THE IMPACT OF DIGITAL PRESENCE ON THE RELATIONSHIP BETWEEN INNOVATIVENESS AND FIRM PERFORMANCE IN SUB-SAHARAN AFRICA

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ABSTRACT

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The phenomenon of digitalization has gained ground in recent years on the African continent, affecting all sectors of activity without distinction. By focusing on how the digital and innovation can lead to reasonable advantage, we proceed on clarifying approaches and perspectives of various businesses in the Sub-Saharan Africa with a focus on the western region. The paper also investigates the digital presence concept and practices while determining its relationship with firm innovativeness and performance through the different dimensions and constructs which shape them.

In this research, a pre-interview was handled followed by online survey developed under google form through which data were collected. As a result of the research, innovation constructs and the contours of firm performance were described followed by a deep exploration of digital practices and orientation of businesses toward them.

Results of the study revealed that innovativeness is positively associated with firm performance through process, product and marketing dimensions. Further, it was found that digital presence has direct positive impact on innovativeness through digital transformation and digital usage. However, its moderating role on the relationship between innovativeness and firm performance was not significant. It was also found that digital tools like websites, e-mails and social media are the most used with the goal to promote the business & its products also for interaction with audience and data gathering.

Keywords: Innovation, Digitalization, Technology, Firm performance, Sub-Saharan Africa, West Africa.

ÖZET

SAHRA ALTI AFRİKA'DA DİJİTAL VAROLUŞUNUN YENİLİKÇİLİK VE İŞLETME PERFORMANSI ARASINDAKİ İLİŞKİ ÜZERİNDEKİ ETKİSİ

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Son yıllarda dijitalleşme fenomeni Afrika kıtasında hızla yayılmakta ve ayrım yapmaksızın tüm faaliyet sektörlerini etkilemektedir. Bu araştırma, dijitalin ve yeniliğin nasıl makul bir avantaj sağlayabileceğine odaklanarak Sahra Altı Afrika'daki çeşitli işletmelerin yaklaşımlarını ve perspektiflerini netleştirmeye amacıdır. Makale ayrıca dijital varlık kavramını ve uygulamalarını araştırırken, onları şekillendiren farklı boyutlar ve yapılar aracılığıyla firma yenilikçiliği ve performans arasındaki ilişkiyi belirlenmektedir.

Araştırmada, veriler ön görüşmeler ve çevrimiçi anketler aracılığıyla toplanmıştır. Araştırmanın sonucunda, yenilikçilik yapıları ve firma performansının ana hatları tanımlanmış, ardından dijital uygulamalar ve işletmelerin bunlara yönelimi derinlemesine araştırılmıştır.

Araştırmanın sonuçları, yenilikçiliğin süreç, ürün ve pazarlama boyutları aracılığıyla firma performansıyla pozitif yönde ilişkili olduğunu göstermektedir. Ayrıca dijital varoluşunun dijital dönüşüm ve dijital kullanım yoluyla yenilikçiliğe doğrudan olumlu bir etkiye sahip olduğu ortaya çıkmaktadır. Bununla birlikte, yenilikçilik ve performans arasındaki ilişki üzerinde moderatör rolü bulunamamıştır. Öte yandan, web siteleri, e-postalar ve sosyal medya gibi dijital araçların, işletmeyi ve ürünlerini tanıtma, ayrıca hedef kitleyle etkileşim ve veri toplama amacıyla en çok kullanıldığı tespit edilmiştir.

Anahtar Kelimeler: Yenilikçilik, Dijitalleşme, Teknoloji, Firma performansı, Sahra Altı Afrika, Batı Afrika.

RÉSUMÉ

L'IMPACT DE LA PRÉSENCE NUMÉRIQUE SUR LA RELATION ENTRE INNOVATION ET PERFORMANCE DES ENTREPRISES EN AFRIQUE SUBSAHARIENNE

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Le phénomène de la numérisation s'est accru ces dernières années sur le continent africain, affectant sans distinction tous les secteurs d'activité. En nous concentrant sur la manière dont le numérique et l'innovation peuvent conduire à un avantage raisonnable, nous avons entrepris une démarche vers la clarification des approches et des perspectives de diverses entreprises en Afrique subsaharienne, avec une focalisation sur la région ouest. Le document étudie également le concept et les pratiques de la présence numérique tout en déterminant sa relation avec l'innovation et la performance d'entreprise à travers les différentes dimensions et concepts qui les façonnent.

Dans cette recherche, un pré-entretien a été réalisé, suivi d'une enquête en ligne développée sous formulaire Google à travers laquelle les données ont été collectées. À la suite de la recherche, des concepts d'innovation et des contours de la performance des entreprises ont été décrites, suivies d'une exploration approfondie des pratiques numériques et de l'orientation des entreprises vers celles-ci.

Les résultats de l'étude ont révélé que l'innovation est positivement associée à la performance de l'entreprise à travers les dimensions processus, produit et marketing. En outre, il a été constaté que la présence numérique a un impact positif direct sur l'innovation à travers la transformation digitale et l'utilisation du digital. Cependant, son rôle de modérateur sur la relation entre l'innovation et la performance des entreprises n'a pas été significatif. Il a également été constaté que les outils numériques tels que les sites

Web, les e-mails et les médias sociaux sont les plus utilisés dans le but de promouvoir l'entreprise et ses produits, ainsi que l'interaction avec le public et la collecte de données.
Mots clés : Innovation, Digitalisation, Technologie, Performance des entreprises, Afrique subsaharienne, Afrique de l'Ouest.

ETİK İLKE VE KURALLARA UYGUNLUK BEYANNAMESİ

Bu tez çalışmasının bana ait, özgün bir çalışma olduğunu; çalışmamın hazırlık, veri toplama, analiz ve bilgilerin sunumu olmak üzere tüm aşamalarından bilimsel etik ilke ve kurallara uygun davrandığımı; bu çalışma kapsamında elde edilmeyen tüm veri ve bilgiler için kaynak gösterdiğimi ve bu kaynaklara kaynakçada yer verdiğimi, bu çalışmanın Anadolu Üniversitesi tarafından kullanılan ‘’bilimsel intihal tespit Programı’yla tarandığını ve hiçbir şekilde ‘’intihal içermediğini’’ beyan ederim. Herhangi bir zamanda, çalışmamla ilgili yaptığım bu beyana aykırı bir durumun saptanması durumunda, ortaya çıkacak tüm ahlaki ve hukuki sonuçlara razı olduğumu bildiririm.

Mahamane Sani MAMADOU YACOUBA

STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with “scientific plagiarism detection program” used by Anadolu University, and that “it does not have any plagiarism” whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

Mahamane Sani MAMADOU YACOUBA

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Although the doctoral thesis process is a long and tiring road with ups and downs, it is a process that makes very important contributions to the doctoral candidate. During my thesis work, I got involved with lot of people from different origins and perspectives, different field of activities and with whom I interact and got to learn new things. That made an insightful contribution in my academical and professional life.

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1. INTRODUCTION

The introduction of the Internet, followed by conversation and sharing platforms, as well as mobile applications, completely changed market dynamics. These online and digital instruments grew in popularity throughout time, expanding their global reach. Companies are becoming more interested in this issue as the consumer becomes more involved in them; as a result, they are adjusting their business model to be at the same level of knowledge as the target.

This engagement of companies into new approaches, embedded by internal and external pressures (Tiago & Verissimo, 2014) is mostly due to the fear of fall (Gates, 1999), prevention from loss of market share (Gerlich, 2001) because adapting to this digital era seems being the best way to grab opportunities and survive in the competitive arena.

We are therefore facing an innovative era accentuated by the digitalization of information and goods where any company is obliged to adopt a dynamic character in order to achieve rapid and continuous evolution. This era is also referred as "digital presence", characterized by the exposure of companies on the internet for online activities (Oliveira, Dubeux, & Pereira, 2015).

This digitalization relates both the on-line rush and digital shift of the daily and traditional activities in a well-structured way with the goal to create opportunities for businesses by providing a higher efficiency to leading organizations on one hand and customer awareness on the other.

The importance of digitalization becomes gradually apparent in the literature. Many scholars have examined it under different perspectives. It first grants access to a plethora of new digital tools that can be used for marketing purposes, and secondly, I t improves marketers' access to, collection of, processing of, and reporting of data related to their marketing activities. (Järvinen, Tollinen, Karjaluoto, & Jayawardhena, 2012). Digitalization brings advantage to firms through advanced technology such as social networking sites, mobile applications and so on. These opportunities lay mostly onto customer relationship, sales, information and also brand efficient management (Ahuja, 2014; Cruz & Karatzas,

2019; Rowley & Edmundson-Bird, 2013). Hence, it represents a value to businesses, allowing an upgrade of their activities in a well-organized system so their performance (Tiago & Verissimo, 2014).

However, if digitalization is a global activity, what about its advent in African market?

Although the African continent has long been left behind on certain development plans, it should be noted that the situation is quite different in terms of information technology (IT) adoption and usage. The continent has followed suit in recent years in the field of technology. African countries are now experiencing a significant rise in the adoption and use of digital tools, a revolution allowing individuals and companies to interact effectively with their interlocutors. Accordingly, information and communication technologies have spread with unprecedented speed especially with the advent of mobile phones and internet cafes (Alzouma, 2008). These tools have become more and more important especially for companies and have created a multitude of opportunities for them.

Huet (2017), one of the authors who dwelled on the question presented five digital advances as a result of his research on the continent. These advances have been attributed the term " leapfrog " denoting the bonds assimilated to the rapid innovations of Africa in domains such as information and communication technology ICT, mobile financial services, e-commerce, e-government and platforms (Huet, 2017). Regardless, different types of firms evolve within this digital scope categorized as formal digital enterprises on the continent (Boateng, et al., 2017).

One of the research projects ruled by the International Monetary Fund (IMF) shows that sub-Saharan Africa is catching up by digital relation to the rest of the world since the internet penetration is growing rapidly speed, especially due to mobile connectivity. The authors also stated examples of countries like Cabo Verde, Ghana, Rwanda and Seychelles which are at the top of the ranking in their group of returned in the region (Abdychev et al. (2020).

Sub-Saharan Africa (SSA) has traditionally been defined by poverty, low human development, and restricted access to infrastructure and services, but innovation and digitalization are changing the economic and social environment. According to the World

Bank (2019), digital technologies have the ability to open up new avenues for growth and development, promote inclusion and participation, and improve the efficiency and effectiveness of government services. As a result, several SSA countries have made innovation and digitization top objectives, investing in policies and programs targeted at hastening their digital transition.

Another important point is the advent of the Covid-19 pandemic which has emphasized the growing relevance of digital technology in crisis response and recovery planning. Simultaneously, the crisis opened doors to an opportunity for Sub-Saharan Africa's digital transformation and lead to the establishment of resilient digital-based employments in the region. The deployment of 4G networks, as well as the early stages of the 5G era, provided opportunities in different areas such as smart cities and infrastructures, digital commerce, healthcare and automation for industrials (GSMA, 2022, p. 32); increasing the craze of entrepreneurship in these categories of businesses and other ones as well.

Entrepreneurship is one area where innovation and digitization are making an impact in SSA. According to the United Nations Development Program (UNDP) (2018), digital technologies represent a source that empowers a so-called new generation of entities that are developing creative solutions to the region's most critical issues, known as healthcare, education, finance, and energy. Mobile money, for example, is a popular tool for financial inclusion in many SSA countries, including Kenya, Tanzania, and Ghana (Mbiti & Weil, 2011; EIB, 2014).

Coming to West African region, digitalization has been excelling recently where the cell devices (mobile phone) revolution has been a key driver. People and businesses in the region can now access mobile banking, e-commerce, and e-government as digital services thanks to the widespread availability of mobile phones. Moreover, the rise of social media platforms and growth of tech hubs and incubators has also played an important role in digitalization, as they have become important channels for communication, news, information sharing and support to startups by innovative solutions development for local problem solving.

Accordingly, we investigate theoretically and empirically whether innovativeness affect firm performance. The research seeks to uncover the nature of the connections between innovativeness, digital presence, and performance. The core premise of the presented model is that digital presence moderates the impacts of each innovativeness construct on firm performance, namely product, process, and marketing, fully or partially. Several firm characteristics are also theorized to moderate these relationships. These correlations are also thought to be moderated by a number of corporate factors. The hypothesized correlations are experimentally examined using a sample of domestic and international enterprises operating in the western area of Sub-Saharan Africa.

1.1. Problem of the Study

The changing and developing entrepreneurial environment, primarily due to new trends and technology, has an impact on how businesses function and respond to client expectations. Dealing with these sophisticated components is critical for seizing opportunities and outperforming competitors.

Our research intends to investigate the function of innovation and digitalization in businesses while empirically supposing that they influence companies' performance in a region of the African continent where newness and technology are less or differently distributed than in the Western world; and where culture also plays a significant role.

We are all aware about the existing gaps between developing and developed economies, gaps which are considered as the most promising areas for enterprises innovativeness (Bubel, Ostraszewska, Turek, & Tylec, 2015). In addition, there has been less research on the topics of innovativeness, performance, or even their relationships and what impacts them on the African continent, particularly in sub-Saharan enclaved regions where local small and medium-sized enterprises (SME) growth has exploded in recent decades. Also, the question of digital presence and its role together with the firms' immersion into innovative approaches remains a more or less ambiguous topic due to realities linked to the environment in which these companies operate and evolve.

The issue statement for this study emphasizes the need for empirical research into the impact of innovation and digitalization in Sub-Saharan West African businesses, as well as the obstacles and opportunities related with their acceptance and diffusion. It also underlines the significance of doing context-specific research that takes into account the region's unique traits and demands. Since then, our study has tended to provide insights into how businesses are evolving in Africa, taking into consideration their daily innovative and digital practices.

1.2. Purpose of the Study

This research therefore conceptualizes digital presence as technological elements usage such as social networking sites (SNS), mobile, web applications, platforms, all relevant technological and artificial intelligence artifacts facilitating digital interaction between firms and customer. Innovativeness is conceptualized as a multidimensional construct based on managerial perceptions at the product, process and marketing level. Firm performance is conceptualized as the financial as well as non-financial outcomes of a company’s general operations.

To summarize, our twofold objective in the study is (1) to identify the constructs of digital presence and innovativeness in West African region and (2) to assess the relationship between innovativeness, digital presence and firm performance. Thus, the corresponding research questions are: How far innovative are firms through their activities? What progress have firms made towards digital implementation and where are they currently? What is the role of digitalization in the firm? Does it have any bearing on the link that exists between innovation and the dependent variable performance? What type of digital schemes are likely to promote innovation and performance of the firm? Which of innovativeness constructs have influence on the independent variable firm performance? In other terms, the study aims to draw emphasis on the set of innovative and digital elements which have direct or indirect impact on firm performance, but also to develop a specific profile of innovative firms based on their activities in the digital era.

1.3. Operational Definitions of Key Terms

The following terms are defined for the purposes of this research study:

AI: Artificial Intelligence

DAI: Digital Acceleration Index

DIGIT: Digitalization

DP: Digital Presence

DPI: Digital Presence Index

DT: Digital Transformation

EDAI: Enhanced Digital Access Index

EM: Earned Media

FLP: Financial Performance

FP: Firm Performance

GII: Global Innovation Index

INNOV: Innovativeness

MI: Marketing Innovation

NFP: Non-Financial Performance

OM: Owned Media

OECD: Organisation for Economic Co-operation and Development

PM: Paid Media

PRI: Product Innovation

PSI: Process Innovation

SNS: Social Networking Sites

SSA: Sub-Saharan Africa

ST: Software Technology

UNDP: United Nations Development Programme

WASR: West African Sahel Region

2. LITERATURE REVIEW

In this part, previous research regarding innovation, digitalization and performance will be discussed supported by detailed examples from their authors.

2.1. Innovation & Innovativeness

A considerable number of papers has been generated regarding the two concepts of innovation and innovativeness since they have gotten a lot of attention in almost all fields over years. Accordingly, it is therefore important to consider this question through an overview of the literature including the main aspects of innovation and innovativeness.

Different theories exist suggesting that the two terminologies have the same meaning. However, distinct perspectives exist under each of them, revealing both contrasts and connections between the two entities (Tsai & Yang, 2013). Thereby, the following paragraphs will be the subject of the necessary edification for the general understanding of these terms. Although, the review will include definitions of both concepts. At this point, it's a matter of recalling the points of convergence between the two qualities and determining which term is most appropriate.

2.1.1. Innovation

The word Innovation is assimilated to a diverse set of terms such as new idea, a kind of product or even something creative. It is the introduction or creation of a new process or a new business system. What makes it different from innovativeness which is more like the proclivity to develop or adopt new products, processes, or businesses (Kamaruddeen, Yusof, & Said, 2010).

Focusing on etymology and broad sense of the term, the term innovation comes from the Latin noun "innovatio," which is derived from the verb "innovare." which implies to present [something] new. Thus, it can apply to both the process of introducing something new or the object itself (Aronson, 2008, p. 65).

Accordingly, innovation is commonly characterized as the infusion of new ideas into the company, whether those ideas are expressed in the firm itself through goods, processes, services, work groups and management, or marketing methods (Gibbons, et al., 1994). It is also defined as the development, adoption, and implementation of innovative ideas, processes, goods, or services (Erdil, Erdil, & Keskin, 2004).

The Organisation for Economic Co-operation and Development (OECD) defined innovation as ‘’the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices work place organizations, or external relations’’ (Oslo Manual, 2005, s. 46).

Other scholars see it as changes settled in production and process, helping firms on their distinctive technological competence as well as their transformation in terms of resource’s setting (Dodgson & Bessant, 1996); as a new product or service, a new manufacturing process, or a new organizational structure or administrative system (Hult, Hurley, & Knight, 2004) or even the development of a novel product-market-technology-organization-combination (Boer & During, 2001) or the launch of new products, processes, or business systems (Knowles, Hansen, & Dibrell, 2008).

According to Govindarajan and Trimble, it is an initiative of any new project to ourselves with an uncertain outcome (Govindarajan & Trimble, 2010).

Scholastica and Maurice (p. 2354) stated that it ‘’comprises of specific technical information about how to perform things better than the current state of the art” (Scholastica & Maurice, 2013).

Kalkan et al. (p.72) defines it as “implementing new ideas in terms of product development, new process technologies and management practices, which create value” (Kalkan, Bozkurt, & Arman, 2014).

According to Shams et al. (p. 1591), “an innovation is an idea, practice, or object which is perceived as new by the individuals or other units of adoption and which may be a recombination of previous concepts, a schema that challenges the currently order, a formula, or a unique approach” (Shams, Alpert, & Brown, 2015).

For Kamaruddeen et al. (2010, p. 70) innovation is “an interactive, dependent, systematic, problem solving and strategic process of adoption or creation or improvement in product, process, technology and management and market, aimed at maintaining or improving competitiveness, while satisfying the customers, and driven by the learning process within the firm, between firms and external environment”. However, others believe that innovation requires more than simply the development of new technology; it also entails adopting and restructuring business procedures, internal organizational structures, and external relationships (Hervas-Oliver et al., 2014 p. 874).

Regardless, innovation is mostly conceptualized as a significant change to achieve goals through specific and subjective attributes. It encompasses creative thoughts and new imaginations as device or method, a market application of solutions to new requirements, unarticulated needs, or current market demands (Sousa & Gaspar, 2019) or even actions carried out by a business to add value to its products and services (Bouwman, de Reuver, & Nikou, 2017). Compared to it, innovativeness is a wider concept involving the company as a whole toward change adoption. Mostly used to assess the degree of novelty of an idea (Garcia & Calantone, 2002), innovativeness portrays inescapably the status of organizations offers known as products and services when introduced into the market.

However, board definitions exist under the terminology. In the coming paragraphs, a board of found definitions related to innovativeness will be discussed, followed by constructs which may exist under the variable.

2.1.2. Innovativeness

Innovativeness is mostly referred to early action or capacity to introduce something new. It is on one hand consider as an aspect of the firm culture cultivating the spirit of openness to new ideas (Hurley & Hult, 1998), and on the other as the ability to innovate,

defined as the introduction of new procedures, products, or ideas into the company (Hult et al., 2004). This tendency to receptivity and inclination to adopt and support new ideas, novelty, experimentation, and creative processes may result in new products, services, or technological processes creation and launch (Lumpkin & Dess, 1996; Rubera & Kirca, 2012), in adoption of manufacturing process and business systems (Knowles et al., 2013); or even establishing new markets through a mix of strategic thinking and inventive behavior and processes (Wang & Ahmed, 2004).

Innovativeness reflects the total engagement of the organization into adoption and even inclination to new ideas, products or services, process and system (Hult, Hurley & Knight, 2004; Knowles et al., 2013); as well as the enhancement of existing goods and/or processes by fully using the organization's creative resources (Gebert et al., 2003).

Accordingly, the new ideas adoption tends to be comparative to others operating in the same environment of the organization. As Rogers (2003) stated, innovativeness is ‘’the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than any other member of the system’’ (Kamaruddeen et al., 2010, p. 75).

For instance, the construct is also referred to technology adoption and usage. Some researchers see it as the company’s proclivity towards adoption of technology (Foxal et al., 1984; Kitchell, 1995; Lumpkin & Dess, 1996) which facilitate organizations’ adaptation and strengthen their enrollment into competitive environment.

As an important aspect of the organization culture (Tsai & Yang, 2013; Crespell and Hansen, 2016), innovativeness is also demonstrated by the proclivity to invent and embrace new goods, procedures, or corporate systems (Kunz et al., 2011); which encourage new ideas, novelty, experimentation, creative processes and market-impacting ideas and solutions that might lead to new goods, services, or technology processes.

Garcia & Calantone (2015) join the same point of view and referred innovativeness as the ability to cause a paradigm shift in science and technology as well as market structure in an industry through a new innovation.

However, Innovativeness have been conceptualized under variety of perspectives known as managerial and customer and as a construct which can be represented at different levels. Studies mostly focus on the firm or organizational level, some others on the product and process or even market level, all depending on the research perspective.

The table 1 emphasizes the strategic dimensions under which innovation and innovativeness have been conceptualized over time by scholars. Most of the researchers stated in this table have focused on the same dimensions under both innovation and innovativeness. Product/service followed by organization/firm, process and marketing are the most used dimensions in the researches to explain both constructs. Regardless, innovation and innovativeness are two concepts that present both differences and similarities, depending on the perspective. However, it exists a link between the two constructs showing that innovation is the antecedent to innovativeness (Kamaruddeen et al., 2010); that enlighten our conception and usage of the terms.

Even some authors refute the connectivity between innovation and innovativeness (Tsai & Yang, 2013), we argue that innovation is an antecedent of innovativeness (Kamaruddeen et al., 2010) and the innovativeness of a business reflect its degree to innovate.

We rely on innovativeness as the capacity to engage into innovation following Hult, Hurley & Knight (2004), and also view it as the degree of innovation of the company's strategic elements. We define it as the level of involvement into dynamic processes (both technological and non-technological) on a long term and with the goal of gaining a competitive edge in the market through companies' successes. For the purposes of this investigation and in accordance with previous researches, we conceptualize innovativeness as a multidimensional construct based on company perceptions at the product, process, and marketing level (Gunday et al., 2011; Wang & Ahmed, 2004; Alpay et al., 2012; Hassan et al., 2013; Abosag & Brennan, 2017). Our approach consists of taking into account relevant dimensions representing firms' strategic activities within the market. We then present in the coming sections each of these dimensions prior proposed and discussed.

Table 1. *Strategic dimensions under innovation and innovativeness (adapted from Knowles et al., 2013)*

AUTHOR	CONCEPT	PRODUCT	MARKETING	BRAND	ORGANIZATION / FIRM	CUSTOMER	MARKET	PROCESS	BEHAVIOR	STRATEGIC	BUSINESS SYSTEM
Alpay, Bodur, Yılmaz & Büyükbalcı (2012)	Innovativeness	○					○	○	○	○	
Hatak et al. (2016)	Innovativeness	○									
Kellermans et al. (2012)	Innovativeness	○			○						
Abosag & Breman (2017)	Innovativeness	○	○	○	○	○	○				
Gunday et al. (2011)	Innovation	○	○		○			○			
Hassan et al. (2013)	Innovation	○	○		○			○			
Subramanian & Nilakanta (1996)	Innovativeness				○						
Atalay et al. (2013)	Innovation	○	○		○			○			
Garcia & Calantone (2002)	Innovativeness	○									
Knowles, Hansen & Dibrell (2013)	Innovativeness	○						○			○
Bosso et al. (2013)	Innovativeness	○									
Polder et al. (2010)	Innovation	○			○			○			
Sethi et al. (2001)	Innovativeness	○									
Crespell & Hansen (2016)	Innovativeness	○						○			○
Salomo et al. (2008)	Innovativeness	○									
Boer & During (2001)	Innovation	○			○			○			
Danneels & Kleinschmidt (2001)	Innovativeness	○									
Hovgaard & Hansen (2004)	Innovation	○						○			○

Table 1: *(Continuous) Strategic dimensions under innovation and innovativeness (adapted from Knowles et al., 2013)*

Huaman-Ramirez et al. (2019)	Innovativeness	○		○				○			○
Anning-Dorson et al. (2018)	Innovativeness	○						○			
Vikash Naidoo (2010)	Innovation		○								
Shergill & Nargundkar (2005)	Innovation		○								
Nguyen et al. (2015)	Innovation			○							
Fazal-e-Hasan et al. (2019)	Innovativeness			○							
Mulyana et al. (2020)	Innovativeness		○								
Hsu et al. (2010)	Innovativeness		○								
Das & Joshi (2007)	Innovativeness							○			
Faroque et al. (2017)	Innovativeness							○			
Avlonitis & Salavou (2007)	Innovativeness	○									
Ardyan (2016)	Innovativeness	○									
Dunk (2011)	Innovation	○									
McNally et al. (2010)	Innovativeness	○									

The study focuses on three characteristics of innovativeness: process, product, and marketing. Even other forms of innovations can be valuable, we think that these three dimensions may offer special promise for businesses. For instance, streamlining internal operations, logistics, and resource management, according to process innovation, may considerably enhance efficiency and productivity, which is critical for firms functioning in demanding settings. Product innovation may help open new markets and meet unmet requirements by adapting products and services to the individual demands and preferences of African customers, enabling inclusive growth. When it comes to marketing innovation, reaching out to geographically scattered groups with cost-effective and culturally appropriate marketing methods may greatly increase brand awareness and recognition.

2.2. Process Innovation

Focused on internal systems and capabilities, process innovation includes the introduction of new elements used to produce a product or service (Rousseau, Mathias, Madden, & Crook, 2016). On some other hands, it is seen as the way of introducing and/or improving production and logistics methods, management approaches, technology (Alpay et al., 2012; Hassan et al., 2013) allow for significant enhancements in supporting activities (purchasing, accounting, maintenance and computing, production and management); being an important factor into product development and improvement. Similarly, Atalay et al. (2013) process innovation is the deployment of a new or considerably enhanced production or delivery method that incorporates major modifications in techniques, equipment, and/or software. These improvements then assist organizations in their quest of efficiency, through the cost reduction of production or delivery, new production methods, quality increase (Oslo manual 3rd edition, 2005), time gaining and so on.

