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Economic Role of Mobile Economy; A Case of Northern America

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Abstract: ***The concept of a digital economy has become a common term that describes how digital technology is modifying production and consumption patterns. Although the geographical emphasis of the digital economy was originally in developed economies, its impact has a global effect, and it is also increasingly affecting developing countries in a variety of ways. Therefore, the analysis of the digital economy requires serious concentration on its development dimensions. This article dealt with creating and acquiring value in the digital economy. Driven by the integration of many technical, commercial, and geographical factors, mobile phone companies adopt a new architecture based on network design rules for virtualization, cloud computing, and network automation.***

Keywords: Mobile Technology, Mobile Economy, Development, Digitalization, North America

1. Introduction

Due to the rapid development and elevating utilization of information and communication technology (ICT). Even though the speed of digital transformation differs, all countries are impacted. This is of great importance for implementing the 2030 Sustainable Development Agenda and bringing great opportunities and challenges to developing countries. Recently, one of the exciting attributes has been the exponential development of legible information or digital data on the Internet. This includes the growth of big data analytics, artificial intelligence (AI), cloud computing, and new business models (digital platforms). As other devices are connected to the Internet, more people use digital services, and more value chains are connected digitally, the contribution of digital data and technology will elevate even further. As a result, the ability to capture data and turn it into digital intelligence has become critical to the competitiveness of firms. As operations become digitalized and utilize ancillary services that need data, including transport and logistics, retail distribution, and finance, manufacturers and exporters are progressively relying on data analytics.

It is more difficult to measure the digital economy and the digital economy outside the digital industry. The impact of digital technology use can be due to spillover impacts, and imperceptible results (including business flexibility, management methods, or productivity) are further dependent on other factors[1]. Some research has used surveys and data on e-commerce by measuring the impact of information and communication technology / the digital sector on the economy [2, 3], or by examining geographical changes in global data and knowledge [4, 5]. Due to methodological confronts and the lack of reliable statistics, these methods often face limitations. The proposed definition of a digital economy is often entirely associated with the aforementioned factors. One approach is widely consistent with many other studies [2]is the conceptualization of a digital economy presented by Bukht and Heeks [6]: The part that comes out is entirely or mainly from digital technology with a business model based on digital products or services. Another strategy is to look at the digital economy, which covers all the digital technology approaches to the economy [7]. Knickrehm et al. [8] define the basis of the digital economy further and hold that it is: "The contribution of total economic output from the large and wide range of 'digital' inputs. This digital input encompasses digital competencies, digital devices (hardware, software, and communication equipment), and digital intermediate products and services used in manufacturing". Such large-scale operations reflect the foundations of the digital economy."

Given that this article emphasizes value creation and acquisition, it focuses on the procedures and modifications of the digital (or overall) economy, not the results of operations. This affects the types of policies related to the functioning of the digital economy (rather than the necessary circumstances for such an economy). While there is a need to focus on specific technologies, there is also a need to emphasizewider developments such as deployment, digital data, and e-commerce. This helps to analyze changes in the digital economy simultaneously and recognize that such changes can take place in different ways. The above definitions emphasize other priorities: cutting-edge digital activities or more comprehensive economic digitalization. In discussions regarding the dynamic digital economy, "digital infrastructure" is often referred to, and this notion still lacks a general conceptualization. It can be beneficial to undertakevarious stages of digital infrastructure: (i) ICT networks (connected to digital infrastructure), (ii) data infrastructure (data centers, submarine cables, and cloud infrastructure); (iii) digital platforms; and (iv) digital equipment and applications. Some professionalsfurther use the data itself as an element of digital infrastructure. In the case of digital platforms, although they are not just infrastructure, they also integrate infrastructure — by linking two or more market segments. In addition, at zero level, energy infrastructure is essential for digital infrastructure, because this technology requires electricity to operate. In this contextual article, this broad and flexible approach applies to the utilization of the term 'digital infrastructure'.

The concept of a digital economy has become a common term that describes how digital technology is modifying production and consumption patterns. Although the geographical emphasis of the digital economy was originally in developed economies, its impact has a global effect, and it is also increasingly affecting developing countries in a variety of ways. Therefore, the analysis of the digital economy requires serious concentration on its development dimensions. This article dealt with creating and acquiring value in the digital economy. To date, most of the discussion about digitalization and development has focused on the level to which economies can afford different technologies and whether these technologies are utilized. This article aims to go a step further and discuss the scope of value creation and acquisition. Particular attention is paid to how data-driven economic activities may influence developing countries and business models (mainly digital systems) and strengthening their role as producers and entrepreneurs in this changing economic landscape.

