assessment of China's high-speed rail expansion. *Journal of Business Venturing*, *35*(6), 106046. doi: 10.1016/j.jbusvent.2020.106046.

Constantiou, I., Eaton, B., & Tuunainen, V. K. (2016). The evolution of a sharing platform into a sustainable business. *2016 49th Hawaii International Conference on System Sciences (HICSS)*.

Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), 1–21. doi: 10.1515/zfsoz-1990-0602.

Cuverol, M., Granados, M. L., Pilkington, A., & Evans, R. (2023). Start- ups' use of knowledge spillovers for product innovation: The influence of entrepreneurial ecosystems and virtual platforms. *R&D Management*, *53*(4), 584–602. doi: 10.1111/radm.12567.

Daniel, E., & Ellis-Chadwick, F. (2016). Entrepreneurship and liminality: The case of self-storage based businesses. *International Journal of Entrepreneurial Behavior & Research*, *22*(3), 436–457. doi: 10.1108/ijebr-01-2015-0015.

Darveau, J., & Cheikh-Ammar, M. (2021). The interplay between liminality and consumption: A systematic literature review with a future research agenda. *International Journal of Consumer Studies*, *45*(4), 867–888. doi: 10.1111/ijcs.12678.

David-West, O., Umukoro, I. O., & Onuoha, R. O. (2018). Platforms in sub-Saharan Africa: Startup models and the role of business incubation. *Journal of Intellectual Capital*, *19*(3), 581–616. doi: 10.1108/jic-12-2016-0134.

Davidsson, P. (2015). Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization. *Journal of Business Venturing*, *30*(5), 674–695. doi: 10.1016/j.jbusvent.2015.01.002.

Davidsson, P., & Gruenhagen, J. H. (2020). Fulfilling the process promise: A review and agenda for new venture creation process research. *Entrepreneurship Theory and Practice*, *45*(5), 1–36. doi:10.1177/1042258720930991.

Davidsson, P., Recker, J., & von Briel, F. (2020). External enablement of new venture creation: A framework. *Academy of Management Perspectives*, *34*(3), 311–332. doi: 10.5465/amp.2017.0163.

de Reuver, M., Sørensen, C., & Basole, R. C. (2017). The digital platform: A research agenda. *Journal of Information Technology*, *33*(2), 124–135. doi: 10.1057/s41265-016-0033-3.

Disrupt Africa (2022). The Nigerian startup ecosystem report. *Disrupt Africa*. Available from: www.disrupt-africa.com

Döringer, S. (2021). The problem-centred expert interview'. Combining qualitative interviewing approaches for investigating implicit expert knowledge. *International Journal of Social Research Methodology*, *24*(3), 265–278. doi: 10.1080/13645579.2020.1766777.

Eaton, B., Elaluf-Calderwood, S., Sorensen, C., & Yoo, Y. (2015). Distributed tuning of boundary resources: The case of apple's iOS service system. *MIS Quarterly*, *39*(1), 217–243. doi: 10.25300/misq/2015/39.1.10.

Ens, N., Hukal, P., & Jensen, T. B. (2023). Dynamics of control on digital platforms. *Information Systems Journal*, *33*(4), 890–991. doi: 10.1111/isj.12429.

Esteban, L., Ács, Z. J., & Szerb, L. (2024). Analysis of the digital platform economy around the world: A network DEA model for identifying policy priorities. *Journal of Small Business Management*, *62*(2), 847–891. doi: 10.1080/00472778.2022.2100895(847.

Farshchian, B. A., & Thomassen, H. E. (2019). Co-creating platform governance models using boundary resources: A case study from dementia care services. *Computer Supported Cooperative Work (CSCW)*, *28*(3-4), 549–589. doi: 10.1007/s10606-019-09353-0.

Fernandes, C., Ferreira, J. J., Veiga, P. M., Kraus, S., & Dabić, M. (2022). Digital entrepreneurship platforms: Mapping the field and looking towards a holistic approach. *Technology in Society*, *70*, 101979. doi: 10.1016/j.techsoc.2022.101979.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, *12*(2), 219–245. doi: 10.1177/1077800405284363.

Foisal, T. M., Alam, A., & Abedin, T. (2023). 4 digital technologies in entrepreneurship and shifting of entrepreneurial trajectories. In *Entrepreneurial Processes in the Era of Digital Transformation* (pp. 45–66). doi: 10.1515/9783110790313-005.

Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology & Health*, *25*(10), 1229–1245. doi: 10.1080/08870440903194015.