Reichstein & Salter (2006, p. 1) in their research focused on process innovation sources investigations and defined PSI as “new elements introduced into an organization’s production or service operations input materials, task specifications, work and information flow mechanisms, and equipment used to produce a product or render a service with the aim of achieving lower costs and/or higher product quality”.

For Das & Joshi (2012), process innovation is considered as an organizational competence that marshals, integrates, and leverages organizational resources to enhance or create new processes. It represents changes in how businesses develop and deliver new end goods or services. They are often characterized by an internal organizational emphasis and are focused at enhancing the efficacy and efficiency of enterprises' technical and administrative processes (Piening & Salge, 2015). The authors also supplied arguments about PI being mostly incremental in nature, showing the focuses on marginal improvements to already existing procedures intended for production or service development.

Rousseau et al. (2016) in their research discussed about different scenarios concerning the relationship between process innovation and firm performance. Initially, the author suggested that PSI may be acquired outside and used within the organization rather than generated internally and applied to the market. Second, the goal of PSI is frequently to enhance efficiency and lower operational costs inside the organization. Third, process innovation is likely to temper the link between innovation and performance, resulting in a higher impact on performance measures that account for appropriation and a lesser impact on performance measures that do not account for appropriation.'' (p. 8). These statements give another view on how process innovation can be approached and applied within the firm, showing its total contrast and difference with product innovation.

The literature above gives a general understanding and fact that process innovation's role is to generally develop optimized methods for optimizing faster, cheaper, and/or of higher quality product/service delivery; what makes it obviously linked with product innovation. Mainly production oriented, the acquisition of embodied knowledge shapes process innovation strategy, which acts as a vital tool for addressing organizations' inadequate internal capacities. (Hervas-Oliver et al., 2014). With the potential of improving performance, PSI may, for example, create advantages that are difficult for competitors to observe and imitate (Mooi et al., p. 743). Even assumed to provide numerous benefits to an organization and aid in the achievement of a competitive advantage, significant number of businesses have implemented process innovations practices with limited success (Baer & Frese, 2003). As an example, Baer & Frese mentioned the Waterson et al. (1999) study about effectiveness of several modern manufacturing practices in the UK where approximately 50

to 60 percent of the companies thought their innovations met objectives only “moderately”, “a little”, or “not at all.” (p. 46).

2.3. Product Innovation

As customer needs change and new markets emerge, companies seek to meet these new demands by adjusting their existing product portfolios or developing entirely new lines. This is known as product innovation, and when done successfully, it can generate a positive stream for the companies. Product innovation is described as something in “possession of newness” (Hetet, Ackermann, & Mathieu, 2020) and ‘’uniqueness’’ (Sethi et al., 2001) compare to competitive offers. In general, the innovation will either provide an additional benefit or solve a previously unsolvable problem. Aside from the fact that it is new, an innovative product might result in considerable advances and uniqueness in terms of its features, intended usage, software, user-friendliness, or components and materials, functioning, and advantages (Hassan et al., 2013; Gunday et L., 2011; Boisvert & Ashill, 2011). PI owns also many specificities, from both customer and firm perspective (Danneels & Kleinschmidt, 2001; Hassan et al., 2013). It can be seen both new for the firm that produce it (Polder, 2010) but also new to the customer, in the goal to bring efficiency in the business. This argument joins the statement made by the OECD (2005) about product innovation classified as introduction of a product only new to the firm or new to the market.

For Garcia & Calantone (2002), PI is a measure of the potential for a product to cause a disruption in the marketing and/or technology processes. It was described by Story, Boso & Cadogan (2015) defined as a mix of the degree of innovation (newness) and intensity (quantity) of enterprises' new product offers. The writers have concentrated on the necessity for many new products offers to meet varied market demands, in addition to the need for novelty. Further, product innovation contributes to heterogeneity among industry competitors (Rousseau, Mathias, Madden, & Crook, 2016). According to the authors, new goods are generally proprietary in nature since they are produced within a corporation and subject to a degree of uncertainty and legal protection that raises hurdles to imitation.

Hovering the above literature, product innovation encompasses a wide range of meanings and approaches. In summary, it is clear that product innovation is a type of adaptation of original products to create a solution to current customer needs; but also, which serves on the other hand for companies to place themselves efficiently on the market while being protected. It is important here to understand that the term ‘’ product ‘’ is employed in the study to cover both goods, services and ideas. Accordingly, we consider product innovation as the degree of innovation in the company’s product with the goal to anticipate market changes more quickly and capitalize on opportunities that arise rather than reacting to upheavals. In other terms, this study uses product innovation to assess the business’ ability to create or to adopt new ideas for new product development (Lau, Yam, & Tang, 2011) which will provide in return a significant competitive advantage and attractiveness in the market.

2.4. Marketing Innovation

A marketing innovation is “the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing” (Oslo Manual, 2005, s. 49) which is used to enter new markets, respond to rival moves, enhance sales, and build long-term competitive advantage (Mulyana et al., 2020). Ungerman et al. (2018, p. 133) argued that “MI must be a part of marketing concept and strategy that differs significantly from traditional methods”. The term is emphasized as new and innovative activities related to marketing functions rule by the companies in the market (Cascio, 2011). Hsu et al. (2010) define it as “a business’ innovative concept to orchestrate marketing activities, which contain novelty to attract consumers and satisfy their needs on value.” (p. 1216).

Nevertheless, product form and appearance modifications do not have to affect the product's functional or user qualities; product packaging changes must be significant; the employment of new concepts for marketing a firm's products and services will govern in-product promotion, and pricing will entail the use of new pricing techniques to sell the firm's goods or services. Marketing innovation is often confused with other dimensions known as

product and process ones. Accordingly, the Oslo manual (2005) has ruled on the case while highlighting the different points constituting the benchmark of differentiation. For instance, the factor that distinguish product and marketing innovations is a major change in the product's functions or applications. Product innovations are goods or services that have significantly better functional or user qualities over previous items.

That said, while marketing innovation is defined as the adoption of a new marketing idea that entails a major modification in the design of an existing product, the key separating process and marketing is the objective. Process innovations include procedures and support activities targeted at lowering unit costs or improving product quality, whereas marketing innovations attempt to increase sales volumes or market share in order to modify product positioning or reputation (Oslo Manual, 2005, p. 54-55).

This view is supported by Ilić et al. in their research highlighting the importance of MI in new economy. According to the authors, marketing innovation entails the use of never-before-used strategies, concepts, or approaches based on a mix of factors such as major product design changes, the adoption of a new price strategy, the implementation of a completely new retail idea, and the implementation of a completely new promotion concept (2014, p. 36).

As a result, it is feasible to comprehend and successfully employ the terminology. Following earlier research, we give a framework for thinking about marketing innovation by envisioning it as a company's goal to provide new and/or enhanced product design, promotion, distribution, and price tactics. In summary, it is an innovation into marketing mix activities of the company known as the four Ps of marketing--product, pricing, and promotion (Shergill & Nargundkar, 2005) with the aim to gain competitive advantage.

2.5. Digital Presence

Few are the companies nowadays whose activities are not related to a digital-based system, which with an early implementation, provide the opportunity to do more to stand out from others, namely the competition (Wroblewski, 2018). Going digital is a key source for businesses in a way that they can spread a message, a good or service and collect feedbacks

from their audiences and customers through efficient channels. All that with no limitation in time or space, different from the traditional manner. Roland Berger (2015) join the argument by stating that it is no longer sufficient to create good products in the digital world. More and more product features are being accomplished through software rather than hardware (p. 5). For instance, digitalization is seen as ‘’a collecting basin’’ where new innovations including digital applications are captured to enhance internal processes (Wroblewski, 2018) and improving or transforming business models/processes (Mazzoni, 2019). According to Gassmann et al. (2014, pp. 6), digitalization is the ‘’ability to turn existing products or services into digital variants, providing advantages over tangible products’’.

Digital presence is defined as a set of channels via which consumers converse about brands and companies, and also It refers to how a company appears on the internet. In other words, it is what people discover when they search for your organization or business on the internet (webSURGE, 2019). As the sum of online activities, it encompasses exposure of the company whether managed by the corporation itself or carried by stakeholders (Cruz & Karatzas, 2019). Moreover, being digitally present reflect the engagement of the company into Electronics tools usage (Eid & El-Gohary, 2013) and digital elements adoption such as automated and interactive apparatus boosting companies’ activities (e.g., banks cash dispenser) Cruz De Oliveira et al. (2015).

Focusing on our study, digital presence will be presented as a concept structured as ‘digital transformation’ stating business’ affinity to digital components at all stages within the company and online presence of the business for external purposes. The following paragraphs will provide general overview of the elements with sufficient literature. The aim is to focus on these dynamic capabilities which constitute the disruptive character of businesses in the globalization era and examine how firms can differ in integrating with and exploiting them.

2.5.1. Transformation as important step into digital presence

Vial (2019, p. 121) defined digital transformation as “a process that aims to improve an entity by triggering significant changes to its properties through combinations of

information, computing, communication, and connectivity technologies". It also considered as the use of digital technology to inspire uniqueness in company operations and manufacturing in order to suit the market's requirements. (AlMulhim, 2021). Considered as drivers for changes in the corporate world (Rachinger, Rauter, Müller, Vorraber, & Schirgi, 2019), DT is the process of transitioning a company from legacy to new approaches through the use of emerging technologies which help improving the experience of the organization's employees, customers, suppliers, partners and stakeholders (Karagiannaki, Vergados, & Fouskas, 2017).

Nasiri et al. (2020, p. 2) It is described as the transformation of company processes, culture, and organizational factors in order to fulfill market demands as a result of digital technology. Further, it is based on the institution's ability to re-imagine possibilities such as extension, interactions, convergence, modularization, and integration of existing business with digital technology (Pramanik, Kirtania, & Pani, 2019). Even not being supposed as technological leap, digital transformation plays a vital role in organizations in terms of new business and thinking methods in order to keep up with digitization by leveraging digital factors (Ulas, 2019).

On a very technological hand, digital transformation DT refers to the process by which a corporation integrates digital technology into all of its activities in order to improve performance (Allouche & Zerbib, 2020). The author also argued that a successful transformation is in fact supposed to guarantee a coherent and "intelligent" organization capable of preventing customer attrition, anticipating the expectations of a prospect, developing a dedicated offer, etc. and giving example of Amazon in 2013 filing a patent allowing it to deliver a package even before its "buyer" has placed an order. In the same vein, Cherkaoui, co-author of the book "The new horizon of digital transformation" argued that companies must pivot their organization towards a "data-driven culture" and propose 9 pillars for developing that strategy: a storytelling corporate culture, Makers at the helm, Talent on the shoulders of giants, A strategy focused on innovation, Data capital as the main growth factor, Customer obsession, Decision-making informed by data and AI, Technology as an enabler of value and last, Velocity, beyond agility and resilience (Raffin, 2022).

Accordingly, we follow the arguments of Laurent Bour stating that “the process of implementing as many digital technologies as possible available within their activities, for a better business and with a view to sustain the business” (Bellalij, 2021, p. 1252) and consider digital transformation as technologies adoption by institutions with the goal to run their business into a better manner. Seeing them under the smart perspective, technologies may refer to entities in which physical equipment are supplemented with the smart qualities of digital technologies (Nasiri et al., 2020), enabling the organization or firm to keep up to date on market trends and consumer preferences (AlMulhim, 2021).

The following paragraphs will embody general literature about technologies types such as software, Phygital and media which are though to bring businesses at the optimum level of digitalization.

2.5.1.1. Software Technology as key for digital presence

Software is described as a collection of computer programs, accompanying documentation, and data (Wikipedia, 2022) or simply a type or component of technology created by humans that enables users to do specific tasks or processes using a computer or other technical instrument (Madhurihammad & Kashishsoda, 2021). The word "software technology" refers to the development processes, programming languages, and tools that support them (Oxford Univesity Press, n.d.).

It is important to clarify that the use of the term software in our research refers to any non-palpable technology resources therefore different from hardware and influencing the course of business activities. We consider software technology as capability helping to implement strategies that benefits from the combining of tools and technology.

Software has become increasingly important in almost every industry whether developed and managed in-firms or externally by partners. As stated by Ebert & Counsell (2017, p. 82), software defines the future perhaps more than any other discipline. It is important to first get into the definition of the term for general understanding.

New software technology is frequently heralded as the next long-standing problem solver to be adopted, only to fail and vanish within a short period of time (Zelkowitz, Wallace, & Binkley, 2003) because of their adoption without evidence of being effective.

For instance, Grimm (2003) in his research about software technology place in the automotive industry focuses on software-related trends in the sector. The author revealed some current examples of modern technology used in automotive such as intelligent powertrain control, ESP (Electronic Stability Program), and the active distance control DISTRONIC emphasize the newest generation vehicle's degree of comfort., while not forgetting the complex nature of their use and. Apart from that, the author has specified the importance of harmonization, which, if not mastered, could cause errors and costly changes in the process.

In the same vein, Gangwar (2017) has looked at cloud computing in her research with the aim of bringing out the value of this worthy piece of technology; with the aim to illustrate how cloud-based services may be optimally used for increased company performance in the manufacturing industry and other organizations with comparable configurations. Gu, Yang & Huo (2021) in their research, chose the supply chain to edify the role of software. As part of information technology tools used within the businesses, it engages them into resilience.

In general, software technology is in most cases used for product and development purposes (Banker, Bardhan, & Asdemir, 2006), process control and procedures design related to policies (Muafi, Gusaptono, Effendi, & Charibaldi, 2012) and much more. However, everything is dependent on the capacity to obtain and implement the appropriate model (Mauerhoefer, Strese, & Brettel, 2017) followed by the appropriate strategic, structural, and cultural conditions ensured by the top management.

2.5.1.2. Phygital technology as key for digital presence

Phygital (physical + digital) is a marketing word that refers to the combination of digital and physical encounters (Horwitz, 2016). t is described as the joining of the physical and digital worlds in order to establish a marketing communication ecosystem between

businesses and customers, or between the user and the product (Moravcikova & Kliestikova, 2017) drawing on the best from both physical and digital with the target of one-dimensional brand communication (Švec & Madleňák, 2017). The term phygital refers to how common things are linked to their surroundings, receiving information and modifying their performance without the need for human interaction (Nofal, Reffat, & Moere, 2017). In the retailing, it is represented as a solution and a new way concept of giving value to the in-store buying experience and meeting the fragmented omnichannel behavior of customers (Belghiti et al., 2018). For instance, Johnson & Barlow in their research focused on consumer psychology and neuroscience, set the term onto marketing point of view and argued that Phygital experiences may be designed to provide a novel and seamless user experience, influencing customer perceptions of product value while fostering trust and reducing misunderstanding (Johnson & Barlow, 2021, p. 2365). The authors also confine their analysis to a pair of ideal types representing proportion of possible cases; these are automated sensing technologies (ASTs) known as facilitator of in-store experience and simulated in-person experiences (SIPs) known as Use augmented and virtual reality technology to bring digital items into the actual world for in-person interaction and evaluation before purchase.

As the channels of customer interaction and communication proliferate, phygital puts innovative tools and advanced technologies within the reach of the general public. It improves the marketing experience at the physical point of sale. The figure 1, highlight the concept as an outcome from the merge of the two elements.

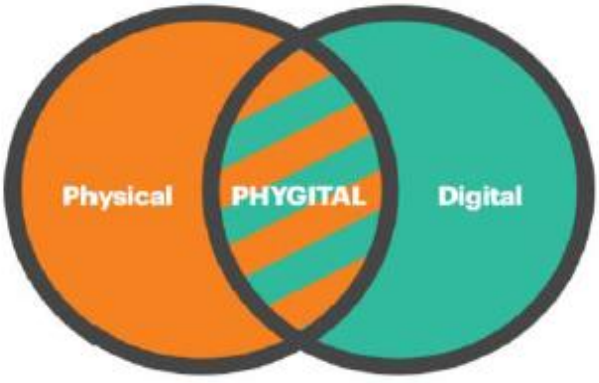

Figure 1. *Cross connection of the virtual and real world*
Source: *Moravcikova & Kliestrikova, 2017, p. 150.*

However, phygital is not limited to retail but also extends to other domains. For instance, Nofal, Reffat & Moere (2017) submit few of Phygital application areas examples such as phygital map that gives opportunity to exploit paper-based atlases merged with digital media contents; phygital game referred to projected playground with robot which has been very successful in recent years under major video game brands; also, phygital public space known as digital blogs and physical surveys to share and shape public spaces. Similarly, Moravcikova & Kliestikova (2017) argued that the concept is a fantastic environment for branding a product or service (p. 149) and give further examples in the context of phygital, including QR codes and augmented reality. Accordingly, we do not limit the concept to in-store experience but also to own place experience by relying on nowadays business models such as entertainment sector (gaming & cinema) where customer can get its own VR to enjoy at any place a movie or play games.

The phygital is thus, any physical equipment fulfilled by a given technology intended to facilitate and take to another level the businesses offer to the audience. Focusing on our research, we conceptualize it as a competitive strategy allowing firms to interact with customers by providing goods (products/services) through a memorable way with the goal to increase the organization performance.

2.5.1.3. Media as key for digital presence

As the online presence of companies is made up of summarized components Banner (2018) argued that ‘'The single most significant reason why organizations need a strong digital presence in the twenty-first century is because this is where their consumers reside”. That give an overview of how important brands have to develop good impressions online through media and any platform where they regularly get in touch with audiences. The author also listed key areas of digital presence which a research company in Finland has listed. We have in the first-row digital marketing, solely referred to the promotion or communication of the company value offering. Second, there is digital product/service experience, which covers everything a consumer encounters when interacting with a product/service on a digital platform. Then there's electronic commerce, which is described as a business model that allows a corporation to deliver commercial products or services over the internet, including

secure payment mechanisms. We also have electronic customer relationship management, which is when businesses use internet-based technology to maintain and develop client connections. On the fifth row is social media, which is described as websites and computer applications that allows users to communicate and exchange information over the internet by using a computer or a mobile phone. And last, mobile optimization which is the process of ensuring that visitors' get optimized experience through their used devices when accessing a company's website via mobile (Banner, 2018, pp. 20-21).

Nevertheless, the level of digital adoption is less or more the resultant of internal and external influences which come straight from the environment businesses evolve in. (Tiago & Verissimo, 2014). For instance, Haj-Bolouri & Flensburg (2017) used Google as an example in their study, emphasizing its relevance in providing firms with solutions in terms of services meant to increase their digital presence. These solutions are under different forms such as "Calendar", "Meet", "Chat", "Drive", "Docs", "Sheets", "Slides", "Forms", "Sites" and encompass ideas used to provide help into company objectives achievements.

However, numerous other solutions and channels exist as support of companies to run their presence efficiently. The literature review provides insight concerning elements the which characterize Digital Presence. They are grouped together as media and are considered as supports channels facilitating companies' onboarding in the digital era. They are used mostly for information and presence, communication and interaction with customers, commercial transaction, trust and engagement, brand building, sales or even services and products delivery (Rowley & Edmundson, 2013; Cruz & Karatzas, 2019; Rowley & Edmundson, 2013; Tiago & Verissimo, 2014; Rowley & Slack, 2003). They are mostly classified into three categories known as owned, paid and earned media (Vieira et al., 2019; Cruz & Karatzas, 2019); which represent the most used and relevant type of media in businesses.

Focusing on the study and based on the above literature, we refer digital presence to usage of advanced technology-based media such as social networking sites (social media, blogs and forums), websites, e-mails and any other relevant and similar media type. The following paragraph will shade light on the different type of media which characterize the online presence of businesses.

In mass communication, media are the communication channels or technologies used to store and coney information or data (Wikipedia, 2023); it is a broad term that encompasses all forms of communication that serve functions such as informing, raising awareness, educating, socializing, entertaining, and agenda setting, and includes all types of oral, written, and visual images (Igi-Global). In the marketing field, we refer it to initiatives adopted to reach audiences through different channels.

In the literature, owned media is referred as a channel the company controls which creates brand profitability (Corcoran, 2009) but also as visits on website that represent measurable customer's activity (Srinivasan et al. 2016). It includes the company's online assets, such as corporate, product, and brand websites, blogs, campaign sites, social media profiles, and mobile applications, as well as brick-and-mortar stores and offices that connect buyer personas with the company's digital activities (Demirci et al., 2014; Cruz & Karatzas, 2019). OM is the channel through which brands strengthen their relations with their audience. As Rusdan et al. (2018, pp, 496) stated, it is ''the home of a brand content that are accurate and to keep a long-term relationship and engagement between brand and their consumer''.

Paid media is in contrast an external endorsement such as paid advertising, retargeting, influencers, promotions with lower levels of credibility compared to earned content, but still be a powerful tool (Cruz & Karatzas, 2019). PM is described as a sort of media that must be paid for inside a company's social media ecosystem, such as sponsored advertising, as well as a weekly investment in online paid media search, such as sponsored advertising on Facebook and Google AdWords (Vieira et al., 2019).

View as external endorsement same as "Paid media", "Earned media" is created, initiated, circulated and used by customers. For Demirci et al. (2014), it is a place where motivated consumers show desire to connect, create, control and consume through activities such as blogging, micro blogging, bookmarking, product reviews, forums and discussion boards, etc... EM is also defined as the number of likes, shares, and comments on brand's posts (Colicev et al., 2018) in social media such as Facebook and Instagram in time t (Vieira et al., 2019). Because customers are growing more aware, actively involved, and demanding of service firms, and because they can communicate with their partners via online social

networks and communities (Bolton & Saxena-Iyer, 2009), it is imperative that earned media remains an important channel that organizations need to watch closely and manage efficiently.

2.6. Firm performance

Successful businesses are though essential for the development of countries since they are considered by most of economists as engines capable of determining economic, social and political development. As a result, in order to thrive in a competitive business environment, every organization must operate under performance-based standards (Taouab & Issor, 2019). Otherwise, they might have a negative impact and, in the worst-case scenario, lead to bankruptcy (Diesveld, 2018).

The firm's success is primarily explained by its performance over a specific time period (Al-Matari, Al-Swidi, & Fadzil, 2014), a performance that was historically regarded as the equivalent of organizational efficiency in achieving goals with limited resources in the 1950s and has evolved significantly the competence and aptitude of a company to use existing resources efficiently in order to achieve success in the twenty-first century (Taouab & Issor, 2019). As a critical concern for companies (Eneizan, Abd.Wahab, M.S, & Obaid, 2016), performance is what firms seek to increase through their activities to maintain or attend a certain level in the market. The concept is frequently used to measure an enterprise's effort and competitiveness, and it is a significant achievement in a certain area of activity (Achim & Borlea, 2010). However, a substantial and expanding body of research has examined the problem using generally identical definitions and measuring techniques that vary.

For instance, according to Hult et al., (2004) firm performance is the attainment of organizational goals relating to profitability, sales growth, and market share, as well as the realization of broad company strategic objectives. Qrunfleh & Tarafdar (2014) suggested that an improvement with firm performance would come from supply chain performance. According to Verboncu & Corcodel (2013), performance is a managerial and economical matter based on general and specific procedures which can only be addressed in the context two important concepts known as efficiency and effectiveness. For Colasse, the term

performance is a catch-all since it encompasses a wide range of concepts like as growth, profitability, return, productivity, efficiency, and competitiveness (Achim & Borlea, 2010).

For Ardyan performance it is all about success into reaching company's goals and this success level can be seen and evaluated through the financial, marketing, operational, and human resource performance of the company. The author defines it as "as SMEs success in reaching profitability and growth level according to what has been set" (Ardyan, 2016, p. 83)

Early studies focused on performance including operational (Lee, Kim, Choi, & Lee, 2009); accounting (Klapper & Love, 2004), product or production level (Zhou, 2006) (Chen, Wang, Huang, & Shen, 2016), some others at the market and marketing level (Hendar, Nurhayati, & Sugiyarti, 2018) (Salavou & Avlonitis, 2008). Nevertheless, in our study we rely on performance at the firm level, conceptualizing it as the company's overall performance. That sets businesses at a competitive level in the market since both qualitative and quantitative factors are taken into account. Managers and academicians have begun to include new, non-financial performance criteria including as customer satisfaction, employee satisfaction, environmental satisfaction, and social performance in recent decades (Diesveld, 2018). Accordingly, our focus goes through a multidimensional aspect of the construct with general measures (relevant and applicable for all firms) comprising both financial and non-financial performance (Anning-Dorson et al., 2018) which will be highlighted in details through following paragraphs.

2.6.1. Financial Performance

Financial performance is a subjective assessment of a company's capacity to generate income by utilizing assets from its primary mode of business. The term is also used to define a company's overall financial health throughout a specific time period (Kenton, 2022).

FP is a quantitative assessment of how successfully a firm uses its business assets and earns revenues over a certain time period, referring to the company's overall financial health (Diez-Busto, San-Martín, & Pérez, 2022). Financial performance, as the organization's performance goal, comprises financial measurements such as profit growth, return on investment, and return on assets (Gopalakrishnan, 2000). Gopalakrishnan has approached a

number of theorists, namely marketing, strategy, through which she was able to develop a hypothesis relating the positive effect of the adoption of innovation on financial performance.

FP according to Chang et al. (2016), is the improvement of economic goals based on revenue minus cost-related criteria such as profitability, return on investment, and return on sales. Roman et al. (1999) argued that accounting indicators and market-determined measures reflect overall financial performance of a company. Lee et al. (2009) considered financial performance as an increase of sale amount and sales benefit with findings of their research showing positive influence of process and customer performance on it.

Considerable studies focused on the financial aspect of performance since it reflects an important aspect for businesses, while most used the construct as a dependent variable especially about the used measurement determining it. Lim et al. (2011) in their meta-analysis research on IT and firm financial performance found stronger relation in studies that employ accounting measures rather than market measures. In their examination of the conditions before and after the global financial crisis, Saleh et al. (2017) discovered that family enterprises with concentrated ownership performed better than nonfamily firms with dispersed ownership structures.