2. Methodology

The data and evidence presented in this article were gathered through a rapid desk-based research. A total of five journals were detected as the most authentic to information and communication technology for mobile economy literature. These journals include "Information Technologies & International Development", "The Electronic Journal of Information Systems in Developing Countries", "Information Technology for Development", and "Asian Journal of Communication". The following search terms were used: "Mobile AND North America", "App AND North America", "Digitalization AND North America", "Mobile Economy AND North America". The search of these ICT emphasized journals was facilitated by internet search and adequate key words and search terms. Recommendations and contributions were presented based on a number of professionals in the field.

3. Results / Discussion

5G: prospects remain strong in North America

North America is a world leader in 5G network setup, application development, and marketing. Operators continue to work with other 5G stakeholders, including companies, equipment suppliers, universities, and municipalities, to develop 5G applications in many industries. Due to the advent of the 5G-enabled iPhone 12 and the relaxation of the barrier, the consumer sector is seeing an increase in 5G recording, leading to people returning to cities to work, entertainment, and other social activities [9]. For example, Verizon has reported that by the end of June 2021, the share of 5G-enabled devices in its mobile network had risen to about one-fifth of the total number of connections. For most consumers, increased broadband connections are still the primary use case for 5G [10]. However, the demand for comprehensive content continues to grow, using high bandwidth and low 5G secrecy to provide consumers with a better experience. Although the provision of eMBB in the consumer market has always been the core of the first 5G distribution, given the number of digital transformation projects underway in different industries, B2B is the most significant incremental opportunity in the 5G era [11]. Most business opportunities for operators will depend on the 5G SA network set up. This has happened all over North America, and T-Mobile US has become the first operator globally to launch a 5G SA network nationwide in August 2020. Other regional operators are expected to take similar action by 2021 and 2022 [12]. 5G SA enables the network to disconnect the underlying service connection to LTE and introduce many enhanced features. The result is an improved ability to support IoT (typing), Internet formatting, and URLLC usage cases while providing simplified network architecture and subsequent cost optimization. These features are necessary for expanding IoT services in 5G times.

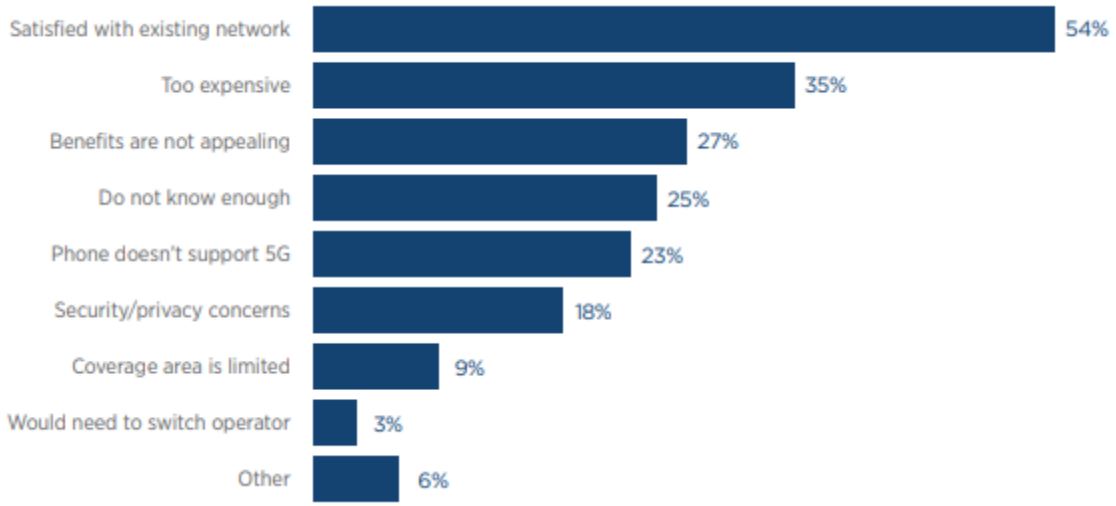

Figure 1: 5G Barriers in North America

To date, most 5G worldwide have relied on the 3.5 GHz spectrum, with very few exceptions. But the United States is one of those exceptions. Its first commercial 5G network was launched using a millimeter waveband (24 GHz and above) [13]. Today, the US market is a world leader in using 5G millimeter wave spectrum. With the support of the Federal Communications Commission (FCC), the millimeter-wave spectrum was used for mobile phone

services earlier than most countries. US operators plan to expand their millimeter range by 2021 and beyond. In March 2021, Verizon announced plans to build another 14,000-millimeter-wave zone by the end of 2021, while AT&T announced plans to expand its millimeter-wave system to 40 cities and 40 locations, including airports in partnership with Boingo [14]. US Cellular and C Spire are also weighing millimeter waveforms. In addition, in a recent millimeter-wave FWA experiment, US Cellular achieved a continuous average download speed of 1 Gbps within 7 kilometers. C Spire is testing the 28 and 60 GHz frequency spectrum for FWA use.