Fredriksen, H., & Hadjerrouit, S. (2019). An activity theory perspective on contradictions in flipped mathematics classrooms at the university level. *International Journal of Mathematical Education in Science and Technology*, *51*(4), 520–541. doi: 10.1080/0020739x.2019.1591533.

Frontier Economics (2018). Early stage investment in sub-Saharan Africa's tech sector A report prepared for Africa Technology Business Network. *Frontier Economics Network*, 1–17.

Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The Qualitative Report*, *20*(9), 1408–1416. doi: 10.46743/2160-3715/2015.2281.

Garrigos-Simon, F. J., Alizadeh Moghadam, S. S., Abdi, L., Pourmirali, Z., & Abdi, B. (2021). Digital entrepreneurship dimensions and strategies: Crowdsourcing and digital financing. *Management and Business Research Quarterly*, *18*, 1–15. doi: 10.32038/mbrq.2021.18.01.

Gawer, A. (2021). Digital platforms' boundaries: The interplay of firm scope, platform sides, and digital interfaces. *Long Range Planning*, *54*(5), 102045. doi: 10.1016/j.lrp.2020.102045.

Ghazawneh, A., & Henfridsson, O. (2010). Governing third-party development through platform boundary resources. In *International Conference on Information Systems (ICIS)*, St. Louis.

Ghazawneh, A., & Henfridsson, O. (2012). Balancing platform control and external contribution in third-party development: The boundary resources model. *Information Systems Journal*, *23*(2), 173–192. doi: 10.1111/j.1365-2575.2012.00406.x.

Ghezzi, A., & Cavallo, A. (2018). Agile business model innovation in digital entrepreneurship: Lean startup approaches. *Journal of Business Research*, *110*, 519–537. doi: 10.1016/j.jbusres.2018.06.013.

Giang, H. T. N. H., Hai, T. H., Quyen, N. T. P., & Hoang, H. T. (2024). Beyond boundaries: Empowering family SMEs' international growth through digital platforms' architecture and governance. In *Proceedings of the 57th Hawaii International Conference on System Sciences*.

Giardino, C., Bajwa, S. S., Wang, X., & Abrahamsson, P. (2015). Key challenges in early-stage software startups. In: Lassenius, C., Dingsøyr, T., & Paasivaara, M. (Eds), *Agile Processes in Software Engineering and Extreme Programming. XP 2015. Lecture Notes in Business Information Processing (Vol. 212)*. Cham: Springer, doi: 10.1007/978-3-319-18612-2_5.

Gibbons, S. W., Ross, A., & Bevans, M. (2014). Liminality as a conceptual frame for understanding the family caregiving rite of passage: An integrative review. *Research in Nursing & Health*, *37*(5), 423–436. doi: 10.1002/nur.21622.

Giones, F., & Brem, A. (2017). Digital technology entrepreneurship: A definition and research agenda. *Technology Innovation Management Review*, *7*(5), 44–51. doi: 10.22215/timreview/1076.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory, Strategies for Qualitative Research*. Piscataway, New Jersey: AldineTransaction, A Division of Transaction Publishers, Rutgers-The State University. Available from: https://www.routledge.com/india

Gudi, A., & Chinta, R. (2020). Awareness and possession of digital competencies for digital entrepreneurship. In *Twenty-Sixth Americas Conference on Information Systems*, Salt Lake City.

Haki, K., Blaschke, M., Aier, S., Winter, R., & Tilson, D. (2024). Dynamic capabilities for transitioning from product platform ecosystem to innovation platform ecosystem. *European Journal of Information Systems*, *33*(2), 181–199. doi: 10.1080/0960085x.2022.2136542.

Hanesch, A., & Schallmo, D. (2022). Clarifying digital entrepreneurship: A systematic literature review and bibliometric analysis. In *The XXXIII ISPIM Innovation Conference*, Copenhagen, Denmark.

Hein, A., Schreieck, M., Riasanow, T., Setzke, D. S., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, *30*(1), 87–98. doi: 10.1007/s12525-019-00377-4.

Heshmatisafa, S., & Seppänen, M. (2023). Exploring API-driven business models: Lessons learned from Amadeus's digital transformation. *Digital Business*, *3*(1), 100055. doi: 10.1016/j.digbus.2023.100055.

Howard-Grenville, J., Golden-Biddle, K., Irwin, J., & Mao, J. (2011). Liminality as cultural process for cultural change. *Organization Science*, *22*(2), 522–539. doi: 10.1287/orsc.1100.0554.