2.6.2. Non-financial performance

Opposite to financial construct, non-financial performance includes all other aspects that do not express monetary value. As a change in the perspective of purely financial focus, non-financial performance is adopted to derive more to a qualitative evaluation based on business offers, employees and the customers' perception (Hernaus, Bach, & Vuksic´, 2012). The authors also argued about the easy implementation of the measures of NFP and useful character for businesses to forecast their financial performance in advance. Gijsel (2012) research on Economic Crisis on Dutch companies provided evidence that NFP measures are relevant in period of crisis since their usage is higher and at the same time, they determine an increase in annual bonus of the companies. Furthermore, organizations that employ non-financial data to measure their performance outperform others in the stock market, showing that non-financial measurements provide suitable information content for performance management (St-Pierre, 2005, p. 4). Similarly, Poincelot & Wegmann (2005) argued that, in

contractual theories, non-financial measures of performance, such as, for example, indicators of customer or staff satisfaction are only used as the means to better achieve an ultimate objective and help managers to ensure consistency between strategy and the allocation of decision-making rights but also contribute to the reduction of conflicts. Accordingly, priority should be given to non-financial performance techniques that may alter as the company's demands change (Skrinjar, Bosilj-Vuksic´, & Indihar-Stemberger, 2008). In other terms, measurement of non-financial performance is presumably intended to a better alignment of value creation from both shareholder's and social side (Chatterji & Levine, 2006) and it is more effective in assisting companies in implementing and managing new projects. (Ahmad & Zabri, 2016).

However, this opinion is not shared by some authors who are in favor of financial performance measures over non-financial ones, due to their subjective character and the difficulty of proving their accuracy, efficiency, or in a timely fashion (Chow & Stede, 2006). NFP measures may also be biased since their computation may change over time, differs between firms and may be easier to manipulate (Gijsel, 2012). Yet, contradictions exist concerning the useful role of non-financial performance. In our study, we rely on the approach that qualitative elements (non-financial) are relevant in the evolution of the company and constitute a significant impact in the determination of the performance.

2.7. Theoretical Model of the Study

A conceptual model where innovativeness, digital presence and firm performance took part was developed after reviewing various literature. In the below figure, the structure of the framework relates the relationship between the three variables while suggesting the direct influence of INNESS on FP. It is also supposed that DP has direct effect on INNESS and moderate its relationship with FP. Further, it is considered that innovativeness and digital presence are made of a number of dimensions. An overview of the theoretical framework is given by the model which is portrayed as followed:

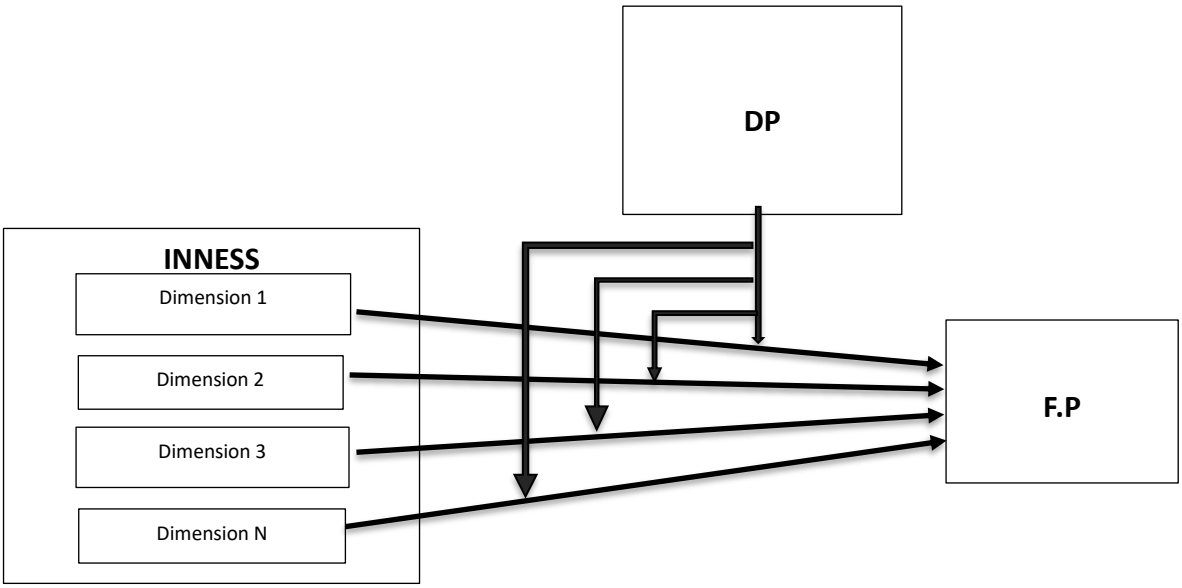

Figure 2. *Conceptual model*

3. The Sub-Saharan Africa Region

Sub-Saharan Africa, described as the region with the world's poorest countries and the highest illiteracy rates, has achieved astonishing success in extending education since independence, despite the region's cultural and economic diversity and severe poverty (Hyde, 1993, p. 100). Aside from the label of the region containing the poorest countries, the Sub-Saharan Africa is also the land of the fastest growing economies.

Geographically speaking, the region covers the West, Central, East, South, and Horn of Africa; with a population of around two billion or 1,211,190,000.99 exactly by 2022 estimates (The World Bank Group, 2022).

The coming paragraphs speaks about the entrepreneurial health of the region in the last years supported by a few concrete examples.

3.1. An Overview of Disruption in Sub-Saharan Africa

The African continent, has seen a boom in businesses in recent years with entrepreneurship focusing mainly on variants such as technology even if the level is not the same as that of the Western, Asian or American structures. The continent is at the heart of the most important information and communication revolution (Duval, Crochemore, Laure, Hanff, & Jekinnou, 2018) and this might be due to the implementation of modern tailor-made solutions based on the reality of the environment and meeting the requirements of the population. Although businesses on the continent have slowly started digital, its adoption and capacities are gaining speed (Dannouni, et al., 2020).

Based on a study on SSA regional economic outlook, digital connectivity is advancing at high speed in sub-Saharan Africa. Although the global digital divide remains significant, the gap with the rest of the world is declining rapidly. The Internet penetration in the region has increased tenfold since the start of the first decade of 2000, while it has tripled in the rest of the world (Abdychev et al., 2020).

The graph (figure 2) below provides this progression (from 2010 to 2017) in detail while comparing sub-Saharan Africa with fragile states, low income developing countries and also the rest of the world. The research results, however, indicated relatively weak digital penetration in sub-Saharan African. The overall level of online commerce remains low compared to other regions, but it experiences a rapid growth. In 2019, e-commerce revenue grew by 24% on average in SSA, and active online payment users accounted for a quarter of the population of the region, compared to at least half of the population in all other regions and 90% in advanced countries. A strong disparity in region is also found with regard to. the use of online commerce and the use of social networks.

Most of the research focuses on technologies such as the massive provision of the internet, access to financial innovations such as means of mobile payment and transfer, etc. (Kendall, Schiff, & Smadja, 2013; Osiakwan, 2017). Nevertheless, the region is not limited to fintech but leans towards more daring aspects and many other technological revolutions and innovations. It exists more ‘’leapfrogs’’ under both public and private sector scope such as e-commerce, e-government and platforms Huet (2017), software and IT, hardware,

information service or even platform economy (Boateng et al., 2017), which constitute a meaningful step into evolution for the continent. Some others, drawn into more disruptive findings such as Blockchains, robotics, renewable energy (Chukwujekwu, 2016), for the ease into in carrying out activities such as farming, education, healthcare and so on which are essential for the nations' economy (Abdychev et al., 2020).

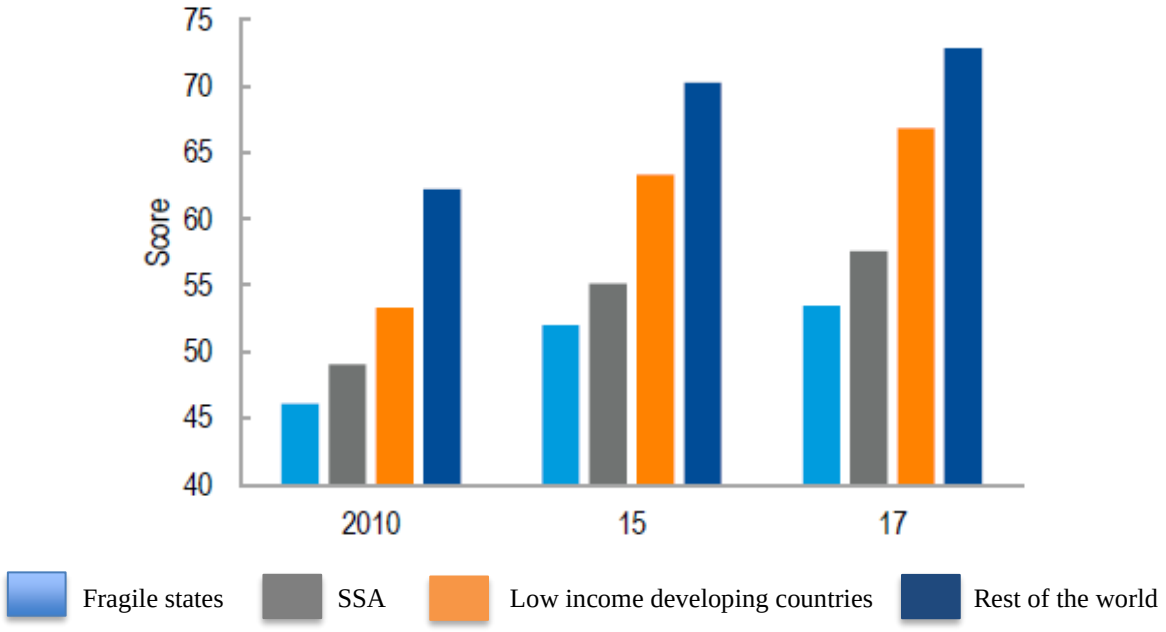

Figure 3. *Enhanced Digital Index (EDAI)*
Source: *Alper & Miktus* (2019)

Speaking about businesses, it was found through World Bank's Enterprise Surveys (WBES) that use of email serves as a proxy for connectivity digital business insofar as it is an important component, even predominant, in most companies thus, possible to estimate the impact of on turnover of companies… (Cariolle et al., 2019); relating the necessity of such tool in businesses' activities. In terms of innovation, the SSA is regarded as the area having the greatest number of outperforming economies. The findings of the GII (2021) research (Table 3) provide an overview of the region's most innovative countries, including Mauritius and South Africa are in the top 65; Kenya and the United Republic of Tanzania are in the top 100 and have improved their performance over time; and Rwanda has resumed the lead among low-income economies.

Table 2. *Ranking of the most innovative African economies*
Source: *Global Innovation Index (2021).*

GII RANK	ECONOMY (COUNTRY)	REGION RANK
52	MAURITIUS	1
61	SOUTH AFRICA	2
85	KENYA	5
89	CABO VERDE	6
90	TANZANIA	7
100	NAMIBIA	9
102	RWANDA	10
105	SENEGAL	11
106	BOTSWANA	12
107	MALAWI	13
110	MADAGASCAR	14
112	GHANA	15
113	ZIMBABVE	16
114	IVORY COAST	17
115	BURKINA FASO	18
118	NIGERIA	19
119	OUGANDA	20
121	ZAMBIA	22
122	MOZAMBIQUE	23
123	CAMEROON	24
124	MALI	25
125	TOGO	26
126	ETHIOPIA	27
128	BENIN	28
129	NIGER	29
130	GUINEE	30
132	ANGOLA	31

Digital technology has created new opportunities for companies in the region, allowing them to provide relevant solutions for their audiences. However, it is important here to understand that most businesses in this area of Sahel face shortcomings in terms of access and improvement of the advanced tools.

This may be due to the economic and financial situation but also the geographical position of the country in which they are established (e.g., landlockedness, not enough strong infrastructure, etc.). Although, the goal of the study is to highlight the disruptive engagement of businesses in this region, also their affinity to digitalization and digital maturity. It is not excluded that there are already advances in the field (Farming, Agribusiness, Environment, Energy, etc.); however, the question to be asked is do this really suit the environment, benefit the company and allow profit? For instance, it is reported in each of these countries relevant actions relating businesses evolution technologies in the diverse sectors.

3.2. Presentation of the West Africa and the Sahelian Region

West Africa (Western Africa in other terms), is the continent's westernmost area. The Economic Community of West African States (ECOWAS) or Union économique et monétaire ouest-africaine (UEMOA), an organization established by the Lagos Treaty of 1975, promotes the region's economy. The ECOWAS is made up of fifteen member nations who have cultural and geographical links as well as mutual economic interests and are both located in Western Africa; it is restricted to eight Francophone countries that use the CFA franc as their common currency. (ecowas.int, 2016).

West Africa, which includes 16 nations with distinct landscapes, cultures, and economies, remains an area with enormous promise and dynamism in 2023. While obstacles remain, tremendous progress is being made in a variety of industries, making it a fascinating region to observe.

Coming to the topic of economic development and diversification, the area has one of the world's fastest-growing economies, with a predicted 4.6% growth rate for 2023 (World

Bank, 2023). As we get into the year 2024, here's a look at some of the important trends and changes influencing the region:

- The International Monetary Fund (IMF) forecasts 4.2% GDP growth in West Africa in 2024, indicating a sustained rebound from the economic effect of the epidemic (IMF, 2023).
- Oil and gas continue to be key drivers of growth in nations such as Nigeria and Ghana, while agriculture is critical in others such as Côte d'Ivoire and Mali. However, diversification outside these traditional industries is gaining traction, with an increased emphasis on services, manufacturing, and technology.
- Governments are increasingly emphasizing the importance of diversifying their economy outside conventional industries by encouraging entrepreneurship, innovation, and investment in renewable energy and tourism. Countries such Africa Ghana, Ivory Coast, and Senegal are leading the way with aggressive growth plans and infrastructural expenditures.

Speaking about demography, the region has a varied and quickly changing population, with over 380 million people spread over 16 nations. Understanding these demographics is critical for successfully navigating the region's economic, social, and political landscapes. Here's a look at some major trends and observations for 2024:

- Rapid population increase: West Africa has one of the world's fastest-growing populations, with an annual growth rate of about 2.5% (Worldometer, 2024). This equates to an estimated 24 million additional residents in the region per year.
- Young population: The median age of West Africa is 18.8 years, making it one of the world's youngest areas (Worldometer, 2024). This youth bulge brings both possibilities and problems in terms of education, employment, and social services (World Bank, 2023).
- Urbanization: Cities are rapidly expanding, with a projected 44.7% of the world's population already living in cities (Worldometer, 2024). This urbanization trend offers potential for economic growth while simultaneously posing issues in infrastructure, housing, and social services (UN Habitat, 2022).

Overall, West Africa's demographic makeup presents both benefits and problems, such as a large and expanding market for products and services, as well as the need to address issues such as youth unemployment, education, and healthcare.

The Western region of the continent is made up of countries all affiliated to a specific area; and one of these areas is the Sahelian Zone. The Sahel is the transitional ecoclimatic and biogeographic zone in Africa located between the Sahara to the north and the Sudanian savanna to the south. It has a semi-arid climate and stretches throughout Northern Africa's south-central latitudes between the Atlantic Ocean and the Red Sea. In other terms, it is a huge semi-arid African territory that separates the Sahara Desert to the north and tropical savannahs to the south, and it is a place of both potential and problems. It has an abundance of human and natural resources, which means it has huge potential for fast expansion (AfriqueRenouveau, n.d.). The name is derived from the Arabic term for "coast, shore": this is explained as being used in a figurative sense (in reference to the southern edge of the vast Sahara).

The Sahel, which spans eight West African countries from Senegal to Chad, is a complex and dynamic terrain distinguished by enormous difficulties as well as exciting potential. Some parts of countries like Senegal, Mauritania, Mali, Burkina Faso, Algeria, Niger, Chad, Sudan, Eritrea, Ethiopia are all part of the Sahel region of Africa. Nonetheless, our emphasis is centered on the western section as the political Sahel, which includes Burkina Faso, Mali, and Niger, all of which were former French possessions (Cooper, 2018). These countries constitute the most part of a semi-arid region with natural resources like oil, gold and uranium, making it one of the richest one in the world.

3.3. Digitalization and Innovation in West Africa and Sahelian region

Leveraging the digital economy has the potential to alter Sub-Saharan Africa (SSA). Rapid digital transformation is redefining the global economy, accelerating financial inclusion, decreasing information asymmetry gaps between buyers and sellers, and altering how economies of scale are realized (The World Bank Group, 2023). The internet economy in Africa is expected to reach US$180 billion by 2025 (up from US$115 billion in 2020),

accounting for 5.2 percent of the continent's GDP" according to research by Google and the International Finance Corporation (IFC) (2020). The COVID-19 pandemic has hastened this digital change, since many nations have been able to use digital technology to maintain business and education continuity, reduce service outages, and cope with social alienation (pp. 7).

Many West African businesses have embraced digitalization and innovation techniques in recent years to improve their operations and overcome conventional hurdles to trade and financial inclusion. One of the most notable instances is the regional rise of e-commerce platforms, which has facilitated cross-border trade and enhanced access to goods and services.

Jumia, a pan-African e-commerce company with operations in some of the west African countries (Nigeria, Ghana, and Ivory Coast) is one example of a business applying digitalization and innovation tactics in the Sahelian region. To improve the efficiency and reach of its operations, Jumia has developed a variety of digital solutions, such as mobile applications and online marketplaces. Accordingly, Jumia's creative approach to e-commerce has contributed to the expansion of West Africa's digital economy and helped to overcome traditional trade hurdles such as distance and information asymmetry (Bright, 2016). MFS Africa, a pan-African mobile payments company with over 170 million users connected that permits cross-border transactions and remittances, is another example of a business applying digitalization and innovation methods in the Sahelian region. MFS Africa has created a proprietary network that connects mobile money services across the continent, allowing customers to send and receive payments from anywhere in the world; what makes the company one of the biggest contributors to the growth of digital financial services in the region (fsdafrica, 2019).

The Sahelian region is characterized by low levels of economic development, poor infrastructure, and harsh environmental conditions, all of which impede its capacity to use digitalization and innovation for sustainable development. Despite these challenges, creative firms are developing that are addressing these concerns and promoting good change. There are new opportunities and challenges that policymakers, researchers, and practitioners must

address. The digital gap, which refers to the unequal distribution of digital technology and services across populations and territory, is one of the most pressing concerns confronting the Sahelian region. According to the world bank statistics, the digital gap in Sub-Saharan Africa is widening, with only 29% of the population having access to the internet by 2020. According to the survey, Sahelian nations such as Burkina Faso, Chad and Mali are among the least connected, with less than 30% of their inhabitants utilizing the internet (The World Bank Group, 2023).

In recent years, strong growth has been recorded in this area, reporting the enthusiasm of companies to follow, and suit with digital trends and innovation. For instance, the common examples of innovative and impact maker start-ups operate mostly in categories like Agriculture surveillance of protected areas, prevention and risk and disaster management, construction, communication, art, tourism and also microfinance (Duval, Crochemore, Laure, Hanff, & Jekinnou, 2018). Even with economic instability and despite challenges, companies in the Sahelian zone are still trying to buckle down and adapt to this digital age in which we live through innovative projects. One such possibility is the ability of digital technology to improve agricultural productivity and food security, both of which are vital to the livelihoods of millions of people in the region. For example, it has been demonstrated that using mobile-based systems for weather information, market prices, and financial services increases farmers' income and resilience to climate unpredictability. Aker and Ksoll (2015) published the findings of a randomized assessment in Niger in which rural families enhanced their access to and competence to use information technology. We discovered that in treated areas, households planted a more varied basket of crops, notably marginal income crops farmed by women.

The Sahelian area is varied, with different demands and potential for innovation in different nations and industries. However, the examples offered demonstrate the ability of creative businesses to address the region's difficulties and promote good change. By tackling current obstacles and cultivating a supporting ecology, the Sahelian area may realize its promise as a hub for equitable and sustainable development. Overall, West African businesses' digitalization and innovation activities have the potential to revolutionize the region's economy and enhance the lives of its people.

4. METHODOLOGY

The study's goal is to comprehend digital presence difficulties while deciphering its relationship to innovation and performance. To that end, the goal of this chapter is to present the study strategy and procedure, followed by an explanation of the background and sample. Further, the measurement and operationalization of the concepts will be described as well. As conclusion, data analysis procedure will be discussed.

4.1. Research Design and Method

The quantitative research approach is applied in general. The thesis's subject and objective are the digitalization and innovation state of firms in the Sahel and Coastal countries of west Africa, as well as their relationship; and this approach was selected to understand the influence of these factors on their performance. The study's major factors were judged to be digital presence, innovation, and performance.

The research is hold under both exploratory and conclusive (descriptive) design. For Kotler & Armstrong (2006, pp. 122), ‘’ The goal of exploratory research is to collect preliminary data that will aid in the definition of issues and the formulation of hypotheses. The exploratory phase of our study will aid in deciphering the meanings of the independent variables and determining what they are made up of. Since they differ depending on the business setting, it was determined to conduct a thorough analysis in order to build the constructs. The main goal is to get insights and understanding.

Hypotheses tests are used in the study's **conclusive section** to determine whether the produced and proposed model is relevant. These tests will focus on the link between innovativeness, digital presence, and firm performance. The study's purpose is to discover evidence for a causal association between the variables.

The technique in this study consists of three major parts. The first is a review of relevant literature and the suggested conceptual model. The second phase is administering surveys to explain and assess if the produced and recommended model is relevant.

Inputs for the survey have been extracted from literature reviews and expert/specialist semi-structured interviews, which helped in measuring the research model. This combined method is also an excellent way to investigate relationships, and hence is well suited to describing and testing correlations and hypotheses. The developed survey has been sent to respondents through different channels, and been considered as data for the quantitative analyses.

4.2. Research Model

A research model based on literature review and specialists' interview is developed at this stage. The model aims to test whether innovativeness affects firm performance through its constructs known as process, product and marketing innovation.

The major goal of this study was to look at firms' levels of innovation (innovativeness) and its effect on their performance. Given the importance of digitalization to businesses, it was decided to introduce the digital presence variable and investigate its interaction with the other variables, namely innovativeness and firm performance. Further, it is to highlight what digital component is used, how it is used and to what extent it is used in businesses.

4.2.1. Innovativeness (process, product and marketing innovation)

Prior researches on innovation stated on the positive relation with the variable and firm performance (Jin et al., 2004; Kellermanns et al., 2012; Suliyanto & Rehab, 2012). While others discovered no direct positive or even negative correlation (Subramanian & Nilakanta, 1996). However, the relation is also channeled through different firm's outer influencing aspects.

For instance, Tsai & Yang (2013) reported that the influence of innovativeness on performance is most beneficial when market volatility and competition intensity are strong and least positive under lower ones. While some indicates that the more innovative companies have a better performance (Deshpandé et al., 1993). Previous research has also

found that this favorable effect is bigger for larger organizations, firms that invest more in advertising, and even firms in high-tech industries (Rubera & Kirca, 2012).

As an important determinant of performance of businesses (Hult et al., 2004), innovativeness may affect performance of organizations under different dimension known as process, product, or even marketing (Gunday et al., 2011; Hassan et al., 2013; Karabulut, 2015).

Past researches showed evidences of PI outcomes having some great impacts such as efficiency effectiveness sand sustainability on firms' manufacturing activities (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler, 2012)

In their research, focused on green innovation and management concern, Tang et al. (2018) found that process innovation and product innovation under the ''green label'' significantly predict firm performance. Similarly, Zhang et al. (2017) study about institutional support affect revealed that both product and process innovation improve firm performance. Goedhuys & Veugelers (2008) confirm the relationship and went further by emphasizing the support access to finance provide to innovation and growth performance. In some other case, when paired with organizational innovation, product and process innovation generates high productivity (Polder et al., 2010s).

However, some authors could only find significant relationship between process innovation and performance and non-significant and negatively link the construct product and firm performance (Hilmi et al., 2010).

For Piening & Torsten (2015), quality improvements, cost and time savings, productivity increases, and turnover growth are some of the possible benefits of process innovation. According to the findings of their study, businesses may actually enhance the chance of attaining process innovation success, which is favorably associated to company financial performance.

Das & Joshi (2012) found positive relationship between process innovation and firm performance in their study focused on technology service firm. Further, the authors argued that '' Process innovation enables an organization to become more efficient (by eliminating

or modifying inefficient processes or creating new ones to make more productive use of limited resources), more responsive to customers (by resolving process-related problems customers may encounter when using a service), and to build new distinctive competencies (by creating and assimilation of new knowledge in its processes)". The authors also add that these operations increase the perceived value of consumers (in terms of cost savings, higher quality, delivery speed, and dependability). Each of these components of process innovation may enhance the firm's economic performance'' (p. 403).

Similarly, Piening & Salge (2015) confirmed in their study that process innovation is positively related to firm financial performance. Predominantly based on cost reduction or improvement of flexibility, process innovation definitely contributes in performance improvements mainly through increases in capacity, flexibility, quality or even rationalization of production processes (Hervas-Oliver et al., 2014).

Focusing on product innovation, quite studies have focused on its link with firm performance. Often playing a mediating role to facilitating a positive influence on performance (Akgün & Keskin, 2014), evidence has been built about it improving performance in entrepreneurial oriented SMEs (Salavou & Avlonitis; 2007; Ardyan, 2016). This view is supported by Salavou & Avlonitis (2008) who, in their paper provided evidence on product-based innovation influence on firm performance through three different levels known as low, high and medium PI.

In the same vein, Dunk (2011) in his study found positive impact of product innovation to financial performance while making it clear that the link between the two variables is dependent to the manner in which budget are used in the organizations.

For instance, Ma, et al. (2018) in their study related to sustainability assess the path to develop types of products that could influence firm performance. The authors summarize the type of green product innovation as manufactured from recycled material and new designed one and demonstrate their ability to decrease costs, reduce energy/resources consumption and environmental impact, increase firms' market share and sales revenue.

Laitinen et al. (2016) confirm the positive association between PRI and FP and provided three insights supporting the assessment that product innovations can lead to

stronger performance: new products meeting customer needs better than existing ones, low competition advantage for innovative new product when launched and, last but not least, newly innovated products can be cheaper than predecessors in case of efficiency of the material or production are improved (p. 301-302).

Similarly, Ramadani, et al. (2019) in their research related to transition economies, indicate the positive impact of product innovation on firm performance. The authors further argue that specific control variables such as size, total labor cost and capital of the firm provide a complementary significant impact to this relationship.

Speaking about marketing innovation, quite studies have focused on its relationship with firm performance with results confirming its powerful ability to predict firm performance (Cascio, 2011); even that link is support partially in some cases (Shergill & Nargundkar, 2005).

Identified as a search for creative and new solutions to problems and needs, marketing innovation is known to create greater competitiveness, especially in the Industry 4.0 context (Ungerman, Dedkova, & Gurinova, 2018). For instance, Nieves & Diaz-Meneses (2016) in their study based on an empirical analysis in hotel industry found that marketing innovation favor financial performance. Similarly, Gupta (2021) found a significant and positive impact of marketing innovation on firm performance using 250 cross-sectional data from middle & higher management executives in Indian firms.

