TECHNOLOGY SERVOCE PROVIDERS OF KENYA

THE KENYA DATA MARKET
A BASELINE STUDY

NOVEMBER 2022

POLICY BRIEF

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1 Executive Summary

The Financial Times [1], published the 2022 list of the fastest growing companies in Africa. In the top ten list, three are from Kenya and five from Nigeria. The three Kenyan Companies listed, namely Wasoko.com, founded in 2016, Flocash.com founded in 2013 and Lorisystems.com founded in 2017 posted revenues of USD 27million, 6.4million and 25 million respectively for the year 2020.

These fastest growing companies all have one thing in common - they are simply digital platforms matching two previously unconnected market segments over the internet. Wasoko connects thousands of small scale retail merchants (Kiosks) to bulk inventory suppliers cutting out the middleman. Flocash is a payment gateway that aggregates payment methods and integrates or connects them to merchants across borders facilitating crossborder payments. Lorisysems aggregates cargo or goods needing shipping and matches them to prospective transporters through digital platforms.

In all cases, none of the digital platform owners actually owns any of the heavy assets needed within their respective value chain. They simply make the digital connection to exchange insightful data and charge some commission on each transaction completed. This study aimed to understand the characteristics of these digital platforms and data markets such as their multi-sided market structure, their cyclic production nature, their network effects and economies of scale and how this positions them to be experience exponential growth, in a relatively small span of time.

Additionally, the study looks at how these new digital platforms and services are challenging the prevailing regulatory, tax regimes and market structures. It then identified and mapped out the key actors, their digital platforms, services as classified under the following UNCTAD [United Nations Conference on Trade and Development, 2019] digital platform categories:

- **Social Network or Advertisement Platforms:**– they extract information on users, analyze it and sell the data insights as targeted Ad space.
- **e-Commerce Platforms:**- these are incumbent or third party companies offering digital exchange platforms for goods and services
- **Gig-economy Platforms:**-they connect demand for a service to various suppliers. Common example being the online taxis (Uber, LittleCab) but service demand can include accommodation (AirBnB) or DomesticWorker services (SweepSouth.com)
- **Cloud (Data Center) Platforms:**-they make, own and rent out ICT hardware and software infrastructure for clients on an "as needed" basis, enabling enterprises to outsource and cut down on ICT costs.
- **Innovation Platforms:**- they serve as a foundation upon which other firms develop complementary technologies, products or services. Android, Apple, Microsoft operating systems are the best examples.
- **Product Platforms**:-they generate revenue by transforming a traditional good into a service, then collect rent or subscription fees on the product. For example the Rolls-Royce Jet Engine division no longer sells jet-engines but rents them out while retaining access to massive realtime datasets arising from the jet-engines in use across different airlines. They therefore sell 'Thrust-as-a-Service'
- **Integrated Platforms:** they combine advertisement, transnational and innovation platform features

The study identified and reviewed the policy and regulatory challenges that digital platforms and markets presents in terms of their impacts on existing and proposed taxation, data privacy, communications, financial and other regulatory regimes.

Given the many dimensions and characteristics that the digital platforms and data market presents, it is evident that that no single 'sector-specific' regulatory agency can unilaterally and adequately address these emerging cross cutting, risks, opportunities, tax and regulatory challenges. It therefore proposed that a joint, collaborative regulatory framework (ITU, 2022)[2] is implemented

[1] Financial Times, Africa's Fastest Growing Companies, https://www.ft.com/africas-fastest-growing-companies, accessed June 2022

[2] ITU, 5th Generation Regulatory Frameworks, https://app.gen5.digital/benchmark/about assessed June 2022

through MoUs to tackle these challenges. The joint initiative should adopt a supportive attitude towards ensuring that Kenyan digital startups and actors grow to become global leaders within their respective sector-specific platform categories, particularly in our strong domains of Agriculture, Tourism and Fintechs.

The study noted that Kenya currently lacks a comprehensive measurement framework for its emerging data markets. It therefore proposes a measurement framework for monitoring the Kenyan digital platforms, data markets and data economy. The measurement framework is adopted from the EU Data Market Study [3] and entails monitoring and measuring six data market indicators under the three broad dimensions of:

- **Workforce Skills Dimension:**-which measures the size of data professionals and the data skills gaps.
- **Supply & Demand Dimension**:- which measures the number of data supplier companies as well as the number of data user companies.
- **Business & Economy Dimension**: - which measures the revenue size of data supplier companies, the value of the data market and its wider impact on the overal GDP.

In line with this strategic objective, it is recommended that the envisioned 'Council of the Future' created by the National ICT Policy (2019) be activated to put together the National AI and Data Strategy and oversee the implementation of the corresponding measurement framework, similar to what other countries [4] [5] [6]have put in place. The National AI and Data Strategy would complement the existing National ICT Digital Master Plan, National Digital Economy Blueprint and the National Broadband Strategy. Additionally, this can also be tasked with coordinating the development and collection of data market metrics by the various and existing government agencies.