Howarth, J. (2023). Startup failure rate statistics. *Exploding Topics*. Available from: https://explodingtopics.com/blog/startup-failure-stats

Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance practices in platform ecosystems: Navigating tensions between cocreated value and governance costs. *Information Systems Research*, *28*(3), 563–584. doi: 10.1287/isre.2017.0701.

Jiang, H., Jingxuan, Y. C., & Gai, J. (2023). How digital platform capability affects the innovation performance of SMEs—evidence from China. *Technology in Society*, *72*, 102187. doi: 10.1016/j.techsoc.2022.102187.

Karhu, K., Gustafsson, R., & Lyytinen, K. (2018). Exploiting and defending open digital platforms with boundary resources: Android's five platform forks. *Information Systems Research*, *29*(2), 479–497. doi: 10.1287/isre.2018.0786.

Karhu, K., Gustafsson, R., Eaton, B., Henfridsson, O., & Sørensen, C. (2020). Four tactics for implementing a balanced digital platform strategy. *MIS Quarterly Executive*, *19*(2), 105–120. doi: 10.17705/2msqe.00027.

Karhu, K., Gustafsson, R., & Lyytinen, K. (2020). Exploiting and defending open digital platforms with boundary resources: Android's five platform forks. *Information Systems Research*, *29*(2), 479–497. doi: 10.1287/isre.2018.0786.

Kim, S., Kim, H. J., & Lee, H. (2009). An institutional analysis of an e-government system for anti-corruption: The case of OPEN. *Government Information Quarterly*, *26*(1), 42–50. doi: 10.1016/j.giq.2008.09.002.

Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, *23*(1), 67–94. doi: 10.2307/249410.

Kovacevic-Opacic, L., & Marjanovic, O. (2024). Designing digital platforms as generative systems through the lens of complex adaptive systems theory. In *Proceedings of the 57th Hawaii International Conference on System Sciences*, Hawaii.

Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., & Spitzer, J. (2018). Digital entrepreneurship. *International Journal of Entrepreneurial Behavior and Research*, *25*(2), 353–375. doi:10.1108/ijebr-06-2018-0425.

Layder, D. (1998). *Sociological practice: Linking theory and social research*. London: Sage.

Leeming, D. A. (2014). *Encyclopedia of psychology and Religion*. New York, NY: Springer.

Lehmann, J., & Recker, J. (2021). Offerings that are 'ever-in-the-making'. *Business & Information Systems Engineering*, *64*(1), 69–89. doi: 10.1007/s12599-021-00730-y.

Levina, N., & Vaast, E. (2008). Innovating or doing as told? Status differences and overlapping boundaries in offshore collaboration. *MIS Quarterly*, *32*(2), 307–332. doi: 10.2307/25148842.

Libakova, N. M., & Sertakova, E. A. (2015). The method of expert interview as an effective research procedure of studying the indigenous people of the North.pdf. *Journal of Siberian Federal University. Humanities & Social Sciences*, *8*(1), 114–129. doi: 10.17516/1997-1370-2015-8-1-114-129.

Liedgren, J., Desmet, P. M. A., & Gaggioli, A. (2023). Liminal design: A conceptual framework and three-step approach for developing technology that delivers transcendence and deeper experiences. *Front Psychol*, *14*, 1043170. doi: 10.3389/fpsyg.2023.1043170.

Lixi, M., Zottel, S., Neto, I., Boroffice, F., Karpinski, K., Tan Lim, L., . . . Adekola, O. A. (2019). Nigeria digital economy diagnostic report. W. B. Group. Available from: www.worldbankgroup.org

Lowe, A., Norris, A. C., Farris, A. J., & Babbage, D. R. (2018). Quantifying thematic saturation in qualitative data analysis. *Field Methods*, *30*(3), 191–207. doi: 10.1177/1525822x17749386.

Lukita, C., Chakim, M. H. R., Supriati, R., Santoso, N. P. L., & Kamil, M. F. (2023). Exploration of perceived use of technology using A digital business perspective. *ADI Journal on Recent Innovation (AJRI)*, *5*(1), 87–96. doi: 10.34306/ajri.v5i1Sp.984.

Lyytinen, K., Yoo, Y., & Boland Jr, R. J. (2016). Digital product innovation within four classes of innovation networks. *Information Systems Journal*, *26*(1), 47–75. doi: 10.1111/isj.12093.