A study conducted in Ghana's SMEs manufacturing industries operating in water, beverage, detergent, and metal fabrication discovered that innovations in product design & packaging, promotion, retail, and pricing provide sustainable market advantage and marginal improvement in competitive advantage by integrating marketing competence and innovative marketing activities (Quaye & Mensah, 2019), also through differentiation based on creating a single common value concept for consumers and contributing to sustainable development (Ilić, et al., 2014, p. 40). Accordingly, these advantages may support the performance of the firm. Peng, Qin, & Tang (2011) study realized in China with datas collected from different industries (manufacturing, service), suggest the significant contribution of marketing innovation to performance under two types known as market-driven and market-driving. The

authors also stated that competitive intensity and technological volatility greatly decrease their effects. The following hypotheses are developed in light of the current research on the links between different forms of innovation and performance of the business.:

H1. = Process innovation is positively associated with firm performance

H2. = Product innovation is positively associated with firm performance

H3. = Marketing innovation is positively associated with firm performance

4.2.2. Direct and moderating effect of Digital Presence

Kitchell (1995) defined innovativeness as the firm's propensity to adopt new technologies. In his study, the author measured the construct by number of computer-based manufacturing technologies used by the firm. In the same vein, Bolton & Saxena-Iyer (2009) backed up the thesis that technology may be used as a tool or method for organizations to develop (p. 99). Authors go on to say that technology allows organizations to be more flexible in how they produce and provide value to clients, all while boosting productivity and cutting costs. Mostly technology-based, digitalization is inevitable for organizations and can be viewed as a catchment area for new innovations; enables businesses to boost operational efficiency, widen their innovation initiatives, and better allocate resources (Wroblewski, 2018). Digital presence is the integration of digital technologies into everyday life (Mahaldar & Bhadra, 2015); and is typically used to alter a company model in order to generate new income and value. (IT Glossary, 2015). As a result of information and communication technology, it has had a significant influence on society in general, transforming how individuals, customers, and companies behave, work, and communicate on a worldwide scale (Myovella, Karacuka & Haucap, 2020).

De la Calle et al. (2020) analyzed some cases as outcome of digital effect on innovation from their research about role in servitisation strategy for Spanish manufacturing companies. Firstly, it concerns the incorporation of digital capabilities into physical products. Then, the use of ICTs to interact with customers and also about technologies which allows the development of new services with some relationship to traditional product (p. 4). As a results, a sustainable competitive advantage can be created.

Drawing from literature in previous paragraphs, digital presence can be assimilated to digital transformation where business model of the company undergoes significant changes (Vial, 2019., AlMulhim, 2021; Nasiri et al., 2020) by performing with technological tools (Madhurihammad & Kashishsoda, 2021; Moravcikova & Kliestrikova, 2017); also to digital presence relating the ability of a business to interact with audiences online (Cruz & Karatzas, 2019; Tiago & Verissimo, 2014; Eid-El-Gohary, 2013; Cruz de Olivera et al., 2015). All of this to aid in the transformation of existing firms into cutting-edge digital organizations with a market competitive advantage (Ivanov, Lukyanova, & Orlova, 2020).

Quiet research discovered a beneficial correlation between digital and innovation from many perspectives and markets. For example, a study conducted in the Nigerian market found that digitalization is beneficial and crucial in explaining the amount of corporate innovation (Olurinola, et al., 2021). The authors also suggested that technology within current corporate structures opens up new markets for those who are inventive. Similarly, Lin & Yi (2022) research focused on Chinese high-tech firms results show how digital infrastructure, among innovation paths, plays underlying support for digitalization which at its turn empower firm innovation. According to the author, such infrastructure may let organizations reinvent the linkages of production, sales, operation, or management, as well as reassemble physical components to create new value or open up new markets (Lin & Yi, 2022, p. 3). Looking at the authors defending the theory that technology causes innovation, it is clear that these two variables have an undeniable link.

Furthermore, it should be noted that DIGIT plays a vital part in deciding the firm's performance. Following definition proposed by Hefner (2017), A moderating variable is one that may strengthen, weaken, negate, or otherwise affect the relationship between the dependent and independent variables, as well as change the direction of the relationship. Westerman et al. (2011) aptly stated that digital transformation is the use of technology to significantly enhance the performance or reach of businesses, and it is focused on reimagining three major areas known as customer experience, operational procedures, and business model.

AlMuhlim (2021) in his study found indirect impact between DT and FP with the help of smart technology as mediating variable. In the same vein, Martinez-Caro et al. (2020) study results suggest that business digitalization with the help of digital organizational culture incorporation may improve firms' performance. From the literature review providing evidences on the influenceable role of digital presence, it is more or less obvious that a potential link exists with other variables. Therefore, we hypothesize that:

H4. = Digital presence directly influences innovativeness

H4.a = Digital transformation has positive impact on process innovation

H4.b = Digital transformation has positive impact on product innovation

H4.c = Digital transformation has positive impact on marketing innovation

H4.d = Digital usage has positive impact on process innovation

H4.e = Digital usage has positive impact on product innovation

H4.f = Digital usage has positive impact on marketing innovation

H5 = Digital presence has an effect on the relationship between innovativeness and firm performance

H5.a = Digital transformation moderates process innovation impact on firm performance

H5.b = Digital transformation moderates product innovation impact on firm performance

H5.c = Digital transformation Moderates marketing innovation impact on firm performance

H5.d = Digital usage moderates process innovation impact on firm performance

H5.e = Digital usage moderates product innovation impact on firm performance

H5.f = Digital usage moderates marketing innovation impact on firm performance

Illustration of Research Model

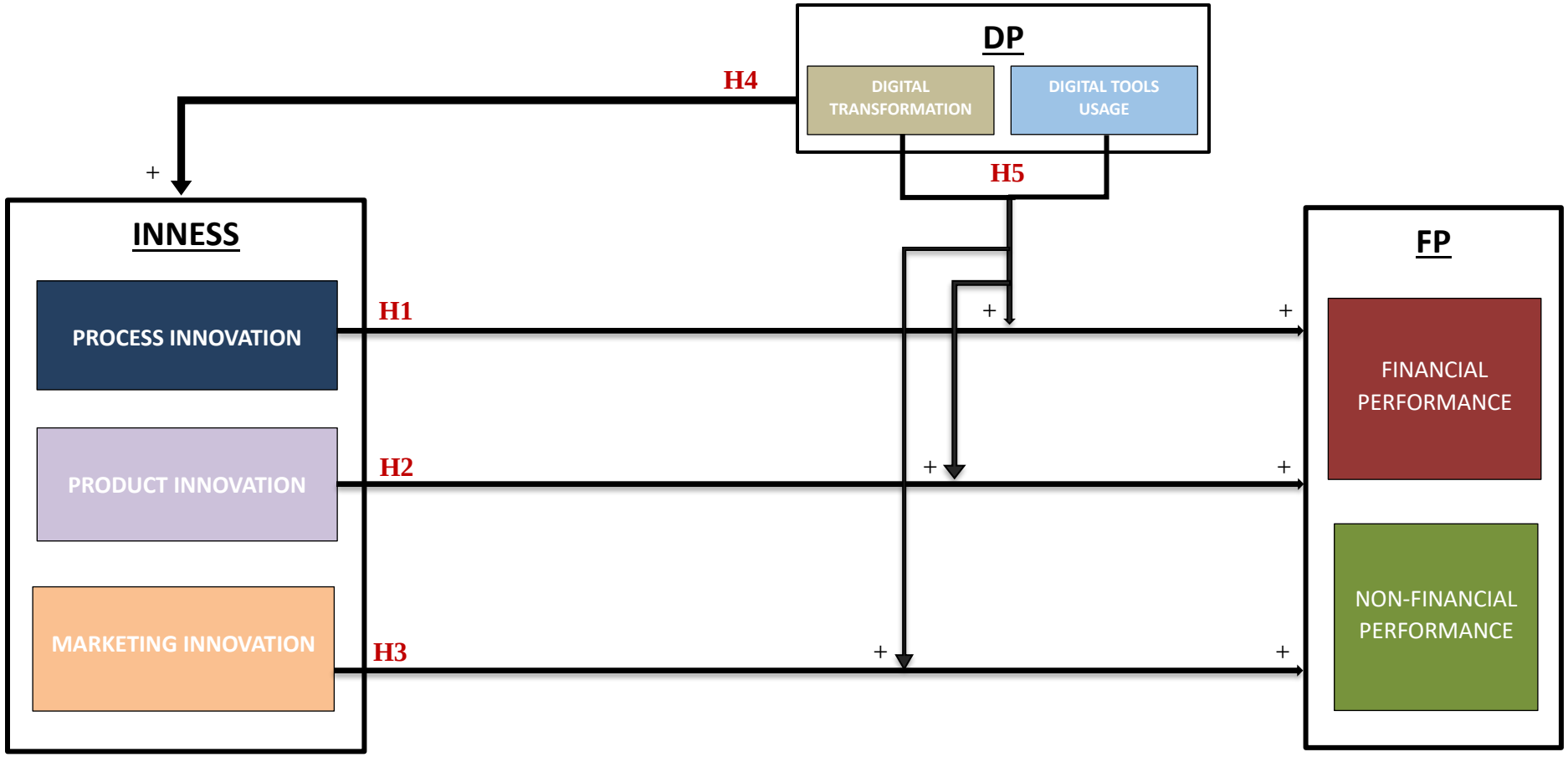

Figure 4. *Research Model*

4.3. Sample of the Study

The research is conducted in the SSA (Sub-Saharan Africa) and data have specifically been collected in the Western region and focusing on a sample composed of companies in all available sector except for non-profit firms. Because great performance is not their purpose, performance indicators may not be representative of those firms. As a result, organizations focused on profit and outstanding performance is approached. To measure the digital and innovative dimensions that affect the performance of businesses in our study, the universe field is formed by companies located in countries of sub-Saharan Africa. Since it is very difficult to carry out comprehensive research in such a large universe in terms of both cost and time concepts, two categories have been settled for the issue: Central Sahelian countries and Coastal countries (West African Coast).

For the Sahelian group, three countries known as Burkina Faso, Mali and Niger were chosen as the accessible universe for the data collection. The choice of these countries is due to their cultural affinity, their geographical situation as both are landlockedness and also their efforts to engage into innovation within the last decade. The three countries themselves constitute a total of more than 69 million in terms of population and 22 % for Burkina Faso, 34 % for Mali and 22 % for Niger as percentage of individuals using the internet (the world bank, 2023).

4.3.1. About Burkina Faso

Starting with Burkina Faso, it is noted that there is a growing realization of the relevance of digitization and innovation for economic progress in the country. The government has started programs to improve digital infrastructure, promote e-government services, and encourage digital entrepreneurial growth. Attempts are being made to close the digital gap and expand internet access, particularly in rural areas. Innovation hubs and incubators are sprouting up, offering assistance and resources to companies and entrepreneurs. Burkina Faso's digital economy efforts are currently focused on strengthening an enabling regulatory environment and assisting the private sector in developing mass-market digital services in the telecommunications and financial sectors, as well as

constructing the necessary infrastructure. This lays the framework for the future growth of the innovation industry. Burkina Faso, according to Joseph Senninger, envoy of the Grand Duke of Luxembourg, is in a positive dynamic in terms of digital growth. (UNCDF, 2021).

4.3.2. About Mali

Speaking about Mali, there is an increasing interest in digitalization in the country, notably in industries such as finance and agriculture. Mobile banking services have grown in popularity, allowing previously underserved communities to get access to financial services. There are other programs to foster digital entrepreneurship and innovation by establishing tech centers and incubators. However, issues such as restricted internet access and infrastructure shortages must still be solved in order to fully realize the potential of digitization (World Bank, 2020). According to a study about African digital economy ran by the World Bank Group (2023) “Mali’s digital ecosystem is fairly young, with over 90 percent of digital businesses emerging in the last decade. Malian digital businesses can unlock employment opportunities for Mali’s fast-growing youth population and can contribute to improving the country’s competitiveness in key economic sectors, as highlighted in Mali’s Private Sector Diagnostic. Malian digital businesses also have the potential to support further social, financial, and digital inclusion, especially among women, since these businesses tend to be less capital intensive than traditional ones and can offer flexible and remote operations opportunities provided adequate connectivity is available” (pp. 92).

4.3.3. About Niger

Niger has also made achievements in digital transformation, with the government promoting e-governance, digital payments, and mobile services. The use of mobile money has grown, allowing rural communities to gain financial inclusion. Efforts are being made to strengthen digital infrastructure and develop a climate conducive to innovation, such as the creation of innovation centers and startup support programs. According to the World Bank (2020), Niger has made notable strides in digital transformation, particularly in areas such as e-governance, digital payments, and mobile services. The report states that "Niger has implemented several initiatives to promote digital payments and mobile services as a means

to increase financial inclusion and improve access to financial services". The adoption of mobile money has expanded, providing opportunities for previously underserved populations to access basic financial services.

For the group of Coastal countries, Côte d'Ivoire, Ghana, Nigeria and Senegal were chosen. These countries play an important role in establishing West Africa's economic and cultural landscape, with their bright energy and unique tapestry determining the continent's future.

4.3.4. About Ivory Coast (Côte d'Ivoire)

Ivory Coast, a vibrant center of digital business and innovation is a country on the West African coast that quickly emerged as a regional leader in digital and innovation. This vibrant ecosystem is backed by a variety of factors, including the World Bank's estimate of 3% contribution of digital technology to GDP, which is expected to quadruple to 6% by 2025, with the objective of becoming a 100% paperless economy by 2030 (Digital Africa, 2023). Other elements like booming in the startup ecosystem and supportive government initiatives are also to take into account (Marcopolis, 2015): the Ivorian government has taken proactive steps to foster its growth. This includes initiatives to liberalize the ICT market, invest in infrastructure development, and promote digital literacy. Accordingly, the country is seeing an increase in the number of IT businesses, which is attracting substantial investment. From financial services to e-commerce and garbage management, these forward-thinking businesses are addressing local issues and creating economic progress. Notably, the top ten businesses have raised over $19 million in total.

4.3.5. About Ghana

Coming to Ghana, it is important to note that Ghanaian growth has recovered after being slowed by the Covid-19 epidemic (0.4% growth in 2020). Thus, the growth rate in 2021 was 4.7%, but it slowed to 3.6% of GDP in 2022. This slowdown, which is largely due to the country's public finance crisis and the rise in inflation and interest rates, is expected to continue in 2023, with growth estimated at 2.8% (IMF, 2022). Despite these economic ups and downs, it was one of the first African countries to invest in internet connection, which

has proven to be a significant influencer in deciding the costs of communication within Africa and throughout the world. Following a succession of information and communication technology (ICT)-related changes that began in the 1980s, substantial digitalization efforts in Ghana began in the early 2000s (Agbagba & Tetteh, 2023). Ghana has made tremendous progress in upgrading its digital infrastructure, including the development of E-government services, Fintech, mobile money, and digital agriculture. The country has ranked in the bottom third of countries in terms of digital infrastructure for the last ten years. The Global Information Technology Report placed it 103rd out of 139 nations in 2016, while the Network Readiness Index ranked it 96th out of 130 countries in 2020. While these rankings reveal that Ghana's physical infrastructure is inadequate, it ranks higher in terms of individual and commercial ICT usage (Karanasios, Senyo, & Effah, 2022).

4.3.6. About Nigeria

Nigeria is frequently referred to as the "Giant of Africa." The expanse of its country, the variety of its peoples and languages, its massive population (the biggest in Africa), and its oil and other natural riches have all contributed to its moniker. Nigeria is the most significant country in West Africa, both politically and economically. It is wealthier and more powerful than any other West African country (National Geographic Society, 2023) with a GDP of around 504 billion USD and a growth rate of 3,2 % (IMF, 2022). Digitalization and innovation are driving a dynamic transformation in the country business landscape. This shift is marked by a growing acceptance of technologies such as mobile money, cloud computing, and big data, which are being used to streamline operations, improve customer experiences, and drive growth. Aside from financial services, digitalization is transforming other industries. Retail is being transformed by e-commerce platforms such as Jumia and Konga, while agricultural startups are leveraging technology to improve crop yields and connect farmers directly to markets. Telehealth platforms are providing vital medical services to underserved communities in the healthcare sector, and educational technology innovations are providing students with personalized learning experiences (Olurinola, et al., 2021).

4.3.7. About Senegal

Senegal, nestled on the westernmost tip of Africa, is a nation on the move. With a vibrant economy, a burgeoning tech scene, and a commitment to digital transformation, Senegal is rapidly emerging as a leader in West Africa. Senegal boasts a stable and growing economy, with a GDP exceeding $45 billion in 2022 (The World Bank, 2023). Senegal is developing a thriving innovation ecosystem, with an increasing number of startups and tech hubs springing up across the country. The government has launched a number of initiatives to encourage entrepreneurship, including the "Startup Act," which provides tax breaks and simplifies regulations for new businesses. These initiatives are attracting talent and fostering innovation in industries such as FinTech, healthcare, and agriculture (GSMA, 2022). Senegal is dedicated to embracing digitalization in all areas. The government's "Digital Senegal 2025" strategy aims to use technology to improve public services, increase access to information, and spur economic growth (Government of Senegal Mediatheque, 2016); such commitment into innovation and digitalization positions the country as a West African leader to be in the coming years.

The study does not focus on a specific industry or a specific type of business, as innovation and digitalization are expected to become increasingly important to all types of businesses. From that perspective, the research focuses on profit companies such as Startups, SME and multinational companies; whether they are locally or internationally owned.

Chamber of commerce and industry and/or business/commerce directory offices located in the main city of each country has been consulted to gather businesses list directly through their official websites or physically with the help of local officer in charge of the management of such requests. We have also checked correspondent networking sites by using specific keywords for the search of the companies as well as for confirming the fact of the business existence and the type of activities it runs.

Two types of sampling methods are used for the data collection, convenience sampling which we think reduce the data collection risks, increase the sample size also, represent a practical and beneficial strategy in terms of speed, cost-effectiveness, and accessibility; also snowball sampling which can be used to reach hard-to-reach populations and be relatively quick and easy to implement.

Convenience sampling (also known as Haphazard Sampling or Accidental Sampling) is a type of nonprobability or nonrandom sampling technique in which individuals of the target population who fulfill certain practical requirements, such as easy accessibility, geographical closeness, availability at a given time, or desire to participate, are included in the research (Etikan, Musa, & Alkassim, 2016, p. 2). For Wimmer & Dominick (2003), it is a non-probability sample that selects the participants that are readily available for the study.

Snowball sampling is a non-probability sampling technique in which initial participants are recruited via their social networks. According to Atkinson & Flint (2001), it is a research subject identification technique in which one subject provides the researcher with the name of another subject, who in turn provides the name of a third, and so on, with the goal of utilizing the social networks of identified respondents to provide a researcher with an ever-expanding set of potential contacts.

Because our sample group is difficult to contact owing to a lack of a well-structured database for communication, these sampling will help reach a bigger audience with the appropriate qualities; they are a convenient strategy used when access to participants with the desired traits is problematic (Naderifar, Goli, & Ghaljaie, 2017).

4.4. Research Instrument

In this research, the first step was to review the relevant literature and shortlist the relevant elements which helped into developing the hypotheses. To do so, we perform interviews which consisted of discussing with experts in the field (Annexes 1 & 2). The goal was to gather enough practical information on the topic whether similar, different or matching with those from the literature. That said, we moved to the third step which was to create final survey, that step was such an outcome of the merge between findings from the literature and specialists' interview. Accordingly, research hypotheses and conceptual model were developed.

Google Forms technology was used to create the online version of the research questionnaires. That platform has become a helpful tool for academics due to its simplicity of use, diversity, and data collecting capabilities. Overall, it provides a straightforward and user-friendly method of collecting data. Its simplicity of use, data collecting capabilities, and

interface with other Google technologies make it a valuable tool for academics across a wide range of disciplines. It also offers cost, speed, and convenience advantages (Dursun, Kabadayı, & Yürüyen, 2022).

The questionnaire consists of different sections. In the first one we emphasize the aim of the research and relevant details about it. The second section hold the practicing questions, about how the firm rule its activities under the scope of innovation and further details about its management through scales items. The asked questions were asked following the order of process innovation then product innovation and marketing innovation lastly. The third section concern the digital presence question, respondents were first asked about their level of agreement with statement related to digitalization, then about the extent to which they use digital tools. Further, they were asked about the management of these used tools and also the purpose of their usage. The fourth section concerned the firm performance. Respondents were asked about their level of agreement regarding financial and non-financial performance dimensions of their businesses. The last section was dedicated to general information. Respondents were asked to give their companies' details (established country, size, year of foundation, industry) but also about themselves (qualification and position title).

Since a big part of the respondents are from francophone countries, the survey was translated in French (since it is their official language) by academic professionals using the translation-back translation (reverse translation) method. As a technique commonly used in cross-cultural research to ensure the accuracy and equivalence of survey instruments or other research materials in different languages, this method helps ensure that the meaning and intent of the items are preserved across languages, enabling valid and reliable cross-cultural comparisons.

Following the translation, we submitted the preliminary version of our thesis research to the social and human sciences scientific research and publication ethics board of the university from which we got the approval decision document that allows us to keep on running the study.

Different channels like e-mail, networking sites (LinkedIn, Facebook and WhatsApp) were used to transfer the survey to companies' respondents; including the link to the survey accompanied with a short acknowledgement inserted as an introduction describing the topic and steps for filling the survey. Questionnaires were sent to businesses by reminding that

they are to be filled by marketing, sales, financial, operation and all relevant managers to the study area to gather information which covers the research field. We also reminded that they are to be completed anonymously so that it is plainly emphasized that there are no incorrect or right responses. This is intended to yield more honest, less socially desirable responses.

Respondents could express their desire to obtain a summary of the research results when completing out the survey. This enhances the likelihood that responders will participate. Below is a detailed table relating the contact sources with companies that got involved in the research.

4.5. Data Collection Tool

In this chapter the measurement will be explained. Additionally, operationalization of variables will be discussed. To conclude, data gathering procedures and analysis are discussed followed with research ethics.

4.5.1. Measurement

A data analysis was performed to ensure the validity of the findings concerning the Digital Presence and Innovativeness dimensions collected from the literature. The survey items are scored using a Likert-scale option with varied specifications depending on the variable type. The questionnaire created in this context is divided into four sections.

The first part includes the innovativeness scales. In this research, innovation is conceptualized as a multidimensional structure based on business perceptions at the level of "process, product and marketing" (Gunday et al., 2011; Wang & Ahmed, 2004; Alpay et al., 2012; Hassan et al., 2013; Abosag & Brennan, 2017). Process innovation can be defined as the activities of the business about the product / service that can meet the customer needs, provide fast and good speed. Product innovation is defined as the qualities that businesses have such as product/service benefits offered in the market and solution capability. Marketing innovation, on the other hand, includes existing product appearance, distribution channels, promotion and pricing. The process innovation scale used in this study was developed by Anning-Dorson et al. (2018)'s study; product innovation from the study of Ardyan (2016)

and marketing innovation are developed from the study of Gunday et al. (2011). Participants were asked to indicate their level of agreement with the scale statements for their businesses and a 5-point Likert scale was used. (5=Strongly agree; 4=Agree; 3=Neither agree nor disagree; 2=Disagree; 1=Strongly disagree).

The second part is on digital presence. Digital asset is defined as a structured concept as 'digital transformation', which indicates the proximity of the business to digital components at all stages and the online presence of the business for external purposes. It reflects the involvement of the business in the use of electronic tools (Eid & El-Gohary, 2013) and the adoption of digital elements such as automated and interactive tools that increase the activities of companies (Cruz De Oliveira et al., 2015). In this study, Nasiri et al. (2020)'s 5-item scale was used to evaluate digital assets (5=Strongly agree; 4=Agree; 3=Neither agree nor disagree; 2=Disagree; 1=Strongly disagree). In addition, a classification consisting of 11 tools prepared by researchers and expert teachers with the support of the literature was used and frequency assessment was requested for these tools (5=Always; 4=Often; 3=Sometimes; 2=Rarely; 1=Never). It was also asked in this part of the questionnaire about the party in charge of the development and management of these tools (1=By the business; 2=Outsourced (by another professional business); 3=Both (with both business and professional support). Finally, it was requested to indicate the intended use of these tools (1=To facilitate tasks; 2=For company and product/service promotion and sales; 3=For interaction with the audience; 4=For data collection; 5=Other – please specify). The last two sections (party in charge of development and management; intended use of digital tools) consist to have a general idea of digital presence management, accordingly, they were not part of the deep statistical analysis but used only for frequency matter.

In the research, firm performance is measured under two dimensions known as financial and non-financial perspective (Anning-Dorson et al., 2018). Financial performance is a quantitative assessment of how successfully a company uses its assets and generate income, referring to the company's overall financial health during a certain time period. (Diez-Busto, San-Martín, & Pérez, 2022). Unlike financial performance, non-financial performance includes all other aspects that do not represent monetary value. It has been adopted to obtain more than a qualitative assessment based on the perception of job offers,

employees and customers (Hernaus, Bach, & Vuksic´, 2012). In this study, financial performance scales are developed from the study of Aydiner et al. (2019), and non-financial performance scales are developed from the study of Annin-Dorson et al. (2018). Financial performance includes 5 statements, while non-financial performance is measured with 4 statements. With regard to performance, respondents were asked to indicate their degree of agreement with statements regarding the entity's financial performance for the last five years (5=Strongly agree; 4=Agree; 3=Neither agree nor disagree; 2=Disagree; 1=Strongly disagree).

4.5.2. Operationalization

In order to investigate the hypothesis produced in the study, the notion must be quantified and hence operationalized. The independent variables are innovation and digital presence, which are quantified by the respective dimensions. Firm performance is the dependent variable determined by two dimensions know as financial and non-financial dimensions both consisting of performance indicators. Some variables are added as controllers, due to the differences in firms' activities, affinity to technology and also performance within the market. Those will help, at the end, to have a snapshot of business types involved and how the contribute to the market balance. The table below relates the operationalization of variables based on the findings from the literature. Quantitative analyses will later provide statistical evidence for the real dimensions of variables.

Table 3. *Operationalization table*

Variable name	Construct	Unit	Numeric coding
INNOVATIVENESS	Process innovation	Metric	Ratio scale
	Product innovation	Metric	Ratio scale
	Marketing innovation	Metric	Ratio scale
DIGITAL PRESENCE	Digital Transformation	Metric	Ratio scale
	Digital tools usage	Metric	Ratio scale
FIRM PERFORMANCE	Financial performance	Metric	Ratio scale
	Non-financial performance	Metric	Ratio scale
COUNTRY OF ESTABLISHMENT	Country	Non-Metric	Nominal scale
COMPANY SIZE	Number of employees	Metric	Intervals

Table 3. *(continuous) Operationalization table*

COMPANY AGE	Year of activity	Metric	Open-ended
RESPONDENT QUALIFICATION	Department	Non-Metric	Open-ended
INDUSTRY	Area of activity	Non-Metric	Open-ended

4.5.2.1. Operationalization of innovativeness

Findings from the literature and confirmed from specialist interview indicate dimensions which are part of the innovativeness constructs. Innovativeness, as a crucial value for businesses, involves both the company's drive and competence to innovate and create new business solutions (Golgeci & Ponomarov, 2013) through different variants. The table below give a list of these dimensions which are tough to have a positive effect on firm performance.