Figure 2: Revenue generation and customer experience in North America

Telco of the future: operators accelerate network transformation strategies

With the marketing of 5G and the introduction of innovations for mobile networks such as the open RAN, the brown network, and the automation of the web, we are beginning to see what future telecommunications companies will look alike [15]. As a result, operators' decisions about network conversion methods are now more critical than ever. Such decisions are very important for operators, network providers, and customers who rely on future networks. In North America, customer revenue and experience are driven by operators' network transformation efforts, and there are fewer problems with cost reduction [16]. This is in stark contrast to other sophisticated areas such as Europe, where operators view customer experience, operating expenses savings, and new revenue as almost as essential priorities. Compared to their European counterparts, North American companies are four times more likely to view revenue-oriented activities as their main strategic goals for network transformation. As in other areas, wide-area deployment is a priority for 5G RAN investment [17]. North American operators invest heavily to ensure widespread deployment, which is necessary to provide 5G to as many potential users as possible. In the United States, the 5G networks of AT&T, T-Mobile US, and Verizon each reach over 230 million people. In the coming years, the operator's first task is to deploy the C-band spectrum to provide higher 5G speeds and capabilities in more locations [18].

However, operators are still waiting for this spectrum to be refined. Open RAN has also become a top RAN priority for operators in North America: only in Latin America is Open RAN higher in the 5G investment priorities. Open RAN is a desirable option for Greenfield operators because it can avoid the challenges of integrating open technology across traditional networks [19]. In the United States, Dish Network, a new entrant for mobile phones, has formed a strategic partnership with AWS to build a cloud-based 5G open RAN. The growing influence of US open-source RAN manufacturers (such as Altiostar, Mavenir, and Parallel Wireless) has also stimulated interest in open source RAN in North America. These companies announced major customer acquisitions in 2021 because they will continue to support available RAN distribution worldwide. In the core network, virtualization investment is a priority. Over the years, operators have turned to virtual core operations. It is evident from the start that this would be a long road trip. However, 5G is another opportunity to drive this transformation. This is important because operators have not yet fully realized the benefits promised by virtualization, such as reducing costs and accelerating service innovation. Closer collaboration with cloud companies could help change this.

IoT: Covid-19 drives enterprise digitization

Covid-19 has caused significant damage to the IoT market by 2020, mainly due to the economic uncertainty caused by the pandemic, which has led to IoT projects being shelved or postponed. The total number of US companies that have started but not completed their IoT projects (including proof of concept (POC)) increased from 8% in 2019 to 17% in 2020 [20]. The pandemic has increased the urgency for many companies to digitalize their businesses because they will increase productivity and efficiency, which will increase the implementation of technologies such as the Internet of Things, artificial intelligence, and 5G. According to the GSMA Intelligence Enterprise in Focus Survey 2020, these US companies with existing IoT projects are investing more than before: only 10% of companies that have used IoT solutions said they have no further IoT planned in 2019 [21]. The urgency of using IoT is still high. In the United States, about two-fifths of companies plan to apply IoT within one year, and one-fifth of companies plan to apply within two years. 6 Despite this, some companies are still reluctant to use the Internet of Things for a short time, which shows that the plan is more cautious and lacks the confidence to get back to normal soon. IoT setup, integration, security, and cost continue to address challenges that may further drive demand.

Figure 3: Expansion of the mobile ecosystem in North America

Covid-19 has affected almost every industry, especially the healthcare industry. In the context of increasing demand and demands for social distance, healthcare providers are relying

more on digital technology than ever before to strengthen the provision of services and improve the efficiency of medical supplies. The Internet of Things provides consumers and businesses with many digital healthcare products and solutions and new ways to treat patients remotely. Mobile phone companies play a vital role in the introduction of new technology. In Canada, for example, Telus enables healthcare professionals to monitor and support patients virtually through the home health monitoring solution. In addition, the pandemic is reshaping cities and boosting interest in new technologies, including video surveillance systems, remote property monitoring, and contactless delivery. North American operators are establishing new markets, partnerships, and ecosystems to seize these opportunities. For example, AT&T and JBG Smith collaborate to create the first "large-scale" 5G smart city in the United States. As the chosen city in Northern Virginia has become the center of the defense and cyber security industry, both parties believe that this new initiative will be a springboard for further innovation in smart cities. The manufacturing industry has also renewed interest in IoT solutions to increase the supply chain's resilience and increase the speed and flexibility of production. During the pandemic, factories had to adjust production levels to meet demand using digital tools such as the cloud, the Internet of Things, and analytics. To support digitalization, the number of smart IoT connection manufacturers in North America is expected to triple from 2020 to 2025, reaching 306 million, rapid growth among all IoT vertical companies.