Mainela, T., & Puhakka, V. (2008). Organising new business in a turbulent context: Opportunity discovery and effectuation for IJV development in transition markets. *Journal of International Entrepreneurship*, *7*(2), 111–134. doi: 10.1007/s10843-008-0034-6.

Malksoo, M. (2012). The challenge of liminality for International Relations theory. *Review of International Studies*, *38*(2), 481–494. doi: 10.1017/s0260210511000829.

Marton, A. (2013). Purposive selection and evaluation criteria for qualitative research. In *Thirty Fourth International Conference on Information Systems*.

McMullen, J. S., & Dimov, D. (2013). Time and the entrepreneurial journey: The problems and promise of studying entrepreneurship as a process. *Journal of Management Studies*, *50*(8), 1482–1512. doi: 10.1111/joms.12049.

Melinda, V., Anjani, S. A., & Ridwan, M. (2023). A platform based business revolution activates Indonesia's digital economy. *Startupreneur Business Digital (SABDA)*, *2*(2), 155–171.

Moe, N. B., Dingsøyr, T., & Dybå, T. (2010). A teamwork model for understanding an agile team: A case study of a scrum project. *Information and Software Technology*, *52*(5), 480–491. doi: 10.1016/j.infsof.2009.11.004.

Mohagheghzadeh, A., & Lindman, J. (2022). Shaping boundary resources of a digital platform: Alliance codevelopment perspective. In *Pacific Asia Conference on Information Systems (PACIS)*.

Mohagheghzadeh, A., & Rudmark, D. (2017). Accelerated tuning of platform boundary resources. In *Nordic Contributions in IS Research* (pp. 98–110). doi: 10.1007/978-3-319-64695-4_8.

Mohagheghzadeh, A., & Svahn, F. (2016). Shifting design capability to third-party developers: An affordance perspective on platform boundary resources. In *Twenty-second Americas Conference on Information Systems*, San Diego.

Moroz, P. W., & Hindle, K. (2012). Entrepreneurship as a process: Toward harmonizing multiple perspectives. *Entrepreneurship Theory and Practice*, *36*(4), 781–818. doi: 10.1111/j.1540-6520.2011.00452.x.

Motoyama, Y., & Knowlton, K. (2017). Examining the connections within the startup ecosystem: A case study of St. Louis. *Entrepreneurship Research Journal*, *7*(1). doi: 10.1515/erj-2016-0011.

Mueller-Greene, C. (2022). The concept of liminality as a theoretical tool in literary memory studies: Liminal aspects of memory in Salman Rushdie's midnight's children. *Journal of Literary Theory*, *16*(2), 264–288. doi: 10.1515/jlt-2022-2025.

Naderifar, M., Goli, H., & Ghaljaie, F. (2017). Snowball sampling: A purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*, *14*(3). doi: 10.5812/sdme.67670.

Nambisan, S. (2016). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *41*(6), 1029–1055. doi: 10.1111/etap.12254.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, *41*(1), 223–238. doi: 10.25300/misq/2017/41:1.03.

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. doi: 10.1016/j.respol.2019.03.018.

Naudé, W., & Liebregts, W. (2020). Digital entrepreneurship research: A concise introduction. Institute of Labor Economics (IZA). IZA Discussion Papers 13667, 1–24.

Nzembayie, K. F., & Buckley, A. P. (2022). *Digital entrepreneurship: Disruption and new venture creation*. Edward Elgar Publishing. Available from: https://books.google.com.ng/books?id=mJ6uzgEACAAJ

OC&C, S. C. (2018). Tech entrepreneurship ecosystem in Nigeria. O. C. S. Consultants.

Ojala, A., Fraccastoro, S., & Gabrielsson, M. (2023). Characteristics of digital artifacts in international endeavors of digital-based international new ventures. *Global Strategy Journal*, *13*(4), 857–887. doi: 10.1002/gsj.1483.

Onwuegbuzie, A. J., & Collins, K. M. (2007). A typology of mixed methods sampling designs in social science research. *Qualitative Report*, *12*(2), 281–316.

Onwuegbuzie, A. J., & Leech, N. L. (2007). Sampling designs in qualitative research: Making the sampling process more public. *Qualitative Report*, *12*(2), 238–254.

Page, A., & Holmstrom, J. (2023). Enablers and inhibitors of digital startup evolution: A multi-case study of Swedish business incubators. *Journal of Innovation and Entrepreneurship*, *12*(1), 35. doi: 10.1186/s13731-023-00306-y.