Table 4. *Operationalization of Innovativeness*

Construct	**Dimension**	**Sources (Most important)**
Process Innovation	Adapting to different product/service processes to meet customer needs	Anning-Dorson et. al (2018)
	Developing new management approaches to help serve customer faster and better	
	Investing significantly in future in new service processes compared to annual turnover	
	Changing service process at a great speed	
Product Innovation	Offering novel products to the market	Ardyan (2016)
	Offering new ideas to the market	
	Developing creative products	
	Offering products/services with new benefits	
	Offering product/service that shows unconventional way of solving problems	
	Offering products/services that introduce many completely new features to the market	
Marketing Innovation	Renewing new or current product design	Gunday et al. (2011)
	Renewing distribution channels	
	Renewing the product/service promotion techniques	
	Renewing the product/service pricing techniques	

4.5.2.2. Operationalization of digital presence

As the entity's visibility, representation, and activities in the digital realm, it is important to provide the dimension of digital presence described both from the literature and specialist interviews. As a result, the table below gives characteristics regarded to be part of digital presence, defining its structure and causing it to have a positive association with variables such as innovativeness and firm performance.

Table 5. *Operationalization of Digital Presence*

Construct	Dimension	Sources (Most important)
Digital transformation	Digitalizing everything that can be digitalized	Nasiri et al. (2020)
	Collecting large amounts of data from different sources	
	Creating stronger networks between the different business processes and digital technologies	
	Enhancing an efficient customer interface with digitalization	
	Achieving information exchange by digitalization	
Digital tools Usage	Digital tools (Company website, software, e-mail, social media, payment systems, mobile applications, marketplaces, SMS/MMS, blogs/podcasts, push notification, phygital technology) usage extent	Maina (2017)

4.5.2.3. Operationalization of Firm performance

Firm performance is a complex notion that can be implemented in a variety of ways. It is critical to understand that no single measure of firm success can capture all facets of a firm's performance. Therefore, it is frequently beneficial to employ a combination of measurements to provide a fuller view of a firm's performance.

In our research, firm performance is measured under two dimensions known as financial and non-financial perspective mainly adapted form Anning-Dorson et al. (2018) and similar authors such as Suliyanto & Rahab, 2012; Hilmi et al., 2010; Tsai & Yang, 2013). Also, subjective measure is used due to hardness to collect objective ones and that subjective measures can be considered as reliable for measuring firm performance (Diesveld, 2018).

Table 6. *Operationalization of Firm Performance*

Construct	Dimension	Sources (Most important)
Financial performance	Achieving high level of return on sales with current customers	Aydiner et al. (2019)
	Achieving high level of return on sales with new customers	
	Increasing Company's market share	
	Achieving high level of return on investment	
	Achieving an increasing profitability	
Non-Financial performance	Showing much better performance in employee performance	Anning-Dorson et al. (2018)
	Showing much better performance in customer satisfaction	
	Showing much better performance in customer loyalty	
	Showing much better performance in service quality	

4.5.2.4. Operationalization of control variables

We incorporated some control variables in the survey. Following previous researches, we settled these variables as the company's size, age, industry, country of establishment, respondent's qualification and discussed them as below. Size is believed to be a strategic competitive indicator of firms in the market. It is included in the study because larger organizations are likely to have advantages such as economies of scale, scope, or network advantages that smaller enterprises may not have (Diesveld, 2018, p. 28).

Recognizing the significance of company size as a control variable improves the rigor and validity of the research, allowing for a thorough examination of the complex dynamics that determine organizational behavior and performance. In our study, we structured the businesses as micro, small, medium-sized and large enterprises; allowing each company to be able to locate themselves (Andrejczuk, 2016).

The age of a company can be useful in research since it can provide vital information regarding the organization's performance, stability, and growth potential. Company age is a commonly used to control for the fact that older companies may have different characteristics than younger companies. For example, older companies may have more experience, more resources, and more established relationships with customers and suppliers. These factors

can all affect a company's performance, so it is important to control for them when conducting research.

The importance of company age as a control variable has been supported by a number of studies. Businesses of varying sizes and ages, for example, may display distinct organizational and environmental factors, which may impact performance. The same is true for businesses in many industries (Radipere & Dhliwayo, 2014). In the study, respondents are asked to indicate the number of years the business has been founded so that being in operation.

Industry type represent a vital characteristic for company's behavior in the innovative and digital era thus their performance in market. There is no focus on a specific industry in the research, what makes industry type an important control variable to include for the general understanding. "Firms in new and expanding sectors are projected to outperform those in old and declining industries" remark Shergill & Nargundkar (2005, pp. 38). Firms in a certain industry may make profits that are higher than average due to characteristics of the country's economy or favorable structural determinants" as well. For the purpose of the research, an open-ended section is available for respondents to express in a better way the industry their companies operate in. Other control variables will help have an understanding location-based reality of the businesses' (country of establishment) and also gather robust and comprehensive information of the activities of the company related to the research topic (respondent's qualification).

4.6. Data Gathering and Management Procedures

The goal of the research was to have a general understanding about digital and innovation situation of companies evolving in sub-Saharan Africa, especially those located in the Sahelian region known as Burkina Faso, Mali and Niger. We engaged a pilot data gathering on July 23rd sending e-mails to approximately 50 companies. However, 11 responses were gathered in first batch and 9 others in the second batch after attempting reminder e-mail sending. All took an interval of approximately one month.

After the step of pilot studies and seeing the unstable political situation caused by gradually military coups in the region, it was decided to enlarge the population of the study passing from the Sahelian to the neighboring coastal countries in the West Africa. That said so, countries like Cote d'Ivoire, Ghana, Nigeria and Senegal. As fast-growing economies in the region, that would allow gather enough data in time and help structure the research in a better way.

The data gathering process started on August 2023, and mail was sent to companies found through online official lists delivered by institutions of those countries. Based on the lists, a verification was made through professional social media pages (LinkedIn and Facebook) and websites of each company to validate its existence and type of activities. Reminders were gently forwarded to those companies (one to two times) to push them fill the questionnaire. Up to last week of November 2023, only 186 respondents have been registered on total 241 questionnaire requests sent. The table in appendix 3 below highlight country-based information sources which were used to reach the respondents for the purpose of the research.

The following procedures were also followed during the data collection period:

- The questionnaire properly stated the goal of the survey to the respondents.
- Respondents were also asked to fill out the survey objectively and attentively.
- The surveys were built in Google Forms and distributed to respondents via e-mail and social networking sites like Facebook and WhatsApp.
- Respondents were also required to answer to all questions showing compulsory requirements

After data was gathered, we proceed to analyses, following the required step which allowed to get acceptable results. The quantitative analyses begin with a factor analysis and Cronbach alpha, to test the discriminant validity and reliability. This type of analysis allows us to reduce and summarize data. Establishing the validity and reliability of one's findings is critical in academic research. A dissertation, as the culmination of extensive research and analysis, is dependent on the reliability and credibility of its findings. The findings lose their

significance and ability to contribute meaningfully to the existing knowledge base without a robust validity and reliability analysis. Validity refers to the degree to which a study instrument or measure properly represents the intended concept or phenomena being examined (Creswell & Creswell, 2018). In simpler terms, it asks the question: Are we measuring what we think we are measuring? Reliability refers to the consistency and stability of a research instrument or measure. It asks: If we repeated the study, would we get the same results? A reliable measure yields consistent results over time and across different individuals or groups.

After conducting the factor analysis, correlation and regression analysis were also used to test our hypothesis. Understanding the relationships between variables is a fundamental pursuit in the tapestry of research. Correlation and regression analysis emerge as invaluable tools in this context, revealing hidden patterns and associations within a dataset. Correlation analysis, according to Field (2013), measures the linear relationship between two variables, providing a measure of the strength and direction of the link. Its coefficient ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no linear relationship. Regression analysis goes beyond explaining a connection to predicting the value of one variable (the dependent variable) based on the values of other variables (the independent variables) (Hair, Babin, Black, & Anderson, 2019). To conclude, Finally, correlation and regression analysis are critical tools for revealing hidden relationships within data, allowing researchers to draw meaningful conclusions and advance knowledge in their field.

We used SPSS version 29.0.1.0 (171) 2023 program to conduct our details analysis which will be discussed in the next section. Before attempting the analysis in the program, we first extract the generated data outcomes from google form which we used for the survey. These datas were then collected transcribed into excel data sheets. In the excel, tables were generated and classified in order to make it easy for the incoming analyses. Thus, we transferred all datas and implemented them to the SPSS software were most of the analyses were handled.

4.7. Research Ethics

This study's data was handled with extreme care and was not shared with any other parties. Each question was prefaced with a brief explanation to assist respondents understand what the constructions meant. Furthermore, respondents were told about the length of the survey, and their anonymity was safeguarded and secured. There were no personal information questions on the poll. All of this was stated in the invitation to join e-mail. Additionally, we implemented the following steps to ascertain ethical conduct in the study:

- Professionals reviewed the questionnaire to verify that all methods followed ethical guidelines, and the design was such that it did not request respondents' names, addresses, or contact information, which was a good precaution to safeguard respondents' privacy.
- We recognize the authors cited in this work by citations and references;
- To guarantee honesty, we provided the findings exactly as they appeared on the questionnaires.

5. DATA ANALYSIS AND FINDINGS

In this section all recommended analyses were handled with the summary tables and respective results as well. We first started with pilot data then shift to the final ones.

5.1. Pilot Analysis

We started with pilot datas analysis first for testing purposes. After gathering the results, final data collection has been started, followed by the analysis as well. As Bryman (2016) aptly states, "a pilot study can act as a valuable precursor to the main research project, providing insights into the feasibility and appropriateness of the research design" (p. 187). This preliminary analysis is an important step in laying the groundwork for a strong and successful dissertation by testing feasibility and fit, refining instruments and measures, investigating data patterns and variability, and gaining confidence and momentum. The demographic profile of the respondents is provided first, followed by the outcomes of reliability, correlation, and regression analysis. Factor analysis was not held at this section

due to low sample size. As Tabachnick & Fidell (2001) stated, 300 participants at least are required for EFA. Since then, all variables were taken in their fully to perform analyses.

5.1.1. Demographic analysis

A total of 20 respondents participated in the pilot analysis over total number of 50 expected. Sample demographics are highlighted in below table; results show that out of the 20 respondents, 10 were originated from Burkina Faso and 10 others from Niger representing 50% each. The results further indicate that Micro companies represented 40%, the small category represented 30%; followed by large one representing 25% and medium one with the lowest percentage 5%. For the company age, we have an interval between 1 to 5 years, with businesses having 1 year of existence representing more than half (55%) of the sample. According to qualification, we have 4 respondents under General Manager qualification representing the highest rate 20%, followed by Commercial Director 10% and all the remain representing a rate below 10% were classified as other. Regarding industry classification Agri-food, E-commerce and Events businesses represent the highest group with 10,0 % each and the remain (with frequency < 2) are representing more than 70% of the respondents.

Table 7. *Sample demographics (Pilot)*

		Frequency (N)	**Percent (%)**
Country	Burkina Faso	10	50
	Niger	10	50
	Total	**20**	**100**
Company size	Micro	8	40
	Small	6	30
	Medium	1	5
	Large	5	25
	Total	**20**	**100**
Company age	3	2	10
	5	5	25
	12	2	10
	Other	11	55
	Total	**20**	**100**

Table 7. *(Continuous) Sample demographics (Pilot)*

		Frequency (N)	Percent (%)
Qualification	Commercial Director	2	10
	General Manager	4	20
	Other	14	70
	Total	**20**	**100**
Industry	Agri-food	2	10
	E-commerce	2	10
	Events	2	10
	Other	14	70
	Total	**20**	**100**

5.1.2. Internal Consistency

Internal consistency ensures that various items within a measure, such as a survey or questionnaire, all tap into the same concept. The stability and consistency of measurements over time and across different observers or situations is referred to as reliability. Cronbach's alpha should be calculated for each latent variable to ensure internal consistency. An observed value of 0.70 or higher should be considered acceptable based on established social science standards. Cronbach's alpha is used in our study to determine acceptance based on values. Values between 0.70 and 0.80 are respectable, and values between 0.80 and 0.90 are excellent (DeVellis, 2012). For Ursachi, Horodnic & Zait (2015), universally recognized norm is that 0.6-0.7 represents an acceptable degree of dependability, with 0.8 or higher indicating extremely good reliability.

Table 8 displays the Cronbach's alpha values for each construct's dependability. Under Innovativeness, elements like process innovation, product innovation and marketing innovation are delineated. Innovativeness refers to the level of involvement into dynamic processes on a long term and for the purpose to gain a competitive advantage in the market through companies' accomplishments. Cronbach's alpha values for process, product and

marketing innovation are respectively 0.78; 0.84 and 0.80, which is above 0.70, indicating that it is acceptable and very good.

Under Digital Presence, elements like digital transformation and digital tools usage purpose are delineated. Digital presence was considered as a concept structured as ‘digital transformation’ stating business’ affinity to digital components at all stages within the company and online presence of the business for external purposes. Cronbach's alpha values for digital transformation and digital usage are respectively 0.64 and 0.74, which falls between 0.60 and 0.80, indicating that for digital transformation it is acceptable and for digital usage it is respectable.

Firm performance consisting of two sub elements known as financial performance and non-financial performance highlighting the level of business to growth and performance. Cronbach's alpha values are respectively 0.91 and 0.78, which is indicating that it is good. All of the scales in the following table are acceptable, valid and consistent (above 0.60).

Table 8. *Cronbach's Alpha table summary (Pilot)*

		Cronbach's alpha
Summary Table		
	Process innovation	0.78
	Product innovation	0.84
	Marketing innovation	0.80
	Digital transformation	0.64
	Digital usage	0.74
	Financial performance	0.91
	Non-financial performance	0.78

Table 9. *Reliability and Descriptive statistics for Innovativeness (Pilot)*

		Mean	Std. Deviation	Cronbach's alpha
Innovativeness				
Process Innovation	Adapting to different service processes	4.45	0.60	0.78
	Developing new management approaches	4.60	0.50	
	Investing significantly in future in new processes	4.05	0.76	
	Changing product/service process at great speed	3.85	0.88	
Product Innovation	Offering novel products to the market	4.05	0.60	0.84
	Offering new ideas to the market	4.15	0.88	
	Developing creative products	4.25	0.64	
	Offering products with new benefits	4.35	0.67	
	Offering product that shows unconventional way of solving problems	3.50	1.32	
	Offering products that introduce many completely new features to the market	3.70	0.98	
Marketing Innovation	Renewing new or current product design	3.60	1.23	0.80
	Renewing distribution channels	4.05	0.83	
	Renewing promotion techniques	4.30	0.73	
	Renewing pricing techniques	3.95	0.89	

Table 10. *Reliability and Descriptive statistics for Digital Presence (Pilot)*

		Mean	Std. Deviation	Cronbach's alpha
Digital Presence				
Digital Transformation	Digitalizing everything that can be digitalized	4.45	0.60	0.64
	Collecting large amounts of data	4.40	0.99	
	Creating stronger networks between processes and digital technologies	4.40	0.50	
	Enhancing an efficient customer interface with digitalization	4.65	0.49	
	Achieving information exchange by digitalization	4.50	0.61	
Digital Usage	Company Website	4.35	1.09	0.74
	Software	4.65	0.59	
	E-mail	4.75	0.55	
	Social media	4.40	0.99	
	Payment systems	4.50	0.69	
	Mobile applications	4.35	0.81	
	Marketplaces	3.40	1.27	
	SMS, MMS	4.10	1.07	
	Blogs, Podcasts	2.85	1.31	
	Push notification	3.50	1.28	
	Phygital technology	4.00	0.97	

Table 11. *Reliability and Descriptive statistics for Firm Performance (Pilot)*

		Mean	Std. Deviation	Cronbach's alpha
Firm Performance				
Financial performance	High level return on sales with current customers	4.05	0.76	0.91
	High level return on sales with new customers	3.85	0.99	
	Increased market share	4.15	0.59	
	High level of return on investment	4.05	0.83	
	Increased profitability	4.05	0.76	
Non-financial performance	Much better employee performance	4.15	0.67	0.78
	Much better performance in customer satisfaction	4.25	0.55	
	Much better performance in customer loyalty	4.25	0.64	
	Much better performance in service quality	4.35	0.67	

5.1.3. Correlation analysis

As a typical diagnostic strategy, correlation analysis is performed before regression to identify potential issues. Correlation analysis is used to determine how closely two variables are connected to one another. It also defined as “a reciprocal relation between two or more things; a statistic representing how closely two variables co-vary” (Mukaka, 2012, p. 69). As Hair et al. (2019) aptly state, "correlation analysis helps researchers determine the degree and direction of the relationship between two variables" (p. 168).

Correlation analysis works on a scale, from perfect positive correlation (+1), in which changes in one variable are proportionally mirrored by the other, to perfect negative correlation (-1), in which one variable increase while the other decreases. A 0 value indicates that there is no linear relationship between the variables. The Pearson correlation coefficient (r) is used to quantify these correlations, which provides a useful measure of the strength and direction of the association.

Following the research hypotheses, the average was calculated by adding firm performance components together respectively by computation. Regarding others, they remain separate to get the right correlation analysis based on the model. Table 13 shows the mean and standard deviation of the variables. Tables 14 and 15 shows the Pearson Correlations. As per the analysis, all independent variables are found to be correlated with the dependent firm performance with marketing innovation having the highest value 0.636 (with significancy at 0.001 level) followed by DT 0.634, PSI 0.627, PRI 0.606 and DU 0.524. However, no correlation was found between digital usage and other variables, showing a non-significant p value at the level of PSI, PRI, MI and DT. Especially, PSI, does not show any significancy at both digital presence dimensions.

Table 12. *Variable's means and standards deviations (Pilot)*

	Mean	**Standard Deviation**
Process Innovation	4.24	0.54
Product Innovation	4.00	0.66
Marketing Innovation	3.97	0.74
Digital Transformation	4.27	0.43
Digital Usage	4.27	0.53
Firm Performance	4.14	0.54

Table 13. *Pearson correlations (Pilot)*

		PSI	PRI	MI	DT	DU	FP
PSI	Pearson Correlation	1	,657**	,592**	0.426	0.419	,627**
	Sig. (2-tailed)		0.002	0.006	0.061	0.066	0.003
	N	20	20	20	20	20	20
PRI	Pearson Correlation	,657**	1	,580**	,715**	0.275	,606**
	Sig. (2-tailed)	0.002		0.007	0.000	0.240	0.005
	N	20	20	20	20	20	20
MI	Pearson Correlation	,592**	,580**	1	,473*	0.337	,636**
	Sig. (2-tailed)	0.006	0.007		0.035	0.146	0.003
	N	20	20	20	20	20	20
DT	Pearson Correlation	0.426	,715**	,473*	1	0.294	,634**
	Sig. (2-tailed)	0.061	0.000	0.035		0.208	0.003
	N	20	20	20	20	20	20
DU	Pearson Correlation	0.419	0.275	0.337	0.294	1	,524*
	Sig. (2-tailed)	0.066	0.240	0.146	0.208		0.018
	N	20	20	20	20	20	20
FP	Pearson Correlation	,627**	,606**	,636**	,634**	,524*	1
	Sig. (2-tailed)	0.003	0.005	0.003	0.003	0.018	
	N	20	20	20	20	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 14. *Pearson correlations simplified table (Pilot)*

	PSI	PRI	MI	DT	DU	FP
PSI	1					
PRI	,657**	1				
MI	,592**	,580**	1			
DT	**0.426**	,715**	,473*	1		
DU	**0.419**	**0.275**	**0.337**	**0.294**	1	
FP	,627**	,606**	,636**	,634**	,524*	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

5.1.4. Regression analysis

Regression analysis aims to understand the relationship between a dependent variable and one or more independent variables (Hair, Babin, Black, & Anderson, 2021). It essentially models how changes in the independent variables impact the dependent variable, allowing researchers to predict the value of the dependent variable based on changes in the independent variables, identify the strength and direction of these relationships but also compare the relative influence of different independent variables on the dependent variable. Interpreting and validating regression analysis results is a crucial step in any research project, ensuring the findings are reliable, accurate, and meaningful. This process goes beyond simply looking at p-values and coefficients; it requires a thorough examination of various aspects to ensure confidence in the conclusions drawn.

5.1.4.1. Firm performance

In this study, it is hypothesized that innovativeness is positively related to firm performance. A linear regression test was run using process, product and marketing innovation as independent variables and firm performance as dependent variable. This model is used in testing hypothesis 1, 2 and 3 in separate tables. The regression analysis findings are given in summarized tables below.

The hypothesis H1 tests if process innovation carries as significant impact on firm performance. The dependent variable FP was regressed on predicting variable PSI to test the hypothesis H1. PSI significantly predicted FP and analyses' results (table 15) shows $F=11.664$; $p < 0.05$), which indicates that the PSI plays a significant role in shaping FP ($b = .627$). The model can explain 39% of the variation in performance (see R square value).

Table 15. *Model summary for H1 (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H1	PSI => FP	0,621	0,393	11,664	0.003	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), PSI

N*ote*: *p < 0.05. PSI: Process Innovation, FP: Firm Performance

The hypothesis H2 tests if product innovation carries as significant impact on firm performance. The dependent variable FP was regressed on predicting variable PRI to test the hypothesis H2. PRI less significantly predicted FP and analyses' results (table 16) show F=10.464; $p < 0.05$), which indicates that the PRI can play a significant role in shaping FP (b = .492). The model can explain more than 36% of the variation in company performance (see R square value).

Table 16. *Model summary for H2 (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H2	PRI => FP	0.492	0.368	10.464	0.005	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), PRI

N*ote*: *p < 0.05. PRI: Product Innovation, FP: Firm Performance

The hypothesis H3 tests if process innovation carries as significant impact on firm performance. The dependent variable FP was regressed on predicting variable PSI to test the hypothesis H3. MI significantly predicted FP and analyses' results (table 17) show F=12.226; $p < 0.05$), which indicates that the MI can play a significant role in shaping FP (b = .462). The model can explain around 40% of the variance of marketing innovation in company performance (see R square value).

Table 17. *Model summary for H3 (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H3	MI => FP	0.462	0.404	12.226	0.003	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), MI

N*ote*: *p < 0.05. MI: Marketing Innovation, FP: Firm Performance

5.1.4.2. Innovativeness

In this study, it is hypothesized that digitalization impacts innovativeness. A linear regression test was run using digital presence as independent variable and innovativeness as dependent variable. This model is used in testing hypothesis H4. The regression analysis findings are given in summarized tables below.

The hypothesis H4 tests if digital presence carries as significant impact on innovativeness. The dependent variable INNOV was regressed on predicting variable DP to test the hypothesis H4 through their dimensions. Digital presence was split into two dimensions which are hypothesized to have an impact on each of the innovation dimensions known as digital transformation DT and digital usage DU. Six hypotheses were created accordingly (H4.a, H4.b, H4.c, H4.d, H4.e and H4.f). According to results, DT does not predict PSI but significantly predicted PRI and MI as per results in table 18, which indicates that the DP can play a significant role in shaping INNOV partially. The model can explain around 51% of the variation in product innovation and more than 20% variation for marketing innovation (see R square value). Having a look on digital usage, it none of the hypotheses showed significancy (table 19).

Table 18. *Model summary for H4.a, b and c. (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H4.a	DT => PSI	0,539	0,181	3,982	0.061	No
H4.b	DT => PRI	1,104	0,511	18,831	< 0.001	Yes
H4.c	DT => MI	0,818	0,224	5,201	0.035	Yes

a. Dependent Variable: PSI

b. Dependent Variable: PRI

c. Dependent Variable: MI

d. Predictors: (Constant), DT

N*ote*: *p > 0.05. DT: Digital Transformation, PSI: Process Innovation

N*ote*: *p < 0.05. DT: Digital Transformation, PRI: Product Innovation

N*ote*: *p < 0.05. DT: Digital Transformation, MI: Marketing Innovation

Table 19. *Model summary for H4.d, e and f. (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H4.d	DU => PSI	0,430	0,176	3,832	0.066	No
H4.e	DU => PRI	0,345	0,076	1,474	0.240	No
H4.f	DU => MI	0,472	0,114	2,308	0.146	No

a. Dependent Variable: PSI

b. Dependent Variable: PRI

c. Dependent Variable: MI

d. Predictors: (Constant), DU

N*ote*: *p > 0.05. DU: Digital Usage, PSI: Process Innovation, PRI: Product Innovation,

N*ote*: *p > 0.05. DU: Digital Usage, PSI: Process Innovation, PRI: Product Innovation,

N*ote*: *p > 0.05. DU: Digital Usage, PSI: Process Innovation, PRI: Product Innovation,

5.1.4.3. Digital Presence

In this study, it is hypothesized that digitalization influences the relationship between innovativeness and performance of firm. A linear regression test was made using digital presence as moderating variable while innovativeness is still considered as independent variable and performance as dependent one. This model is used in testing hypothesis H5. The regression analysis findings are given in summarized tables below.

Table 20. *Model summary for H5.a, b and c. (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H5.a	Moderator1	0,101	0,417	6,074	0.419	No
H5.b	Moderator2	-0,035	0,372	5,025	0.749	No
H5.c	Moderator3	-0,021	0,406	5,817	0.823	No

a. Dependent Variable: FP

b. Predictor Variable: Moderator_1

c. Predictor Variable: Moderator_2

d. Predictor Variable: Moderator_3

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_1: Digital Transformation moderation on H1

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_2: Digital Transformation moderation on H2

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_3: Digital Transformation moderation on H3

Table 21. *Model summary for H5.d, e and f. (Pilot)*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H5.d	Moderator_4	0,135	0,442	6,734	0.239	No
H5.e	Moderator_5	0,113	0,411	5,933	0.278	No
H5.f	Moderator_6	0,126	0,453	7,033	0.237	No

a. Dependent Variable: FP

b. Predictor Variable: Moderator_4

c. Predictor Variable: Moderator_5

d. Predictor Variable: Moderator_6

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_4: Digital Usage moderation on H4

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_5: Digital Usage moderation on H5

N*ote*: *p > 0.05. FP: Firm Performance, Moderator_6: Digital Usage moderation on H6

The hypothesis H5 tests whether digital presence carries a significant impact on the relationship between innovativeness (process, product and marketing) and firm performance. The dependent variable FP was regressed on predicting moderate variables DT & DU and independent variable PSI, PRI and MI. Following the analyses' results of the moderations (H5.a, H5.b, H5.c, H5.d, H5.e and H5.f), the individual predictors p-values are shown to be above 0.05 which implies that none of them independently exert a statistically significant effect on the dependent variable, when holding other predictors constant (p value > 0.05). Accordingly, the regression model is statistically not significant. This means the variable cannot reliably predict the dependent variable. However

The possible explanation can be first of all, a strong correlations among predictors which can inflate the overall model's significance without individual predictors reaching significance (Hair et al., 2019); a variable effect suppression by another making its significance in isolation (Cohen, Cohen, West, & Aiken, 2003); a small sample size which can limit power to detect individual predictor effects even if they contribute to the model's overall significance (Green, 1991) or even the presence of significant interactions between predictors which can impact their individual effects in the analysis (Aiken & West, 1991).