Mobile's contribution to economic growth

By 2020, mobile technology and services accounted for 4.4% of North America's GDP and contributed approximately $ 1 trillion in economic value. The mobile ecosystem also supports more than 2.1 million jobs (direct and indirect) and has contributed heavily to public funding, and has raised more than $ 100 billion through taxation in the sector. In 2025, the contribution of mobile phones will increase by 100 billion US dollars (almost 1.1 trillion US dollars), as countries in the region will increasingly benefit from increased productivity and efficiency due to the increased use of mobile phone services.

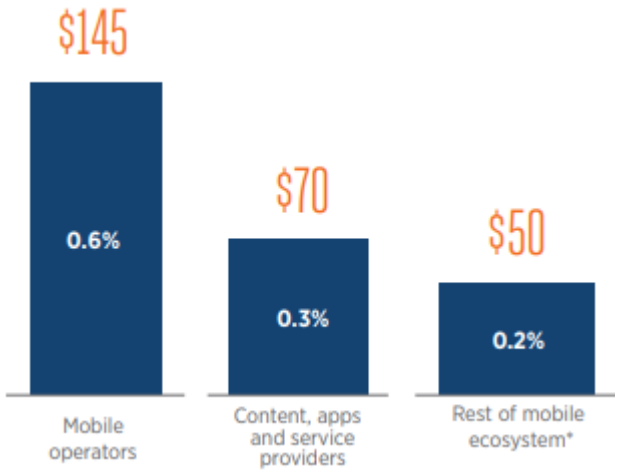

Figure 4: The North America mobile ecosystem

Designing effective spectrum policy

The speed, scope, and quality of 5G services depend on whether the government and regulators support timely access to the appropriate quantity and the making of the spectrum at an affordable price in the proper circumstances. To fully realize the potential of 5G, the use of the IF spectrum is essential because it balances the scope and capabilities critical to the success of 5G. Revenue from the US auction of interconnection (3.7-3.98 GHz) underscores this demand. It exceeded all price forecasts and cost 81 billion US dollars. This price reflects the high demand for mid-range spectrum and reflects the specific market conditions in the United States. Only 280 MHz of spectrum will be available at auction, and no more IF range will be available anytime soon, especially as the 6 GHz band is now open for unauthorized use. The United States is not the only country where the lack of available IF spectrum has a negative effect on prices, which affects the potential of 5G. The resulting investment can also impose short-term restrictions on operators because they want to invest in mobile network upgrades. Some operators have already borrowed money to support this spectrum acquisition. Some companies have also announced ambitious distribution targets to ensure a faster return on investment. On the positive side, this could encourage other governments to speed up the release of the 5G spectrum. The price paid in the auction is ultimately 3.5 times higher than the Citizen Broadband Radio Service (CBRS) intermediate frequency auction (3.55–3.7 GHz), which underlines the potential of the licensing spectrum compared to the sharing method offered by CBRS.

4. Conclusion

Driven by the integration of many technical, commercial, and geographical factors, mobile phone companies adopt a new architecture based on network design rules for virtualization, cloud computing, and network automation. As they adopt new technologies to optimize their systems, operators also support the transition to an open interface in the Radio Access Network (RAN). The opening of unique components and interfaces in RAN will diversify the network equipment and software ecosystem, bring in new resellers and increase market competition. Breaking down the RAN will create new distribution scenarios, stimulate innovation, promote the integration of local devices, improve security transparency and minimize the risks the industry faces when expanding its network in the future.

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Author Profile

Wessam is a veteran C-suite professional with a particular focus on innovation disruption and Ecosystem design. Her name shaped as internationally recognized thought leader and trusted advisor in developing technology modern strategies and breaking through innovation marketspace. Her passion with strategy and innovation enabled her to develop a strong track record as an innovation catalyst for Fintech, Mobile money, Innovation Disruption Strategies within MNOs ,banks, governments and academic institutions as France telecom, Etisalat Holding and Smart government UAE. She is a founder and CEO of Addengreens international corporate which developed the first Innovation Disruptors Academy attached with a specialized innovation center for the new digital age of innovative financial services and technological sphere.

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