Paternoster, N., Giardino, C., Unterkalmsteiner, M., Gorschek, T., & Abrahamsson, P. (2014). Software development in startup companies: A systematic mapping study. *Information and Software Technology*, *56*(10), 1200–1218. doi: 10.1016/j.infsof.2014.04.014.

Pentikäinen, J. (1979). The symbolism of liminality. *Scripta Instituti Donneriani Aboensis*, *10*, 154–166. doi: 10.30674/scripta.67126.

Petrik, D., Model, K., Drebinger, L. A., & Herzwurm, G. (2021). Exploring the satisfaction potential of technical boundary resources in IoT platforms – the microsoft Azure case. In *Forty-Second International Conference on Information Systems*, Austin.

Quinones, G., Heeks, R., & Nicholson, B. (2021). Embeddedness of digital start-ups in development contexts: Field experience from Latin America. *Information Technology for Development*, *27*(2), 171–190. doi: 10.1080/02681102.2020.1779638.

Ratiani, I. (2012). Liminality and the liminal theory of conceptualizing time and space in 20 th century eschatological anti-utopia. 1–17.

Ritala, P. (2024). Grand challenges and platform ecosystems: Scaling solutions for wicked ecological and societal problems. *Journal of Product Innovation Management*, *41*(2), 168–183. doi: 10.1111/jpim.12682.

Rose, A.-L., Leisyte, L., Haertel, T., & Terkowsky, C. (2018). Emotions and the liminal space in entrepreneurship education. *European Journal of Engineering Education*, *44*(4), 602–615. doi: 10.1080/03043797.2018.1553937.

Roshan Kokabha, M., Hekkala, R., & Tuunainen, V. K. (2018). Utilization of accelerator facilities in mobile app developers start-up. In *ECIS 2018 Proceedings at AIS Electronic Library (AISeL)*, Portsmouth, UK.

Rubleske, J. (2020). The tuning of data platform boundary resources: Insights from Twitter. *Journal of Technology Research*, *9*, 1–37.

Ruby, D. (2023). *Startup failure rate in 2023*. Demandsage. Available from: https://www.demandsage.com/startup-failure-rate/

Sanz-Velasco, S. A. (2006). Opportunity development as a learning process for entrepreneurs. *International Journal of Entrepreneurship Behaviour and Research*, *12*(5), 1355–2554. doi: 10.1108/13552550610687637.

Selden, P. D., & Fletcher, D. E. (2015). The entrepreneurial journey as an emergent hierarchical system of artifact-creating processes. *Journal of Business Venturing*, *30*(4), 603–615. doi: 10.1016/j.jbusvent.2014.09.002.

Servantie, V., & Rispal, M. H. (2018). Bricolage, effectuation, and causation shifts over time in the context of social entrepreneurship. *Entrepreneurship & Regional Development*, *30*(3-4), 310–335. doi: 10.1080/08985626.2017.1413774.

Shen, K. N., Lindsay, V., & Xu, Y. C. (2018). Digital entrepreneurship. *Information Systems Journal*, *28*(6), 1125–1128. doi: 10.1111/isj.12219.

Skog, D. A., Wimelius, H., & Sandberg, J. (2018). Digital service platform evolution how Spotify leveraged boundary resources to become a global leader in music streaming. *Proceedings of the 51st Hawaii International Conference on System Sciences*.

Smith, C. G., & Smith, J. B. (2021). Founders' uses of digital networks for resource acquisition: Extending network theory online. *Journal of Business Research*, *125*, 466–482. doi: 10.1016/j.jbusres.2019.07.032.

Söderlund, J., & Borg, E. (2017). Liminality in management and organization studies: Process, position and place. *International Journal of Management Reviews*, *20*(4), 880–902. doi: 10.1111/ijmr.12168.

Standing, C., & Mattsson, J. (2016). 'Fake it until you make it': Business model conceptualization in digital entrepreneurship. *Journal of Strategic Marketing*, *26*(5), 385–399. doi: 10.1080/0965254x.2016.1240218.

Steininger, D. M. (2019). Linking information systems and entrepreneurship: A review and agenda for IT-associated and digital entrepreneurship research. *Information Systems Journal*, *29*(2), 363–407. doi: 10.1111/isj.12206.

Stenner, P., & De Luca Picione, R. (2023). A theoretically informed critical review of research applying the concept of liminality to understand experiences with cancer: Implications for a new oncological agenda in health psychology. *International Journal of Environmental Research and Public Health*, *20*(11), 5982. doi: 10.3390/ijerph20115982.