5.2. Final Data Analyses

After the pilot analysis, the decision was taken to enlarge the sample passing for the Sahelian countries to the neighboring coastal countries. Thence, we were able to collect little bit more data and explore different type of organizations experiencing their activities in different markets under different circumstances. The following paragraph relate the findings about demographic structure of each of the company we could get through for the data collection followed by their statistical analyses (reliability, correlation and regression).

5.2.1. Demographic analysis

A total of 186 valid questionnaires could be collected from the respondents. Table 22 depicts the demographics of the sample. According to the results, Ghana (18.8%), Ivory Coast (18.3%), and Burkina Faso (16.7%) are the three top nations in terms of participation in the research. The table further indicate that large companies (250+ employees) represent the highest participation almost 45%, followed by Medium-sized enterprise (50 – 249 employees) which scored a little more than 30%. Small companies' category comes on the third lane with a percentage of participation at 15% and the category with the frequency to be micro companies with a rate lower than 10%. For the company age, we decided to focus on those with a frequency equal or above seven (7). Doing so, 9 years old businesses represented the highest score followed by companies with 1 – 3 years old and (with frequency equal to 8) and 4 – 27 years old businesses (with frequency equal to 7). According to qualification, we have 12 respondents under Commercial title, 8 respondents under Customer representative, 7 respondents under General Manager qualification and 18 respondents under Manager representing the highest rate 9,7%. All the remain representing a rate below 4% were classified as other. At the end, respondents were classified by industry. The results were shortlisted due to the vast list of different sectors collected from the analyses. The final list shows companies with rate above one (>1%), explaining the higher participation of these industries compare to others (Agri-food, Banking, Financial services, Fintech, Insurance and Real Estate). The remain (with rate < 3 and rate < 1%) are representing more than 85% of the respondents and classified as other in the table.

Table 22. *Sample demographics*

		Frequency (N)	Percent (%)
Country	Burkina Faso	31	16.7
	Ghana	35	18.8
	Ivory Coast	34	18.3
	Mali	15	8.1
	Niger	23	12.4
	Nigeria	19	10.2
	Senegal	29	15.6
	Total	**186**	**100**
Company size	Micro	18	9.7
	Small	28	15.1
	Medium	57	30.6
	Large	83	44.6
	Total	**186**	**100**
Company age	1	8	4.3
	3	8	4.3
	4	7	3.8
	9	9	4.8
	27	7	3.8
	Other	147	79
	Total	**186**	**100**
Qualification	Commercial	12	6.5
	Customer Representative	8	4.3
	General Manager	7	3.8
	Manager	18	9.7
	Other	141	75.7
	Total	**186**	**100**
Industry	Agri-food	6	3.2
	Banking	3	1.6
	Financial services	4	2.2
	Fintech	4	2.2
	Insurance	7	3.8
	Real Estate	3	1.6
	Other	159	85.4
	Total	**186**	**100**

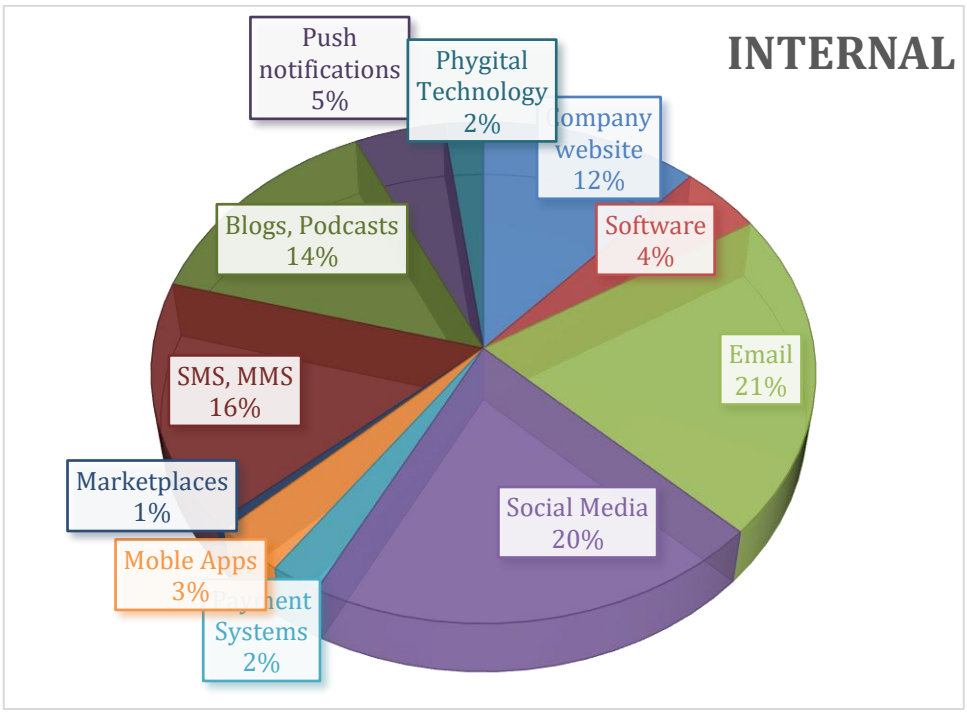

Figure 5. *Digital tools management (Internal)*

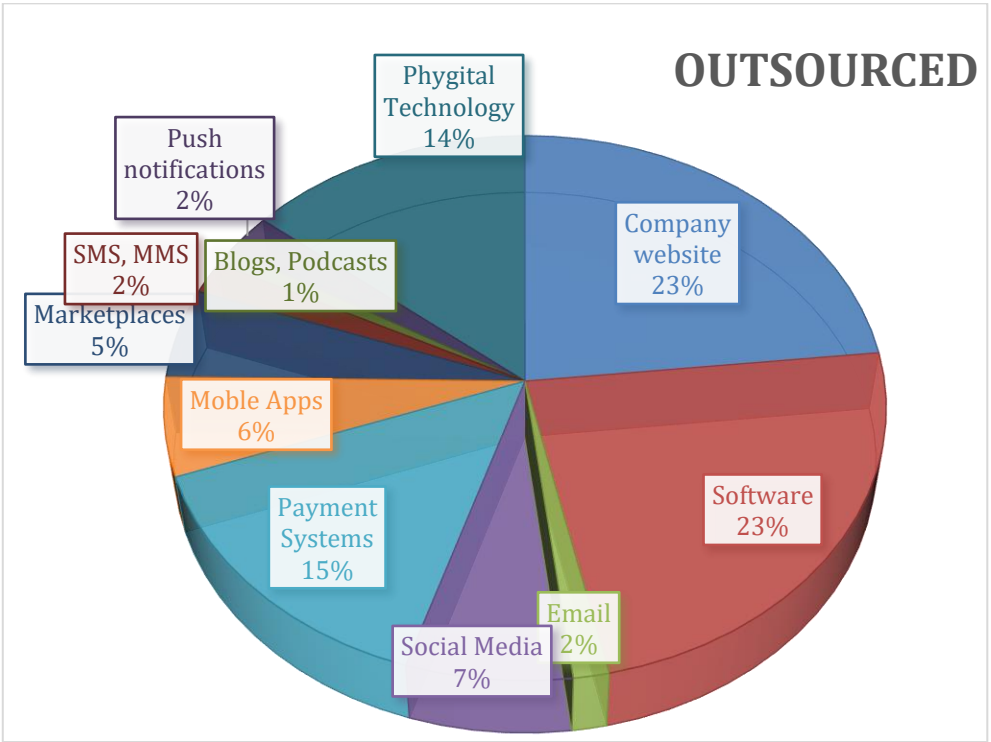

Figure 6. *Digital tools management (Outsourced)*

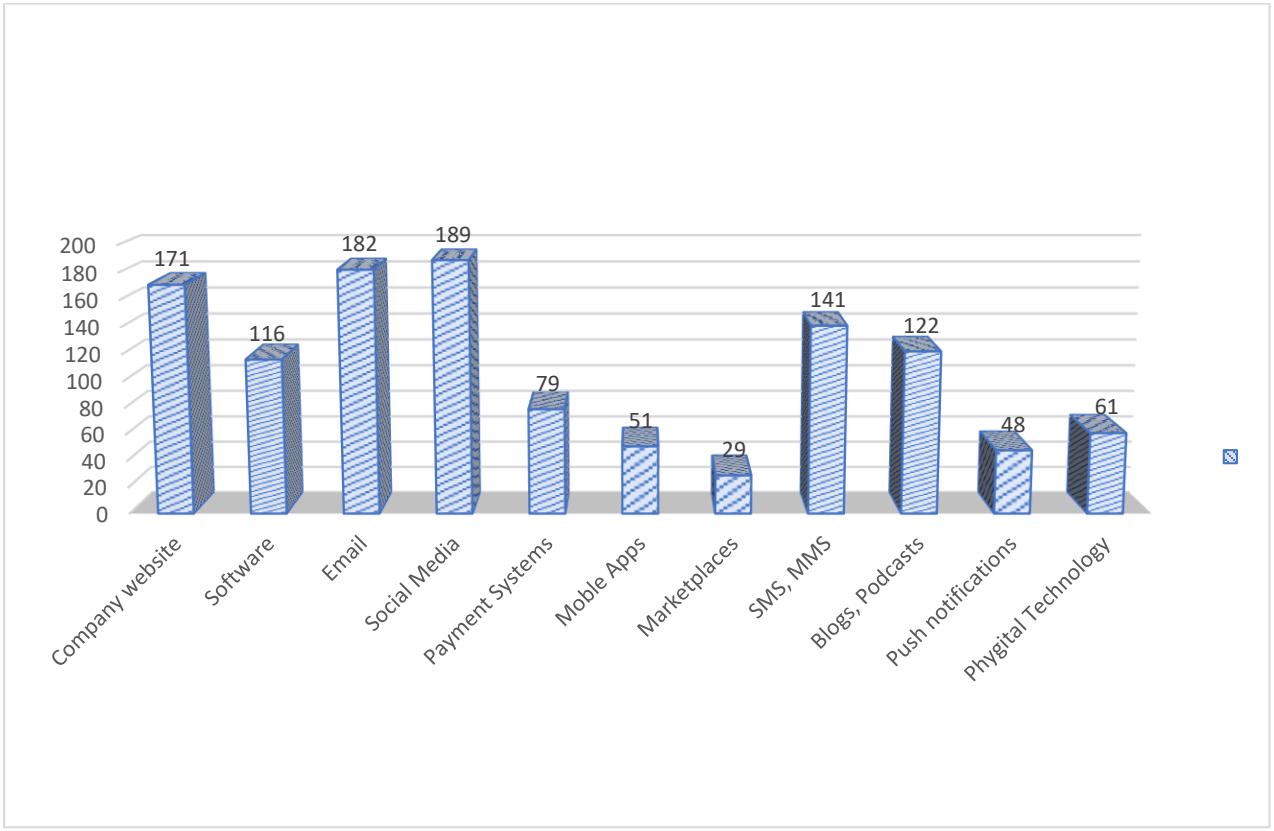

Figure 7. *Frequency of used digital tools (Internal + Outsourced)*

Table 23. *Summary of digital tools usage goals*

	Company website	Software	E-mail	Social media	Payment Systems	Mobile applications	Marketplaces	SMS / MMS	Blogs / Podcast	Push notification	Phygital technology
Facilitating tasks	6	113	10	10	69	36	17	14	6	8	58
Company introduction, promotion & sales of products/services	168	5	120	139	4	21	13	18	27	10	7
Interaction with audience	93	3	106	177	5	31	9	100	23	26	11
Data gathering	38	30	23	149	33	37	13	43	3	21	44

***Company website**	Total respondents: **171** ; Percentage over sample: **91.93 %**
***Software**	Total respondents: **117** ; Percentage over sample: **62.90 %**
***E-mail**	Total respondents: **182** ; Percentage over sample: **97.84 %**
***Social media**	Total respondents: **184** ; Percentage over sample: **98.92 %**
***Payment Systems**	Total respondents: **71** ; Percentage over sample: **38.17 %**
***Mobile applications**	Total respondents: **52** ; Percentage over sample: **27.95 %**
***Marketplaces**	Total respondents: **28** ; Percentage over sample: **15.05 %**
***SMS / MMS**	Total respondents: **129** ; Percentage over sample: **69.35 %**
***Blogs / Podcast**	Total respondents: **33** ; Percentage over sample: **17.74 %**
***Push notification**	Total respondents: **43** ; Percentage over sample: **23.11 %**
***Phygital technology**	Total respondents: **63** ; Percentage over sample: **33.87 %**

Based on the categorization we handled, results gathered from the analyses regarding the use and management of digital tools are showed in above figure 7, 8, 9 and table 27. Accordingly, it is obvious that businesses are mostly in traditional social networks (189 for social media and 182 for emails) followed by company website usage (171). However, mobile apps and phygital technology seems being left behind. That may have several reasons: a timid approach by the protagonists to venture into these technologies or even a fear of failure or lack of ability to measure up to their customers.

Regarding the tools' usage goals, a cross table was developed to helps having a general view of each tool's goal and frequency. We did so to make it easy to depicts since multi choice open question was chosen while developing the survey form. Accordingly, most of the respondents could fill at the same time both goals under one tool or skip them at all; thus, we could end with a probability of "n" lower or higher than number of total respondents.

Website comes on the top with a frequency of usage exceeding 160 and recorded at the section "company introduction, promotion & sales of products/services". It is followed by social media with a frequency of 177 recorded under "interaction with audience" section. Then comes software, e-mail and SMS/MMS with respectively 113 for "facilitating tasks", 120 for "company introduction, promotion & sales of products/services" and 100 for "interaction with audience". All other cross results remain with frequency under to 100. For instance, payment systems (69) intended for "tasks facilitating", phygital recorded the higher frequency (58) under "task facilitation" as well, mobile applications (37) mostly used for "data gathering", blogs/podcast and push notification respectively with 27 intended for "company introduction promotion & sales" and 26 for "interaction with audience".

We also checked the corresponding number respondents based on the tool type toward the total sample. Accordingly, we have company website, e-mail and social media which exceeded the 90% bar making them the top chosen tools during the study. Software and SMS/MMS are in the range of 60-70 while payment systems and phygital technology represent a percentage greater than 30. Coming to mobile applications and push notification, they are situated in the range 20-30 while marketplaces and blogs / podcasts represent the less chosen tools with respectively 15,05 % and 17,74%.

5.2.2. Factor Analysis

Factor analysis, a powerful statistical tool, looks into the hidden structure of complicated data to reveal the underlying components that underlie apparent variable correlations (Yong & Pearce, 2013). Factor analysis serves several purposes. For starters, it functions as a dimensionality reduction technique, reducing a mountain of information to a manageable amount of core constructs (Tabachnick & Fidell, 2007). This parsimony enables researchers to create simpler, more interpretable models and perform fast studies. Second, factor analysis uncovers hidden patterns and linkages in data, revealing connections that would otherwise go unnoticed (Yong & Pearce, 2013).

In the case of our study, we performed the analysis with all innovation dimensions (process, product, marketing), all performance dimensions (financial and non-financial) and digital transformation dimension which is part of digital presence. Digital usage wasn't part of the analysis since it was considered as a specific variable inserted in the model to evaluate the frequency of usage. Its inclusion in the factor analysis could cause several deletions of items and create a disorder in the new variables to be created at the end of the analysis. In order to perform factor analysis, it is required to have a preferable sample size of 100 or more. Comrey & Lee (1992) argued that 50 is a very small sample size, 200 is a medium sample size, 300 is a decent sample size, 500 is a very good sample size, and 1000 is the ideal sample size. Since the sample size of our research is 186, we can claim that it is suitable for factor analysis.

Analysis was performed using a principal component and varimax rotation. The minimum factor loading criteria was set to 0.50. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation. Prior to the item removal operation, results show that most of the communalities were over 0.50 with one of them showing a result close to 0.5 (B1.4 : 0.498). The results were significant, x^2 ($n = 186$) = 1842.246 ($p < 0.001$), which indicates its suitability for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) which indicates the appropriateness of the data for factor analysis, was 0.743. The factor solution that derived from this analysis yielded eight factors for the scale, which

accounted for 63.834 percent of the variation data. Nonetheless, in this initial EFA, some items load under other factors (different from which they belong to). A procedure of deletion was attempted and six items (progressively A1.2; A1.1; C2.4; A2.4; A2.6; A2.5) which loaded onto a factor other than their underlying one were deleted. Hence, these items were removed from further analysis.

The final results of the new analysis confirmed six-dimensional structure. The Kaiser-Meyer-Olkin MSA became 0.771. The six dimensions explained a total of 63.295 percent of the variance among the items in the study. The Barlett's Test of sphericity proved to be significant and most of communalities were over the required value of 0.50. However, some of them showed a result lower than 0.5 (C1.1: 0.487; C2.3: 0.442). Since all items loaded under their belonged factors, it was decided to keep these variables for a further evaluation to see whether they can show greater results through their interaction with other items; especially at the reliability and correlation analyses sections.

Table 24. *KMO and Barlett's Test Results*

Kaiser- Meyer-Olkin (KMO) Measure of Sampling Adequacy Value	**0.771**
Barlett's Test of Sphericity	
Approx. Chi-Square (X^2)	1442.654
sd	231
Sig. (p)	< 0.001

Table 25. *Communalities Results*

Communalities											
	A1.3	**A1.4**	**A2.1**	**A2.2**	**A2.3**	**A3.1**	**A3.2**	**A3.3**	**A3.4**	**B1.1**	**B1.2**
Initial	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Extraction	0.693	0.673	0.521	0.636	0.665	0.712	0.726	0.737	0.704	0.712	0.665
	B1.3	**B1.4**	**B1.5**	**C1.1**	**C1.2**	**C1.3**	**C1.4**	**C1.5**	**C2.1**	**C2.2**	**C.2.3**
Initial	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Extraction	0.658	0.546	0.617	0.487	0.537	0.556	0.681	0.669	0.668	0.619	0.442

Table 26. *Factor Analysis Results*

	Factors					
	Process innovation	**Product innovation**	**Marketing innovation**	**Digital transformation**	**Financial performance**	**Non-financial performance**
A1.3	0.793					
A1.4	0.773					
A2.2		0.769				
A2.3		0.763				
A2.1		0.657				
A3.3			0.847			
A3.2			0.806			
A3.4			0.761			
A3.1			0.707			
B1.1				0.841		
B1.2				0.824		
B1.3				0.799		
B1.5				0.788		
B1.4				0.773		
C1.4					0.775	
C1.5					0.769	
C1.2					0.682	
C1.1					0.628	
C1.3					0.579	
C2.1						0.776
C2.2						0.713
C2.3						0.565
Eigenvalue	1.233	1.454	2.933	4.997	2.024	1.284
Explained variance (%)	5.606	6.611	13.33	22.711	9.198	5.838
Cumulative variance (%)	63.295					

5.2.3. Internal consistency and reliability

The correlation between distinct test items determines an instrument's internal consistency. This correlation reflects if a group of items designed to assess the same concept provide similar results. According to (Hair, Black, & Babin, 2010), while 0.70 is typically considered an acceptable value, values as low as 0.60 may be acceptable for exploratory study as well. In the same vein, Ursachi, Horodnic & Zait (2015) joined the course stating

that universally recognized norm is that 0.6-0.7 represents an acceptable degree of dependability, with 0.8 or higher indicating extremely good reliability.

Table 27 displays the Cronbach's alpha values for each construct's dependability. All scales from innovativeness, digital presence and firm performance are respectable, genuine, and consistent (all over 0.60) indicating that the scale produces consistent results, strengthening the confidence we can place in the data's reflection of the intended concept.

When attempting the non-financial performance analysis, the Cronbach's alpha value looked to be 0.598. We consequently selected for the removing option of the value without which, we may have a better Cronbach’s. Following this approach, C2.3 was removed, resulting in a two-item variable for non-financial performance with a Cronbach's alpha value of 0.64, up from 0.598.

Cronbach's alpha for the 2-item process innovation scale is 0.62, which falls within 0.60 and 0.70, indicating that it is acceptable.

Cronbach's alpha for the 3-item product innovation scale is 0.69, which falls within 0.60 and 0.70, indicating that it is acceptable.

Cronbach's alpha for the 4-item marketing innovation scale is 0.82, which falls between 0.80 and 0.90, indicating that it is very good.

Cronbach's alpha for the 5-item digital transformation Scale is 0.83 as well, which falls between 0.80 and 0.90, indicating that it is very good.

Cronbach's alpha for the 11-item digital usage Scale is 0.85 as well, which falls between 0.80 and 0.90, indicating that it is great.

Cronbach's alpha for the 5-item financial performance scale is 0.78, which falls within 0.70 and 0.80, indicating that it is respectable.

Cronbach's alpha for the 2-item non-financial performance scale is 0.64, which falls within 0.60 and 0.70, indicating that it is acceptable.

Table 27. *Cronbach's Alpha table summary*

		Cronbach's alpha
Summary Table		
	Process innovation	0.62
	Product innovation	0.69
	Marketing innovation	0.82
	Digital transformation	0.83
	Digital usage	0.85
	Financial performance	0.78
	Non-financial performance	0.64

Table 28*. Reliability and Descriptive statistics for Innovativeness*

		Mean	Std. Deviation	Cronbach's alpha
Innovativeness				
Process Innovation	Significant future investments in products/services compare to annual turnover	3.54	0.62	**0.62**
	Changing product/service process at great speed	3.50	0.59	
Product Innovation	Offering novel products to the market	3.33	0.57	**0.69**
	Offering new ideas to the market	3.82	0.60	
	Developing creative products	3.82	0.58	
Marketing Innovation	Renewing new or current product design	3.38	0.57	**0.82**
	Renewing distribution channels	3.53	0.57	
	Renewing promotion techniques	3.78	0.58	
	Renewing pricing techniques	3.66	0.58	

Table 29. *Reliability and Descriptive statistics for Digital Presence*

		Mean	Std. Deviation	Cronbach's alpha
Digital Presence				
Digital Transformation	Digitalizing everything that can be digitalized	3.65	0.76	**0.83**
	Collecting large amounts of data	3.49	0.71	
	Creating stronger networks between processes and digital technologies	3.76	0.61	
	Enhancing an efficient customer interface with digitalization	3.96	0.62	
	Achieving information exchange by digitalization	4.15	0.44	
Digital Usage	Company Website	4.22	1.72	**0.85**
	Software	3.26	1.37	
	E-mail	3.73	0.91	
	Social media	4.40	0.69	
	Payment systems	2.86	1.41	
	Mobile applications	2.18	1.43	
	Marketplaces	2.06	1.20	
	SMS, MMS	2.88	0.99	
	Blogs, Podcasts	2.17	1.77	
	Push notification	2.12	1.20	
	Phygital technology	2.22	1.34	

Table 30. *Reliability and Descriptive statistics for Firm Performance*

		Mean	Std. Deviation	Cronbach's alpha
Firm Performance				
Financial performance	High level return on sales with current customers	3.87	0.51	0.78
	High level return on sales with new customers	3.57	0.56	
	Increased market share	3.62	0.57	
	High level of return on investment	3.35	0.53	
	Increased profitability	3.46	0.55	
Non-financial performance	Much better performance in employee satisfaction	3.64	0.57	0.64
	Much better performance in customer satisfaction	3.94	0.46	

5.2.4. Correlation analysis

In this section, we attempt another analysis (after the one performed in pilot) with the final data gathered so that we can get the exact result whether a relation exists between the variables. On another hand, it is to also discover the existence of any positive or negative relationship between variables. Tables 31 and 32 below highlight all results gathered after the Pearson correlation analysis outcomes with the r and Sig. values for each of the dimension. According to results, process – product – marketing innovation and digital transformation – usage variables were all found to be correlated with firm performance and statistically significant (with r values respectively 0.352, 0.158, 0.288, 0.207, 170 and $p < 0.05$ and 0.01). However, marketing innovation isn't showing any correlation with Digital transformation and digital usage (with r values respectively 0.103; -0.018 and $p > 0.05$). Hence, H1, H2 and H3 are supported and shows that an increase in innovativeness would lead to a positive but lower in the performance of companies. Regarding H4, it can be related that an increase in digitalization will only cause a positive and higher lead in process and product innovation but the contrary in marketing innovation.

Table 31. *Pearson Correlations*

		PSI	PRI	MI	DT	DU	FP
PSI	Pearson Correlation	1	,229**	,218**	,164*	,177*	,352**
	Sig. (2-tailed)		0.002	0.003	0.025	0.015	0.000
	N	186	186	186	186	186	186
PRI	Pearson Correlation	,229**	1	,211**	,441**	,382**	,158*
	Sig. (2-tailed)	0.002		0.004	0.000	0.000	0.032
	N	186	186	186	186	186	186
MI	Pearson Correlation	,218**	,211**	1	0.103	-0.018	,288**
	Sig. (2-tailed)	0.003	0.004		0.160	0.803	0.000
	N	186	186	186	186	186	186
DT	Pearson Correlation	,164*	,441**	0.103	1	,737**	,207**
	Sig. (2-tailed)	0.025	0.000	0.160		0.000	0.004
	N	186	186	186	186	186	186
DU	Pearson Correlation	,177*	,382**	-0.018	,737**	1	,170*
	Sig. (2-tailed)	0.015	0.000	0.803	0.000		0.021
	N	186	186	186	186	186	186
FP	Pearson Correlation	,352**	,158*	,288**	,207**	,170*	1
	Sig. (2-tailed)	0.000	0.032	0.000	0.004	0.021	
	N	186	186	186	186	186	186

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 32. *Pearson correlations simplified table*

	PSI	PRI	MI	DT	DU	FP
PSI	1					
PRI	,229**	1				
MI	,218**	,211**	1			
DT	,164*	,441**	**0.103**	1		
DU	,177*	,382**	**-0.018**	,737**	1	
FP	,352**	,158*	,288**	,207**	,170*	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

5.2.5. Regression analysis

Following our research, we postulated that innovativeness has an impact on firm performance via dimensions such as process, product, and marketing innovation. Regression of each variable are shown in the following summary tables after analyzing each of the developed hypotheses.

In this study, it is hypothesized that innovativeness is positively related to firm performance. A linear regression test was run using process, product and marketing innovation as independent variables and firm performance as dependent variable. This model is used in testing hypothesis 1, 2 and 3 in separate tables.

Hypothesis 1 = Process innovation is positively associated with firm performance

According to findings, first hypothesis tests if process innovation carries as significant impact on firm performance. The dependent variable FP war regressed on predicting variable PSI to test the hypothesis H1. Results showed that process innovation significantly predicted firm performance with p value < 0.001 and R^2 = .124 depicting that the model is capable of explaining above 12% of the variance in firm performance (table 33).

Table 33. *Model summary for H1*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H1	PSI => FP	0.236	0.124	26.058	< 0.001	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), PSI

N*ote*: *p < 0.05. PSI: Process Innovation, FP: Firm Performance

Hypothesis 2 = Product innovation is positively associated with firm performance

According to findings, second hypothesis tests if product innovation carries as significant impact on firm performance. The dependent variable FP war regressed on predicting variable PRI to test the hypothesis H2. Results showed that product innovation significantly predicted firm performance with p value 0.032 and R^2 = .025 depicting the

model capability of explaining around 2.5% of the variance in firm performance (table 34) comparatively less than H1.

Table 34. *Model summary for H2*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H2	PRI => FP	0.120	0.025	4.693	0.032	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), PRI

N*ote*: *p < 0.05. PRI: Product Innovation, FP: Firm Performance

Hypothesis 3 = Marketing innovation is positively associated with firm performance

According to findings, third hypothesis tests if marketing innovation carries as significant impact on firm performance. The dependent variable FP war regressed on predicting variable MI to test the hypothesis H3. Results showed that marketing innovation significantly predicted firm performance with p value < 0.001 and R^2 = .083 depicting the model capability of explaining 8% of the variance in firm performance (table 35).

To answer the research question: "Which of innovativeness constructs have influence on the independent variable firm performance?", it is obvious that all performance constructs are actually having a positive relation. That said, we can argue that in terms of innovation relationship with firm performance, soft strategies are as impactful as assets ones like products/services.

Table 35. *Model summary for H3*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H3	MI => FP	0.215	0.083	16.625	< 0.001	Yes

a. Dependent Variable: FP

b. Predictors: (Constant), MI

N*ote*: *p < 0.05. MI: Marketing Innovation, FP: Firm Performance

Hypothesis 4 = Digital presence has direct influence on innovativeness

Aside the relationship between innovativeness and firm performance, it was also hypothesized that digital presence might have an impact on innovativeness as well. Linear regression was carried out to determine the possibility of that relationship between the two variables. H4 was broken down into six sub hypotheses and testing each of their impact on innovativeness dimensions. The dependent variables PSI, PRI and MI were regressed on predicting variables DT and DU to test the hypothesis H4.a; H4.b; H4.c; H4.d; H4.e and H4.f respectively.

H4.a = Digital transformation has positive impact on process innovation

H4.b = Digital transformation has positive impact on product innovation

H4.c = Digital transformation has positive impact on marketing innovation

Results from table 36 showed that digital transformation significantly predicted process innovation and product innovation with respectively p value 0.025, $R^2 = .027$ and p value < 0.001, $R^2 = .194$. However, the impact of DT on MI was found to not be significant with p value higher equal to 0.160 (> 0.005).

Table 36. *Model summary for H4.a, b and c.*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H4.a	DT => PSI	0.173	0.027	5.073	0.025	Yes
H4.b	DT => PRI	0.411	0.194	44.320	< 0.001	Yes
H4.c	DT => MI	0.098	0.011	1.990	0.160	No

a. Dependent Variable: PSI

b. Dependent Variable: PRI

c. Dependent Variable: MI

d. Predictors: (Constant), DT

N*ote*: *p < 0.05. DT: Digital Transformation, PSI: Process Innovation

N*ote*: *p < 0.05. DT: Digital Transformation, PRI: Product Innovation

N*ote*: *p > 0.05. DT: Digital Transformation, MI: Marketing Innovation

H4.d = Digital usage has positive impact on process innovation

H4.e = Digital usage has positive impact on product innovation

H4.f = Digital usage has positive impact on marketing innovation

Results from table 37 showed that digital transformation significantly predicted process innovation and product innovation with respectively p value 0.015, $R^2 = .031$ and p value < 0.001, $R^2 = .146$. However, the impact of DT on MI was found to not be significant with p value higher equal to 0.803 (> 0.005).

Table 37. *Model summary for H4.d, e and f.*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H4.d	DU => PSI	0.116	0.031	5.977	0.015	Yes
H4.e	DU => PRI	0.220	0.146	31.393	< 0.001	Yes
H4.f	DU => MI	-0.011	0.000	0.063	0.803	No

a. Dependent Variable: PSI
b. Dependent Variable: PRI
c. Dependent Variable: MI
d. Predictors: (Constant), DU
N*ote*: *p < 0.05. DU: Digital Usage, PSI: Process Innovation, PRI: Product Innovation,
N*ote*: *p < 0.05. DU: Digital Usage, PSI : Process Innovation, PRI: Product Innovation,
N*ote*: *p > 0.05. DU: Digital Usage, PSI: Process Innovation, PRI: Product Innovation,

Hypothesis 5 = Digital presence influences the relationship between innovativeness and firm performance

In the study, we argue that digital presence might play a significant role into innovativeness and performance relationship such as when digitalization increase, so does innovativeness as well. The hypothesis H5 examines whether digital presence (digital transformation and digital usage) has a significant impact on the relationship between firm performance and innovativeness (process, product, and marketing). The dependent variable FP was regressed on the independent variable Innovativeness through process, product and

marketing innovation dimensions and the moderate variable digital presence through digital transformation and digital usage.

H5.a = Digital transformation moderates process innovation impact on firm performance
H5.b = Digital transformation moderates product innovation impact on firm performance
H5.c = Digital transformation moderates marketing innovation impact on firm performance

Based on the results from below table 38, individual predictors showed p-values above 0.05 (0.775, 0.638 and 0.654 respectively for Moderator1, Moderator2 and Moderator3) which suggest that none of them independently exert a statistically significant effect on the dependent variable FP.

Table 38. *Model summary for H5.a, b and c.*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H5.a	Moderator1	-0.006	0.124	13.005	0.775	No
H5.b	Moderator2	0.012	0.026	2.447	0.638	No
H5.c	Moderator3	0.010	0.084	8.377	0.654	No

a. Dependent Variable: FP
b. Predictor Variable: Moderator_1
c. Predictor Variable: Moderator_2
d. Predictor Variable: Moderator_3
Note: *p > 0.05. FP: Firm Performance, Moderator_1: Digital Transformation moderation on H1
Note: *p > 0.05. FP: Firm Performance, Moderator_2: Digital Transformation moderation on H2
Note: *p > 0.05. FP: Firm Performance, Moderator_3: Digital Transformation moderation on H3

H5.d = Digital usage moderates process innovation impact on firm performance
H5.e = Digital usage moderates product innovation impact on firm performance
H5.f = Digital usage moderates marketing innovation impact on firm performance

Following the results from below table 39, all predictors generated p-values above 0.05 (0.868, 0.256 and 0.138 respectively for Moderator4, Moderator5 and Moderator6) which suggest that none of them independently exert a statistically significant effect on the dependent variable FP.

Table 39. *Model summary for H5.d, e and f.*

Hypothesis	Regression Weights	Beta Coefficient	R^2	F	p-value	Hypotheses Supported
H5.d	Moderator_4	0.003	0.124	12.974	0.868	No
H5.e	Moderator_5	0.027	0.032	3.000	0.256	No
H5.f	Moderator_6	0.035	0.094	9.479	0.138	No

a. Dependent Variable: FP

b. Predictor Variable: Moderator_4

c. Predictor Variable: Moderator_5

d. Predictor Variable: Moderator_6

Note: *p > 0.05. FP: Firm Performance, Moderator_4: Digital Usage moderation on H4

Note: *p > 0.05. FP: Firm Performance, Moderator_5: Digital Usage moderation on H5

Note: *p > 0.05. FP: Firm Performance, Moderator_6: Digital Usage moderation on H6

5.2.6. Research Summary

This section highlights the outcomes of analyses we proceed way long above. As per the table 45, H1, H2, H3, H4.a, H4.b, H4.d and H4.e hypotheses were found to be supported. However, H4.c, H4.f, H5.a to f were found not to be supported. The model has been revised according to final results.

Table 40. *Research hypotheses summary*

Hypothesis	Sub-Hypothesis and Description	Results
H1	PSI is positively associated with FP	**Supported**
H2	PRI is positively associated with FP	**Supported**
H3	MI is positively associated with FP	**Supported**
H4	**H4.a:** DT has a positive impact on PSI	**Supported**
	H4.b: DT has a positive impact on PRI	**Supported**
	H4.c: DT has a positive impact on MI	Not Supported

Table 40. *(Continuous) Research hypotheses summary*

	H4.d: DU has a positive impact on PSI	**Supported**
	H4.e: DU has a positive impact on PRI	**Supported**
	H4.f: DU has a positive impact on MI	Not Supported
H5	**H5.a**: DT moderates the relationship between PSI and FP	Not Supported
	H5.b: DT moderates the relationship between PRI and FP	Not Supported
	H5.c: DT moderates the relationship between MI and FP	Not Supported
	H5.d: DU moderates the relationship between PSI and FP	Not Supported
	H5.e: DU moderates the relationship between PRI and FP	Not Supported
	H5.f: DU moderates the relationship between MI and FP	Not Supported

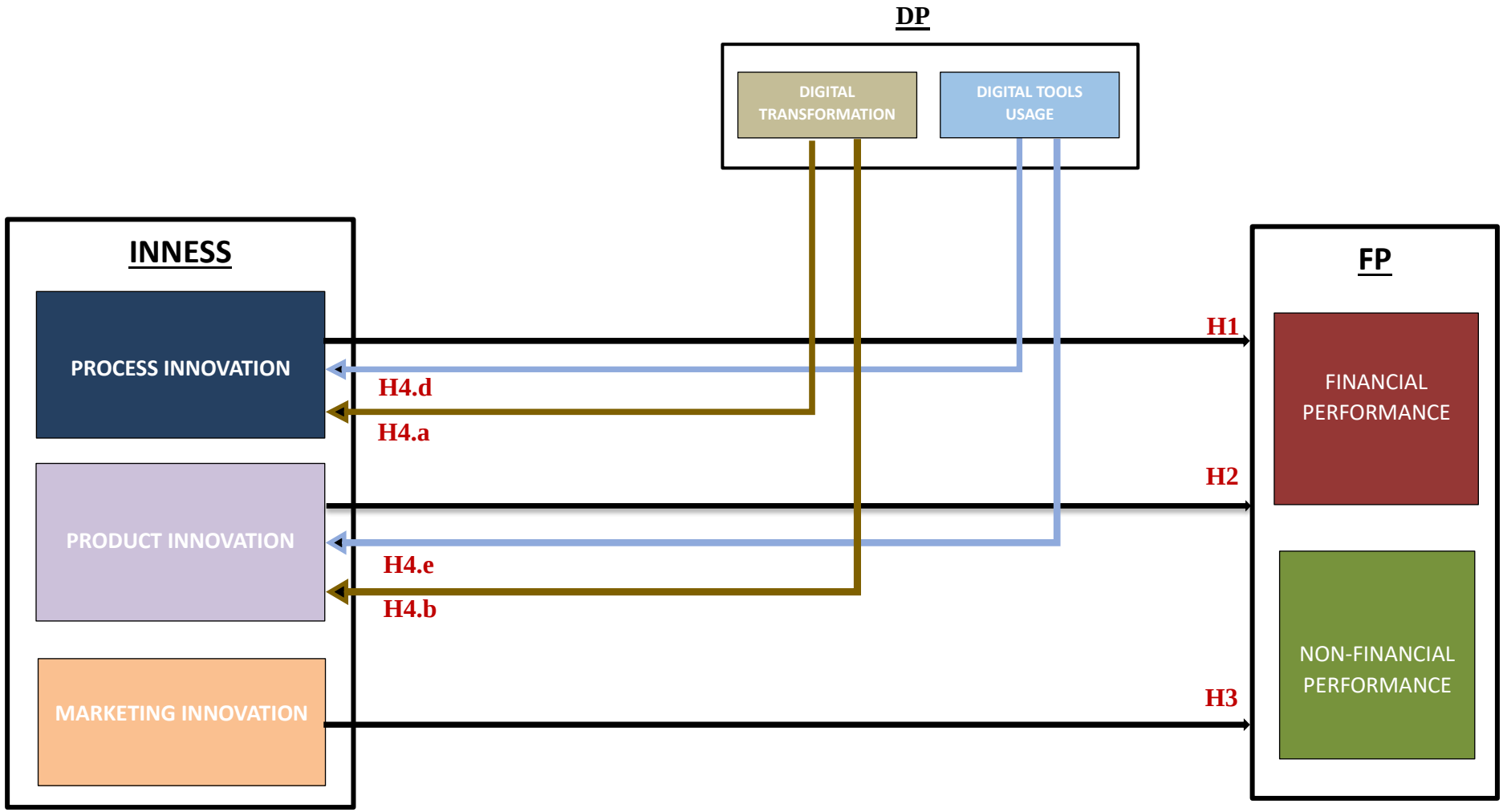

Figure 8. *Final model*

6. DISCUSSION AND CONCLUSION

This section's goal is to provide a conclusion and presents summarized findings based on the analyses. The research question and hypothesis are discussed, followed by a discussion of how the results are interpreted and assessed in light of the scientific literature that is available. The research's practical implications are then discussed. In addition, a critical reflection on the research's limitations is provided, and future research directions are discussed.

6.1. Discussion

The twofold objective of the research was to identify the constructs of digital presence and innovativeness in companies based in west African region and evaluate the relationship of these variables with firm performance. To do so, discussions have been experimented with experts in the domain to gather as much information possible regarding the topic, all of this followed by a deep literature review. The next step was the development of scales based on previous researches and analyses to confirm the developed hypotheses. That survey was distributed and a number of 206 respondents has been obtained (20 for the pilot and 186 for the final analyses) over 400 respondents targeted.

The population for conducting the research was composed by companies in the sub-Saharan Africa and a sample focused in the west African region, especially those in the Sahelian and neighboring coastal countries to test the study's objectives. According to the findings, innovativeness has positive effect on firm performance while digital presence influences innovativeness as well under some of its dimensions. It also viewed innovativeness as a multidimensional concept that includes process, product and marketing innovation for what hypotheses were developed to determine how each of them influences firm performance. The study also considered firm performance as a two-dimensional concept under which lays financial and non-financial dimensions. Speaking about digital presence, it was considered as a mix of digital transformation and digital usage.

According to the findings, the effect of innovativeness on firm performance is clear and differ based on the subdimension through which the relation is being assessed. The first hypothesis

H1 proposed that process innovation is positively related to firm performance. That relationship was shown through the results with a significant predictor ($p<0.05$) for firm performance. This quite explains the importance of businesses to settle procedures within their organizations that make the routine smooth for an efficient result in terms of product/process supply as per Piening & Torsten (2015) who find a positive outcome by increasing process innovation success. The second hypothesis delineate the relationship between product innovation and firm performance with a good result as well (p value < 0.05) like the previous predictor variable. Product (service) innovation is quite strategical element in the company to take into account for an add-value. Regarding H2, we borrowed a view raised by Salavou & Avlonitis (2008); Dunk (2011) whom findings align with our propose. The third hypothesis H3 was about the relation of marketing innovation and firm performance. The results were as positive as those of the previous analyses. That make us argue that as much as a business adopt innovative ways of designing, distributing, and promoting their items as much as there is greater probability to reach a performance score. Authors like Nieves & Diaz-Meneses (2016); Peng, Qin, & Tang (2011) confirmed this approach through their research in specifically the hotel and manufacturing & service industries.

The remain hypotheses were about digital presence which was analyzed first as a direct influencer and by a moderator as well. The H4 (direct influence on innovativeness) was found to be positive at only some levels. The hypothesis was split into six sub hypotheses in order to understand the effect of each digital presence dimension on each of innovativeness dimensions. H4.a, H4.b, H4.d and H4.e (impact of digital transformation and digital usage on process and product innovation) were found to be positive with a p value lower than 0.05 and an r square percentage from almost 3% to 41% depending on the hypothesis. Our results join the research of Lin & Yi (2022) regarding the digital infrastructure among innovation paths and its contribution into achievements of the business. That said, we can argue that digitalization a strategical key for direct impacts and representing a particular asset for innovation. However, digital transformation and digital usage were found not to have positive effect on marketing innovation. In the same line, DP was found not to be significant into its moderating role between innovation and performance. The hypothesis H5 was dispatch into six sub-hypotheses H5.a, H5.b, H5.c, H5.d, H5.e and H5.f respectively for its moderation role of digital transformation & digital usage on H1, H2 and H3. The analyses gave a particular high rate of p value with very low R^2 values.

According to the results, even the moderating section couldn’t show any positive links, most of the variable were found to give positive outcomes in the hypothesized analyses. These findings are consistent with those of Anning-Dorson et al. (2018); Gunday et al. and other authors.

Regarding the tools section, analyses were handled with the goal to check which of the tools are the one companies have affinity with. Accordingly, it was found that digital tools like websites, e-mails and social media are the most used with the goal to promote the business & its products also for interaction with audience and data gathering.

6.2. Conclusion and Contribution

This study attempted to determine the relationships between firm performance, digital presence, and innovativeness. First, this study went deeper to differentiate process, product, and marketing innovation and their relationship to performance. A differentiation of performance was also made by arguing that non-financial subdimension is as important as the financial one while trying to get the perfect range of other variable influences.

On an academic view, the study gives answer to a gap in the understanding of African businesses located in landlocked or underdeveloped area in this era of digitalization and innovation. This research illuminated the profound impact of digitalization and innovation on performance of firms. Our findings add to the existing body of knowledge by applying the model to bunch of businesses in different sector of activities and different countries. Furthermore, our work emphasizes the critical importance of creating an ecosystem that fosters both technological advancements and a culture of creative exploration. Having an open sample including diverse categories of businesses helped understanding the point of view of each of them regarding these technologies and how they perform into managing them. The research also contributes theoretically to a better understanding of three critical dimensions known as digitalization, innovation, and performance. It provides practical insights into how businesses perceive their performance while incorporating digital tools into an innovative approach. It also makes a contribution to policymakers and practitioners. For example, the findings of this study imply that policies aimed at encouraging owners to be oriented toward stimulating their organization's use and well-implementation of new effective strategies. Our study aligns with the rich and long list

of researches run in the specific field of digitalization, innovation and firm performance (Wang & Ahmed, 2004; Kunz et al., 2011; Garcia & Calantone, 2015; Alpay et al., 2012; Hassan et al., 2013; Abosag & Brennan, 2017).

Of course, the non-significant results regarding the moderating impact of digital presence are unexpected in a region where the digital revolution has expanded at fast pace to many countries. This should result in an unexpectedly low impact or maybe misapplication or even not implemented enough. Plenty are the variables presenting a troubling image of a digital gap in West Africa, where firms are struggling to keep up with the worldwide move toward digitalization. Addressing these issues needs a holistic approach that includes infrastructure development, affordability measures, digital literacy programs, and supporting regulatory frameworks. Only by bridging this digital divide will West African firms be able to reach their full potential and contribute significantly to the region's economic growth and development. Accordingly, further research can be done in other regions, for example in developed countries where digital is intensively used.

From a managerial view, companies and managers should get more involved into understanding innovation and digitalization processes fully, in terms of their right application into their organizations. First of all, digital tools are not only meant to be used as an interface between customer and the company but also as a strategic tool for managing tasks in an efficient way within the organization.

Following the purpose of our study, it is also important to provide answers to the research questions we developed earlier in the first pages.

How far innovative are firms through their activities? What progress have firms made towards digital implementation and where are they currently? What is the role of digitalization in the firm? Does it have any bearing on the link that exists between innovation and the dependent variable performance? What type of digital schemes are likely to promote innovation and performance of the firm? Which of innovativeness constructs have influence on the independent variable firm performance?

Regarding these questions, it can be answered that businesses are in a serious manner into adapting with the digital & innovation through different approach, and in their own way if we can

say so. Just by having a look on the analyses' tables above, we can see from the whole list of participants that the majority of them use social media and websites, which is currently one of the most important tools for contacting prospects and consumers, particularly in the African market. We can argue that in terms of the link between innovation and performance, soft strategies are just as important as assets like products/services. We may also claim that digitalization plays a non-negligible twofold function by first influencing the degree of innovation and then favorably influencing the effect of innovation on business performance.

Despite having enormous potential, companies in Sub-Saharan Africa continue to fall behind in terms of aligning with the vanguard of innovation and digitization. Several studies have identified a confluence of elements that contribute to this complicated phenomenon:

1. Inadequate Infrastructure: Obtaining dependable and cheap internet access remains a key challenge. According to (Castells, 2010), "the internet is not simply a communication technology; it is a new mode of production and social organization". Businesses struggle to realize the full potential of digital technology and compete in a worldwide market without proper infrastructure.

2. Skills Gap: A scarcity of trained ICT workers impedes the development and implementation of novel solutions. According to the World Bank (2020), Sub-Saharan Africa's capacity to fully benefit on the digital revolution is hampered by "a critical shortage of digital skills across all sectors" (p. 6).

3. Finance: Securing finance for tech-driven projects may be difficult, especially for early-stage firms. As Adebisi et al. (2022) demonstrate, this is compounded by restricted access to venture capital and risk-averse investment environments.

4. Regulatory Environment: Outdated and restrictive rules can impede innovation and make new technology difficult to implement. UNCTAD (2021) notes that "a lack of clear and predictable regulatory frameworks can create uncertainty and discourage investment in digital technologies" (p. 14).

5. Cultural Factors: Traditional company practices and aversion to change can sometimes be stumbling blocks. According to Akabogu & Ufenmi (2017), "cultural factors such as risk aversion and preference for established methods can hinder the adoption of new technologies" (p. 39).

These interconnected barriers constitute a difficult barrier to entry for Sub-Saharan African enterprises looking to join the ranks of global innovators. Addressing these obstacles via targeted infrastructure investments, talent development efforts, supporting legislation, and culturally sensitive methods will pave the way for the area to move toward a more technologically driven and inventive future.

Sub-Saharan African enterprises may unlock their full potential and contribute to a more equitable and prosperous future for the region by overcoming these constraints and building a conducive environment for innovation and digitalization.

6.3. Research Limitations

The first limitation regarding this study is theoretical. Not all dimensions of innovativeness have been used to develop the scales, after strategical refinement only those suggested to respond better toward the population for the sampling have been chosen (process, product and marketing). Several constructs and capabilities of digital presence may exist as well, compared to what have been used for the analysis.

Secondly, we focus on only one region of the sub-Saharan Africa, within which only few countries have been chosen to represent. The sample could be enlarged for further research, thus will have more understanding about the research question.

As the third point, it is also required to highlight a constraint regarding the data gathering technique. We were constrained in our access to databases and responses. The list of companies gathered with help of chamber of commerce of these countries are not updated and most of the companies on those lists does not exist or does not have any valid information to be used for contacting them. As a result, respondents are primarily acquired through personal connections through social networks like Facebook and LinkedIn. Thus, most of the companies contacted were reacting after at least two reminders. Due too, only a smaller number of respondents could be reach and creating a delay for the data analyses.

Lastly, different other programs and/or methods could be adopted to run the analyses, but due to the restriction in time and non-availability of enough respondents made us chose the SPSS model as the easiest and complete system to run the analyses efficiently.

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Appendix 1: **Experts Interview Questionnaire**

THE RELATIONSHIP BETWEEN DIGITAL PRESENCE, INNOVATIVENESS AND PERFORMANCE: HOW BUSINESSES, IN SUB SAHARAN AFRICA INTERACT WITH THE DIGITAL AND WHAT IS THE IMPACT ON THEIR PERFORMANCE?

This study is carried out within the scope of Anadolu University Marketing Department PhD program. The goal is to gather expert ideas through recorded interview for the development of final scales for the thesis data collection. The important thing is that you specify your own opinion. The answers you give to the questions will be used for scientific purposes only and will be kept strictly confidential. Thank you in advance for your interest and participation.

Best regards,
MAHAMANE SANI MAMADOU YACOUBA
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INNOVATIVENESS

A. In your opinion, what are the types of innovations whose adoption constitutes a competitive advantage for an organization?

- Marketing Innovation
- Product Innovation
- Process Innovation
- Other (Please specify)

B. What do these innovations consist of?

C. What are the terms of their adoption (s)?

D. What do you think could be the goal (s) of their adoption by the organization?

DIGITAL PRESENCE (DIGITALIZATION)

A. In your opinion, what tools are necessary for the organization to strengthen its digital presence?

B. What do you think might be the goal of using these solutions within the organization?

PERFORMANCE

A. In your opinion, what aspects determine the performance of an organization?

B. How would you rate the level of achievement of these aspects within the organization?

Appendix 2: **Experts Interview Outcomes**

INTERVIEW OUTCOMES

TOPIC: ***THE RELATIONSHIP BETWEEN DIGITAL PRESENCE, INNOVATIVENESS AND PERFORMANCE: HOW BUSINESSES, IN SUB-SAHARAN AFRICA INTERACT WITH THE DIGITAL AND WHAT IS THE IMPACT ON THEIR PERFORMANCE?***

INNOVATIVENESS

A. In your opinion, what are the types of innovations whose adoption constitutes a competitive advantage for an organization?

• Marketing Innovation

• Product Innovation

• Process Innovation

• Other (Please specify)

C. What do these innovations consist of?

D. What are the terms of their adoption (s)?

D. What do you think could be the goal (s) of their adoption by the organization?

DIGITAL PRESENCE (DIGITALIZATION)

A. In your opinion, what tools are necessary for the organization to strengthen its digital presence?

B. What do you think might be the goal of using these solutions within the organization?

PERFORMANCE

A. In your opinion, what aspects determine the performance of an organization?

B. How would you rate the level of achievement of these aspects within the organization?

Interviewees List

Participants	Occupation	Current Position / Affiliation / Job Title	Organization Type	Gender	Age	Experience	Interviewee country
P1	COMMERCIAL	MAJOR ACCOUNTS MANAGER	MULTINAIONAL – PAY TV	MALE	30 - 40	More than 3 years	NIGER
P2	CIVIL ENGINEER & BUSINESS ADMINISTRATOR	GENERAL MANAGER	ENGINEERING AND CONSTRUCTION	MALE	30 - 40	9 Years	MALI
P3	ACCOUNT MANAGER	HEAD OF DIGITAL INTELLIGENCE AND E-REPUTATION	COMMUNICATION	MALE	40 - 50	15 Years	NIGER
P4	GENERAL MANAGER	ADMINISTRATIVE ACTIVITIES	MARKETING AND COMMUNICATION	MALE	30 - 40	10 Years	NIGER
P5	SALES SPECIALIST	OVERSEAS AREA SALES SUPERVISING	AUTOMOTIVE	FEMALE	20 - 30	1 Year	TURKEY
P6	MARKETING SPECIALIST	BUSINESS DEVELOPMENT AND MARKETING MANAGEMENT	ELECTRIC-ELECTRONIC	MALE	30-40	4-5 Years	TURKEY
P7	BUSINESS STRATEGIST	CHEF VISIONARY SPECIALIST	BRANDING ORGANIZATION	MALE	20-30	5 Years	NIGERIA
P8	COMMERCIAL TECHNICIAN	CONTROL AGENT	DIGITAL COMMUNICATION	MALE	30-40	5 Years	NIGER
P9	SALES ASSISTANT	TENDER SUPERVISOR	INFORMATICS	MALE	30-40	5 Years	NIGER
P10	LOGISTIC MANAGER	SAFETY COORDINATOR	LOGISTICS & SECURITY	MALE	30-40	4 Years	NIGER

PARTICIPANT 1. Interviewed on May 31st, 2021.