Stephenson, B. (2020). The limits of liminality: A Critique of transformationism. *Liminalities: A Journal of Performance Studies*, *16*(4), 1–23.

Suuronen, S., Ukko, J., Saunila, M., Rantala, T., & Rantanen, H. (2024). The implications of multi-sided platforms in managing digital business ecosystems. *Journal of Business Research*, *175*, 114544. doi: 10.1016/j.jbusres.2024.114544.

Taura, N. D., Bolat, E., & Madichie, N. O. (2019). *Digital entrepreneurship in Sub-Saharan Africa challenges, opportunities and prospects*. Cham: Springer Nature Switzerland AG. Palgrave Macmillan.

Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, *36*(3), 319–329. doi: 10.1016/j.emj.2017.06.005.

Taylor-Wesselink, K., & Teulon, F. (2021). The interaction and influence of digital and non-digital structures, cultures and social norms on entrepreneurship. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, *39*(3), 244–258. doi: 10.1002/cjas.1639.

Tiwana, A. (2013). *Platform ecosystems: Aligning architecture, governance, and strategy*. Cambridge, Massachusetts: Newnes.

Tiwana, A., Konsynski, B., & Bush, A. A. (2010). Research commentary—platform evolution: Coevolution of platform architecture, governance, and environmental dynamics. *Information Systems Research*, *21*(4), 675–687. doi: 10.1287/isre.1100.0323.

Turner, V., Abrahams, R., & Harris, A. (1969). *The Ritual process: Structure and Anti-structure* (1st ed.). Routledge. doi: 10.4324/9781315134666.

Vargo, S. L., Fehrer, J. A., Wieland, H., & Nariswari, A. (2024). The nature and fundamental elements of digital service innovation. *Journal of Service Management*, *35*(2), 227–252. doi: 10.1108/josm-02-2023-0052.

von Briel, F., Davidsson, P., & Recker, J. (2018). Digital technologies as external enablers of new venture creation in the IT hardware sector. *Entrepreneurship Theory and Practice*, *42*(1), 47–69. doi: 10.1177/1042258717732779.

von Briel, F., Recker, J., & Davidsson, P. (2018). Not all digital venture ideas are created equal: Implications for venture creation processes. *The Journal of Strategic Information Systems*, *27*(4), 278–295. doi: 10.1016/j.jsis.2018.06.002.

von Briel, F., Recker, J., Selander, L., Jarvenpaa, S. L., Hukal, P., Yoo, Y., … Wurm, B. (2021). Researching digital entrepreneurship: Current issues and suggestions for future directions. *Communications of the Association for Information Systems*, *48*(1), 284–304. doi: 10.17705/1cais.04833.

Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems*, *4*(2), 74–81. doi: 10.1057/ejis.1995.9.

Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems*, *15*(3), 320–330. doi: 10.1057/palgrave.ejis.3000589.

Wels, H., van der Waal, K., Spiegel, A., & Kamsteeg, F. (2015). Victor Turner and liminality: An introduction. *Anthropology Southern Africa*, *34*(1-2), 1–4. doi: 10.1080/23323256.2011.11500002.

Willson, R. (2019). Transitions theory and liminality in information behaviour research. *Journal of Documentation*, *75*(4), 838–856. doi: 10.1108/jd-12-2018-0207.

Yin, R. K. (2009). *K.: Case study research. Design and method*. London: Sage Publications.

Zaheer, H., Breyer, Y., & Dumay, J. (2019). Digital entrepreneurship: An interdisciplinary structured literature review and research agenda. *Technological Forecasting and Social Change*, *148*, 119735. doi: 10.1016/j.techfore.2019.119735.

Zaheer, H., Breyer, Y., Dumay, J., & Enjeti, M. (2022). The entrepreneurial journeys of digital start-up founders. *Technological Forecasting and Social Change*, *179*, 121638. doi: 10.1016/j.techfore.2022.121638.

Zeng, J., Yang, Y., & Lee, S. H. (2023). Resource orchestration and scaling- up of platform- based entrepreneurial firms: The logic of dialectic tuning. *Journal of Management Studies*, *60*(3), 605–638. doi: 10.1111/joms.12854.

Zhou, Y., Dong, B., Feng, Q., & Wu, S. (2024). Innovation of business models in the digital era: A case study of the new generation digital platform of the information network. *Frontiers in Business, Economics and Management*, *13*(1), 16–20. doi: 10.54097/gk4gfe68.

Corresponding author
Emmanuel Okoro Ajah can be contacted at: emmanuel.ajah@aun.edu.ng