INNOVATIVENESS	
A. Types of innovations	Marketing innovation (Premix market) Canal University (Explained in the question D.) or Cinema University: enabling young local producers to learn and make cinema in order to help them respect international standards.
B. What it consists of	Adapt the different formulas at the level of each layer of the population
C. The terms of their adoptions	Innovations are frozen, the company has had to adopt and change a formula only once since its establishment. The formulas and the prices remain fixed, the work is done on the price. The company is more about the content, not the terms. We play more on the content rather than the terms.
D. The goal of their adoptions	1st goal: income Increase the customer portfolio Promote channels by making them accessible and give visibility through canal plus packages across the continent, in order to allow their colleagues and foreigners to imbibe this content, promote local content, allow producers to content in the field of cinematography to develop, will allow the country to develop, allow people who are in the field of cinematography to develop

DIGITAL PRESENCE	
A. Necessary tools	Outsourced. The amount of time spent in front of T.V Globally, it's to shape customer profile. We work with them based on criteria we submit to them. In Niger for examples, we asked to research about time spent in front of one of the country's local channels.
B. The goal of their usage	To find out the time spent and the usage of a given service, which helps to develop tailormade outcomes.

PERFORMANCE	
A. Aspects determining performance	CRM indicators at customer advisor level (complaints and others) Corporate department: Acquisition volume, turnover, the quantity used to determine turnover. We generate matrices, Dashboard for evaluation. We use platforms such as SAP, ELIOT, and other formal software. We use another external tool / web platform called Expert Plus, to evaluate internally the team through some quiz / questionnaires. It helps the company to find out about the customer portfolio, knowledge about offer and also degree of achievement of actions assigned to each team member.
B. Rating the level of their achievements	Mostly, we divide the year in two RF1 and RF2 (REFORECAST). Thus, dividing the semester in trimester LE 1 and LE2 (Last Estimate): to determine the BI (Business Integration). All this to evaluate and reevaluate the best indicator to reach the BI.

PARTICIPANT 2. Interviewed on June 6th, 2021.

INNOVATIVENESS	
A. Types of innovations	Marketing and Product Innovation: communication (tips for penetrate the market, ...) Process innovation: less impact than first 2 one's. Things are not perceived by the outside world, its internal.
B. What it consists of	Marketing Innovation: usage of modern channels which allows to communicate differently (YouTube channel, using new techniques in the domain in which you are, ..) Product Innovation: Improve the product by presenting it differently => modification; propose newness to people; introduction of new technologies not existing on the market)
C. The terms of their adoptions	Continuous improvement, innovation plan yearly (anyway it depends on the industry in which you are), Monitoring dashboard, consultants / experts (internal and external) who will guide you in the actions.
D. The goal of their adoptions	• Turnover • Sustainability • Long term investment • Environmental and social impacts

DIGITAL PRESENCE	
A. Necessary tools	• Software packages: allow better control of what is done in the company (process, ...) for the execution of certain tasks. e.g., Project management software such as RP for resource management => time saving • Social networks, websites, some work equipment (technological tools)
B. The goal of their usage	• Time saving • Competitivity marketing • Money saving • Reduction of charges

PERFORMANCE	
A. Aspects determining performance	• Growth in terms of turnover, profit, • Achieve objectives through quality indicators (customer satisfaction rate, tracking of services to verify the achievement rate, incident management, contingency management
B. Rating the level of their achievements	Establishment of provisional plans (overall turnover, number of customers to acquire, number of material / equipment to acquire). Usage of a dashboard to make weekly evaluation and monthly checking with the team. The dashboard in weekly updated.

PARTICIPANT 3. Interviewed on June 26th, 2021.

INNOVATIVENESS	
A. Types of innovations	Marketing Innovation: use of marketing classic, the contribution of digital (social networks), search engine (google) Product Innovation
B. What it consists of	Marketing Innovation * Digital marketing: creation of accounts on social networks * Mobile apps (especially in the mobile money category) Product Innovation: * Packaging, product presentation
C. The terms of their adoptions	Depends on the company's objectives: * Make you known or unite a community around the brand. E.g., you have to communicate regularly. Managing pages on social networks is a minimum of 3 posts per week. We must also take into account the management of comments. Sometimes 4 to 6 posts per week. * Highlight b2b offers and give the organization some credibility
D. The goal of their adoptions	• Become known • Prospect (canvass followers) • Get information about their feelings about the products => adjust the price, adjust the service • Federate a community • Anticipate the buzz (bad) • Competitive intelligence, benchmark, duplicate and adapt competitors' strategies • It all depends on the type and size of the structure

DIGITAL PRESENCE	
A. Necessary tools	• Social networks • Websites (companies mostly don't chose that option when they do not have someone for internal management => risk: not updated information, lack in the control of the information structure of the website, etc.) • Mobile Apps
B. The goal of their usage	• The concern to make the company known, the proposals, the desire to show his expertise, to give a point of view to show the mastery of his field

PERFORMANCE	
A. Aspects determining performance	* The quality of the service or product * Interaction with the customer through the contact points: front office, after-sales service, social networks
B. Rating the level of their achievements	* Through internal measurement tools (specific to the company) * Audience rate measurement tools, click rate on an external offer

PARTICIPANT 4. Interviewed on June 27th, 2021.

INNOVATIVENESS	
A. Types of innovations	An innovation, if it is real, it is a competitive advantage. Marketing Innovation: Product Innovation Incremental innovation Frugal innovation
B. What it consists of	• Marketing Innovation: way of presenting a product that will make customers perceive it in a different way • Product innovation: e.g., Apple and Nokia, Apple enter the market and present a product totally different from what exist in the market already (Nokia) • Process Innovation: better innovation-impact ratio. its internal, less visibility. • Incremental innovation: no invention but to improve the process which makes it possible to achieve a goal. E.g., We are not going to invent hot water but to have it, long before we used flints, gradually there were matches, gas stoves, lighters, etc. • Frugal innovation: typical to African countries => we need to concentrate on things which are really essential for the people; and innovate in a very simple way and make accessibility much easier. E.g., Mobile money
C. The terms of their adoptions	You need people or a department that takes care of that. Take the time to study what you are doing, see what is being done elsewhere, to understand the reality. You need innovation projects, you need teams, management must support these innovations, you need money (product innovation). The adoption of innovation depends on the type of business, the reality (budget). For the context of Niger, one innovation per year is reasonable.
D. The goal of their adoptions	• Earn money (save time) • To save money

DIGITAL PRESENCE	
A. Necessary tools	• Good Budget • The government help (to establish strong connectivity projects) People's education (courses on digitalization and tools management) • The internet connection • Collaborators comfortable with the tools • Software
B. The goal of their usage	• The productivity

PERFORMANCE	
A. Aspects determining performance	• The Profit / Turnover ratio • The time taken for a task to be carried out by the collaborators • The customer retention capacity
B. Rating the level of their achievements	• Excel tables: Daily schedules (employees); the tasks to be done in relation to each client with deadlines in the form of a diagram • Web software to manage tasks • The time taken to carry out the tasks • The quality of the finished work

PARTICIPANT 5. Interviewed on October 12 th, 2021.

INNOVATIVENESS	
A. Types of innovations	Product Innovation
B. What it consists of	Improvement into products features
C. The terms of their adoptions	Monthly
D. The goal of their adoptions	Not only about money, but also about aesthetics. Company needs to be pleasant through what it offers.

DIGITAL PRESENCE	
A. Necessary tools	Elements facilitating the interaction of company and clients (e.g., social media)
B. The goal of their usage	Improvement into activities and products

PERFORMANCE	
A. Aspects determining performance	• Creativity (new ideas) • Being update in processes
B. Rating the level of their achievements	the feedback of customers towards the company actions

PARTICIPANT 6. Interviewed on October 26 th, 2021.

INNOVATIVENESS	
A. Types of innovations	Product innovation Marketing Innovation Shipment process management
B. What it consists of	Developing new and problem-solving products is a huge resource for marketing. Not only making a new product, but also thinking and producing the product that solves the problem is of great importance in making the product salable. While the shipment processes are managed, the customer can be provided with great savings and time advantages. For this, close follow-up, professionalism and being a researcher are very important in international trade.
C. The terms of their adoptions	The manufacturer/seller must be sure before adopt innovation. It is imperative not to go into production without believing that it is an innovative product. In other words, the manufacturer should adopt it first, it is necessary to make sure that it produces a product that answers questions and solves problems, and it is necessary to conduct competitor analysis well. From this point on, adopting the potential customer and creating brand loyalty is another process. Issues such as after-sales support, logistics process management, packaging and customer relationship management are parts of a whole.
D. The goal of their adoptions	-

DIGITAL PRESENCE	
A. Necessary tools	This subject will be divided into two according to the experience of the marketing team. To outsource or not to... It is necessary to keep a record of the work done, to think about the long-term not instant needs, and to take videos and photography, considering that every work is a reference value. The way and time of their presentation is at least 50% important. I mean, we recorded it, we took the photo, it's not like let's share it. It is necessary to think carefully about when, with what design, and to whom we share. good designer good editor A competent staff is absolutely necessary to plan the short- and long-term marketing strategies. Or outsourcing the work with expert personnel who can fully control it.
B. The goal of their usage	• Increase sales • Increasing brand loyalty • Increasing Brand Awareness

PERFORMANCE	
A. Aspects determining performance	• Waste in production and perfect production rate. • Quality customer relationship management • Number and rate of staff truly committed to the firm
B. Rating the level of their achievements	• The number of permanent customers gained is one of the biggest indicators of success. • Personnel who are happy to work, personnel whose career goal is to move forward with the company in the same company are also a great indicator.

PARTICIPANT 7. Interviewed on December 30 th, 2021.

INNOVATIVENESS	
A. Types of innovations	Process Innovation
B. What it consists of	They consist the systems or way of doing business in the modern digital age. It involves looking at the business from the customers view rather than the business owner's view. Also analyzing all the customer touchpoints, simplifying and building better processes that will make every touch point experience a memorable one, from marketing engagement, sales, delivery to usage experience. Products can be the same but processes can always be different.
C. The terms of their adoptions	Every innovation trigger change (sometimes uncomfortable) so it's important to be implemented in phases. First is to find out the best possible way of running the business or the customer touchpoints and second is to use technology to automate this best way.
D. The goal of their adoptions	Using the SMART goals strategy, each phase of adopting the process innovation must be aligned to the strategy. The goals must be specific (new way of doing a process), it must be measurable, it must be attainable, it must be realistic and lastly time bound. In summary, the end goal is to have a unique and easy way of doing business or running the organization.

DIGITAL PRESENCE	
A. Necessary tools	Having a positive digital presence is very vital for the success of every organization in this digital age. This can be achieved by having a good digital Marketing strategy across all social media, having a good responsive website, online press releases, good SEO strategy etc.
B. The goal of their usage	The goals may vary based on the nature of the organization but some general goals might include; Communication, Marketing, Crises Management etc.

PERFORMANCE	
A. Aspects determining performance	The performance of organizations can be measured through customer's experience (satisfied, dissatisfied or wowed), staff engagement or commitment to the organization (they will be engaged if it's a positive performance and disengaged for negative ones). Also, it can be seen in the brand public good will and also the revenue.
B. Rating the level of their achievements	Achievements can be rated as poor, satisfactory, good and excellent.

PARTICIPANT 8. Interviewed on January 25 th, 2022

INNOVATIVENESS	
A. Types of innovations	Marketing Innovation. Talking about product innovation seems to be a repetition for me.
B. What it consists of	To adapt a new marketing policy to the resident market, depending on the situation in which you find yourself.
C. The terms of their adoptions	Adoption over 6 months (two quarters) including 3 months of trial phase, 1 month of positioning and 2 months of follow-up. It all depends on the field of activity but also on the market. We can compare the process to the cycle of the product, the only difference is that the decline section is replaced by the "follow-up": launch – positioning – follow-up.
D. The goal of their adoptions	The objective is to be able to enter a market already conquered by the competition, align yourself in the same way as the competition to see the possibilities and room for maneuver => make a turnover in the same way as the competition and oust it. In the case of a product that we innovate and place on the market, and which consumers do not know about => get them to consume the new product without rushing them.

DIGITAL PRESENCE	
A. Necessary tools	Internal and external management software, apps, social networks and websites.
B. The goal of their usage	The purpose for the company is to position itself in relation to the competition. For example, nowadays there are many developments in the field through examples such as e-tracking, e-recruitment, e-commerce. A structure that has a website is more than those that do not. The objective pursued by the structure is to position itself on the digital market differently by directly reaching the target.

PERFORMANCE	
A. Aspects determining performance	Human resources play an essential role, the strategy of the structure, the tools used and the positioning of the structure vis-à-vis the local market, diversification.
B. Rating the level of their achievements	Internally: Turnover, agent performance, quality management to improve procedures. Externally: brand image => notoriety.

PARTICIPANT 9. Interviewed on March 6 th, 2022

INNOVATIVENESS	
A. Types of innovations	Product, process and marketing Innovation
B. What it consists of	It consists of developing the available product, by including the human capital. Or just by supporting the existing product by another one (new)
C. The terms of their adoptions	It is not something predictable, it occurs in response to a given situation.
D. The goal of their adoptions	To satisfy the client (listening, anticipation of needs, consideration), for a substantial market share and increase in the profit.

DIGITAL PRESENCE	
A. Necessary tools	Mostly technology-based supports usage, first for the company (internally) thus for the clients.
B. The goal of their usage	The goal is to make the work easy for the personnel to be able to be productive. In our case, as informatics business, we need to be up to dated first to be able to convince our customers to purchase and guide them to use them efficiently.

PERFORMANCE	
A. Aspects determining performance	Sales rate and the team (agents) are the key performance of the business. For instance, as a focal point, the commercial and the technical services are the engines of the company and essential to run the business. If the services fail there will be no sales and without sales there will be no income.
B. Rating the level of their achievements	It is mostly done based on the given goal which can be trimestral, semestrial or even yearly. Let's say that the sales and related campaigns are run through social networks. To be able to evaluate them, we just need to run a diagnosis using the available tools such as the number of visits to the page and decision-making (e.g. Facebook) to check out from which region, which gender visited my page then took action to check my website to purchase or reshare the products. Talking about the agents, the rating can be done by comparing achievements and assigned objectives.

PARTICIPANT 10. Interviewed on March 9 th, 2022

INNOVATIVENESS	
E. Types of innovations	Product Innovation. Would like to talk about process innovation but its more happening in the back office, not seen by the client.
F. What it consists of	To develop a product by giving it enough characteristics which will make it able to sell itself
G. The terms of their adoptions	When the product come to decline (no exact period).
H. The goal of their adoptions	The objective is to be able to increase productivity and market share, meet emerging and growing customer demands

DIGITAL PRESENCE	
C. Necessary tools	Mostly social networks such as whatsapp, facebook, Instagram… Other elements like mailing and blogging are not that attractive in some markets, especially in countries like mine (Niger).
D. The goal of their usage	The goal is to mainly to gain visibility on these networks. It is about time saving too: for example, if I have products to sell, it is quite easy for me to share the characteristics and prototypes of the products without meeting physically with the potential buyer. It is also about permanent contact and loyalty development: being permanently in touch with the audience by managing their requests, sharing news and solving issues will create a trust between us thus loyalty.

PERFORMANCE	
C. Aspects determining performance	The aspects which determine performance can be these as follow: Market share, notoriety, turnover, ability to innovate, profitability…
D. Rating the level of their achievements	Rating is something subjective to each business and might differ from company to company, based on their goals or/and sector. It is mostly done with internal measurement tools such as dashboards or other technology such as software.

Outcomes summary table

Participants	INNOVATIVENESS	GOAL	DIGITAL PRESENCE	GOAL	FIRM PERFORMANCE	LEVEL RATING
P1	Marketing innovation	* Income * Customer portfolio increase * Product diversification	Phygital and software technology usage	Customer needs tracking, for tailormade offers.	* Complaints, … management * Acquisition volume, turnover, used source evaluation	It's done periodically <8semestrial) to evaluate best indicator.
P2	Marketing, Product & Process innovation	For turnover increase, sustainability, long term investment, environmental and social impacts	Software package, social networks and internet	Time-saving, competitivity, money saving, charges reduction.	Growth (turnover, profit), objectives achievement	Establishment of provisional plans and Usage of dashboard for evaluation (weekly, monthly
P3	Marketing & Product innovation	Popularity, prospection & information gathering, community building, information (buzz or bad) management,	Social networks, websites, mobile apps	Make the company known and show its expertise	Product / service quality, interaction with customer,	By the used of company's own measurement tools, external tools (audience rate, etc.…)
P4	Marketing, Product, Incremental & Frugal innovation	Earn money and time, Save time	Internet, Software	Be more productive	The profit / Turnover ratio, Time management while running a task, customer retention capacity	Checking daily schedules through traditional (excel) and software-based tools, the quality of finished work
P5	Product innovation	Products aesthetics	Social media	Activities and products improvement	Creativity, processes updates	Customers' feedback

Outcomes summary table (continuous)

P6	Product and Marketing innovation; Process management	Great savings (money and time), problem solving	Display management	Sales increase, brand loyalty and awareness	Production rate, customer relationship quality, quality of the company stuff	Customer portfolio (gained customer), the staff commitment to work
P7	Process innovation	Unique and easy way of doing business or running the organization	Social media, responsive website, digital marketing tools usage	Communication, marketing and crisis management	Customers' experience, staff engagement or commitment to the organization, brand public goodwill, revenue	By rating the aspects through poor, satisfactory, good and excellent
P8	Marketing innovation	Market penetration, align in the market at the competitors' level to make good turnover, product push strategy to make prospects be aware and consume	Software, apps, social networks and websites	To get a different position in the market compare to competitors, reaching directly the direct in an efficient way	Diversification	Turnover, worker performance, notoriety
P9	Product, process and marketing innovation	Client satisfaction, substantial market share and high profit	Technology-based supports	Make the work easy (internally), show off (externally) and increase the sales	Sales rate and workers performance	By diagnosis through canal (for sales) and for workers through achievements and assigned objectives
P10	Product innovation	Increase productivity to meet customer demand, market share	Social Networks	Gain visibility, time saving	Market share, notoriety, turnover, ability to innovate, profitability	Internally used dashboard and software technology

Appendix 3: List of respondents' country sources

Country	Information Sources			
	Professional Website	**Official Institution**	**Social Network Chanel**	**Third party support**
Burkina Faso	https://www.scribd.com	Chambre de Commerce et d'Industrie du Burkina Faso / Annuaires d'entreprises	LinkedIn	Business coordinators in Turkiye International Forums
Mali	https://www.afristat.org/contenu/pays	Direction Nationale des Industries	Facebook	-
Niger	https://www.goafricaonline.com/ne https://www.mde.ne/annonces-lgales	Maison de L'Entreprise / Annonces Légales	LinkedIn / Facebook	SMEs and Startups association Leader Agribusiness cooperative chiefs
Ivory Coast	https://www.annuaireci.com/cote-divoire/en https://www.sikafinance.com/	Agence Côte-d'Ivoire pme / pme.gouv.ci	LinkedIn	International exhibition
Ghana	https://www.ghanayello.com/	Ghana National Chamber of Commerce and Industry - Accra Branch Listings	LinkedIn	-
Nigeria	https://www.top50brandsnigeria.com/ https://www.dayoadetiloye.com/	-	LinkedIn	Fintech company COO for linking to other respondents
Senegal	www.senegalcommerce.sec.gouv.sn https://www.industrie.gouv.sn/	Portail d'Informations Commerciales du Sénégal / Entreprises certifiées au Sénégal	LinkedIn / Facebook	International exhibition

Appendix 4: Online (Google Form) Data Collection Message

Dear Participant,

I would like to invite you to participate in a survey on the effectiveness of a new intervention for doctorate thesis research titled "The Relationship Between Digital Presence, Innovation and Performance: How Businesses in Sub-Saharan Africa Interact with Digital and What is the impact on Their Performance?". This study is being conducted at Anadolu University Graduate School of Social Sciences, Marketing Doctorate Program.

The business owner, senior manager, marketing manager, or any collaborator thought to be the most appropriate to answer can respond to the survey. The participation in the study is voluntary and will involve respondents from different sectors in different countries. Accordingly, your opinion is really necessary and will be useful to portray in the best way the activities of companies in this region. The survey scope focuses on evaluating the ability of understanding and responding to questions of each section and is to be filled digitally through an online google form (link as per below).

https://forms.gle/YEZ4y6FzTbeB8Ugq8

Thank you for your time and consideration.

Mahamane Sani MAMADOU YACOUBA.

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Appendix 5: **Questionnaire (Final Form)**

A. INNOVATIVENESS

I. PROCESS INNOVATION

Please indicate your level of agreement with the following statements for your company.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. We adapt to different product/service processes to meet customer needs	5	4	3	2	1
b. Our company has developed many new management approaches to serve customers faster and better	5	4	3	2	1
c. Our future investments in new product/service process are significant compared with our annual turnover	5	4	3	2	1
d. Our company changes product/service process at a great speed	5	4	3	2	1

II. PRODUCT INNOVATION

Please indicate your level of agreement with the following statements for your company.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. Our product(s)/service(s) are novel in the market	5	4	3	2	1
b. We are offering new ideas in market	5	4	3	2	1
c. We develop creative product(s)/service(s)	5	4	3	2	1
d. Our product(s)/service(s) offer new benefit	5	4	3	2	1
e. Our product(s)/service(s) show an unconventional way of solving problems	5	4	3	2	1
f. Our product(s)/service(s) introduced many completely new features to the market	5	4	3	2	1

III. MARKETING INNOVATION

Please indicate your level of agreement with the following statements for your company.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. We renew the design of the current and/or new product(s) through changes in appearance, packaging, shape and volume without changing their basic technical and functional features	5	4	3	2	1
b. We renew the distribution channels	5	4	3	2	1
c. We renew the product promotion techniques employed for the promotion of the current and/or new product(s)/service(s)	5	4	3	2	1
d. We renew the product pricing techniques employed for the pricing of the current and/or new product(s)/service(s)	5	4	3	2	1

B. DIGITAL PRESENCE

1. Please indicate your level of agreement with the following statements for your company.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. We aim to digitalize everything that can be digitalized	5	4	3	2	1
b. We collect large amounts of data from different sources	5	4	3	2	1
c. We aim to create stronger networks between the different business processes and digital technologies	5	4	3	2	1
d. We aim to enhance an efficient customer interface with digitalization	5	4	3	2	1
e. We aim to achieve information exchange by digitalization	5	4	3	2	1

2. Please identify to what extent your company use the tools below

* Phygital technology = Interconnected device used to facilitate interaction between customer and the business using digital technology (e.g. information and payment terminals, QR codes, …)

	Always	Often	Sometimes	Rarely	Never
a. Company website	5	4	3	2	1
b. Software	5	4	3	2	1
c. E-mail	5	4	3	2	1
d. Social media	5	4	3	2	1
e. Payment systems	5	4	3	2	1
f. Mobile applications	5	4	3	2	1
g. Marketplaces	5	4	3	2	1
h. SMS, MMS	5	4	3	2	1
i. Blogs, Podcasts	5	4	3	2	1
j. Push notification	5	4	3	2	1
k. Phygital technology	5	4	3	2	1
l. Others (Please specify)	5	4	3	2	1

3. **Please indicate who is in charge of developing and managing the previously stated tools. You can skip the tools that are not used in your company.**

	Company website	Software	E-mail	Social media	Payment systems	Mobile applications	Marketplaces	SMS, MMS	Blogs, Podcasts	Push notifications	Phygital technology
a. Internal (Managed by company itself)											
b. Outsourced (Managed by external professionals)											
c. Both (internal and outsourced)											

4. **Please link the following purposes to their corresponding tools. You can link the purpose to more than one technology tool.**

	Company website	Software	E-mail	Social media	Payment systems	Mobile applications	Marketplaces	SMS, MMS	Blogs, Podcasts	Push notifications	Phygital technology
a. For facilitating tasks											
b. For company introduction and its products/services promotion											
c. For interacting with audience											
d. For data gathering											
e. Other (Please specify)											

C. FIRM PERFORMANCE

I. FINANCIAL PERFORMANCE

Please indicate your level of agreement with the following statements about the financial performance of your company for the past five years.

***The Return on Sales (ROS): indicate how efficiently a business transforms sales into profits, with the formula **"ROS = total profits (before taxes and interest are deducted) / total sales".**

****The return on Investment (ROI): a calculation of the monetary value of an investment versus its cost; with the formula **"ROI = Net income (profit minus cost) / Cost of investment x 100".**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. Our company has achieved a high level of return on sales* with current customers	5	4	3	2	1
b. Our company has achieved a high level of return on sales* with new customers	5	4	3	2	1
c. Our company has increased its market share	5	4	3	2	1
d. Our company has achieved a high level of return on investment**	5	4	3	2	1
e. Our company has achieved an increasing profitability	5	4	3	2	1

II. NON-FINANCIAL PERFORMANCE

Please indicate your level of agreement with the following statements about the non-financial performance of your company for the past five years.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. Our company has shown much better performance in employee satisfaction	5	4	3	2	1
b. Our company has shown much better performance in customer satisfaction	5	4	3	2	1
c. Our company has shown much better performance in customer loyalty	5	4	3	2	1
d. Our company has shown much better performance in service quality	5	4	3	2	1

D. GENERAL INFORMATION

I. Please indicate the country your company is established in

……

II. Please indicate your company size

[ ] Micro enterprise (0 – 9 employees) [ ] Small enterprise (10 – 49 employees)

[ ] Medium-sized enterprise (50 – 249 employees) [ ] Large enterprise (250+ employees)

III. Please indicate your company's age (e.g. the year it was founded)

……

IV. Please indicate your qualification (respondent's department & position title)

……

V. Please indicate the industry your company operates in

……

Thank you for your participation. We are extremely grateful for your contribution, your valuable time and your honest information.

Appendix 6: Resume

MAMADOU YACOUBA Mahamane Sani