2 Introduction/Background

Kenya has made significant progress in matters ICTs. Several global reports (ITU [7], UN [8] etc) place Kenya as having one of the most sophisticated and developed ICT sectors in Africa. Kenya continuous to provide leadership in the region by being the first to publish and enact various ICT related policy, legal and regulatory frameworks such as the National ICT Policy (2006; rev 2019), Kenya Information and Communication Act (now under review), Computer Misuse and Cyber Crime Act (2018), the Data Protection Act (2019) amongst others. Additionally, it has comprehensive ICT related national strategies including but not limited to the Blockchain and AI Report (2018), the National Broadband Strategy (2020), the Digital Economic Blueprint (2019), the national Digital Master Plan (2022) amongst others.

Despite all these developments that sets Kenya on a path towards a digital economy, Kenya is yet to refine its ICT sector related performance indicators to better reflect and measure the projected digital and data markets. Most ICT sector statistics including those from Communication Authority (CA Quarterly Sector Statistics) the Kenya National Bureau of Statistics (KNBS Annual Economic Survey), KIPPRA economic reports amongst others remain heavily focused on the traditional or core aspect of the ICT sector.

Whereas the traditional ICT sector that is centered around Telecommunications, Broadcasting and Information Technology continuous to play an important role in the Kenyan economy, new data-driven digital services have emerged that need to be equally tracked and measured in order to provide evidence-based policy decisions. Some agencies such as Kenya Revenue Authority have

[3]EU Data Market Study https://datalandscape.eu/study-reports/final-study-report-european-data-market-monitoring-tool-key-facts-figures-first-policy, accessed June 2022

[4]UK National Data Strategy, https://www.gov.uk/government/publications/uk-national-data-strategy, accessed June 2022

[5]EU Data Strategy, https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy$_e n, assessed June$2022

[6]SA, Data and Cloud Policy, https://www.gov.za/sites/default/files/gcis$_d ocument/202104/44389 gon$206.$pdf, accessed June$2022

[7]ITU, Digital Development Dashboard, https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx, accessed June 2022

[8]UN, eGovernment Development Index, Accessed June 2022

already effected tax regimes based on such data-driven digital services under its Kenya Digital Services Tax Act (2021)[9].

This baseline study aims to provide a common understanding of what exactly is a data-driven digital service, what is the data market, its size, its key actors and and how it relates to the digital economy. It also seeks to demystify the nature, structure, pricing and role of digital platforms as a key driver of the digital and data economy and provides regulatory recommendations on how digital platforms could be harnessed and managed.

Specifically, the study seeks to answer the following research questions:

1. The Digital Economy, Digital Platforms and Data Market:- What are the common definitions and concepts?
2. Digital Platforms: - what are their structure, characteristics and classification (taxonomy)?
3. The Kenyan Data Market Ecosystem -who are the key actors, data companies, their data platforms and services?
4. Measuring the Data Market: - What are the key dimensions, indicators and how can they can be measured?
5. Data Markets and Digital Platforms: - the risks and challenges
6. Policy Implications:-how can the various regulatory agencies (CA, KRA, CBK, Data Commissioner, etc) collaboratively manage the emerging data market and the corresponding digital economy?

The rest of the study report is structured along the above research questions.

3 The Digital Economy, Digital Platforms and Data Markets - Definitions and Concepts

UNCTAD [United Nations Conference on Trade and Development, 2019] states that we are only at the early stages of digitalization and therefore the terminologies such as digital economy, data economy, data markets and several other related economic terms will lack globally accepted definitions. This means that there may be many interpretations of the same term in the relevant literature and analyses, as well as in different forums. This is due to the novelty and the lack of sufficient understanding or clarity regarding the emerging digital economy phenomenon.

However, several definitions for the digital economies has been offered such as from the Oxford University Press (2017) which defined Digital Economy as "An economy which functions primarily by means of digital technology, especially electronic transactions made using the Internet".

The G20 (2016) defined the Digital Economy as:

"...a broad range of economic activities that include using digitized information and knowledge as the key factor of production, modern information networks as an important activity space, and the effective use of information and communication technology (ICT) as an important driver of productivity growth and economic structural optimization".

3.1 The Digital Economy Scope - Core, Narrow and Broader Digital Economy

[Bukht and Heeks, 2018] categorised the digital economy into three 'SCOPE' components: The **Core-scope** digital economy, The **Narrow-scope** digital economy and the **Broader-scope** digital economy as shown below.

The **Core-scope digital economy** relates to the traditional ICT economy that includes Hardware manufacturing, Software and IT consulting as well as the Telecommunication sector. Essentially the core or foundational aspects of the digital economy comprise of fundamental innovations such as semiconductors and processors, the core devices such as computers,mobile phones telecommunication hardware and enabling infrastructures such as the Internet and telecoms networks.

[9]Digital Service Tax, https://kra.go.ke/images/publications/Brochure-Digital-Service-Tax-Website.pdf accessed June 2022

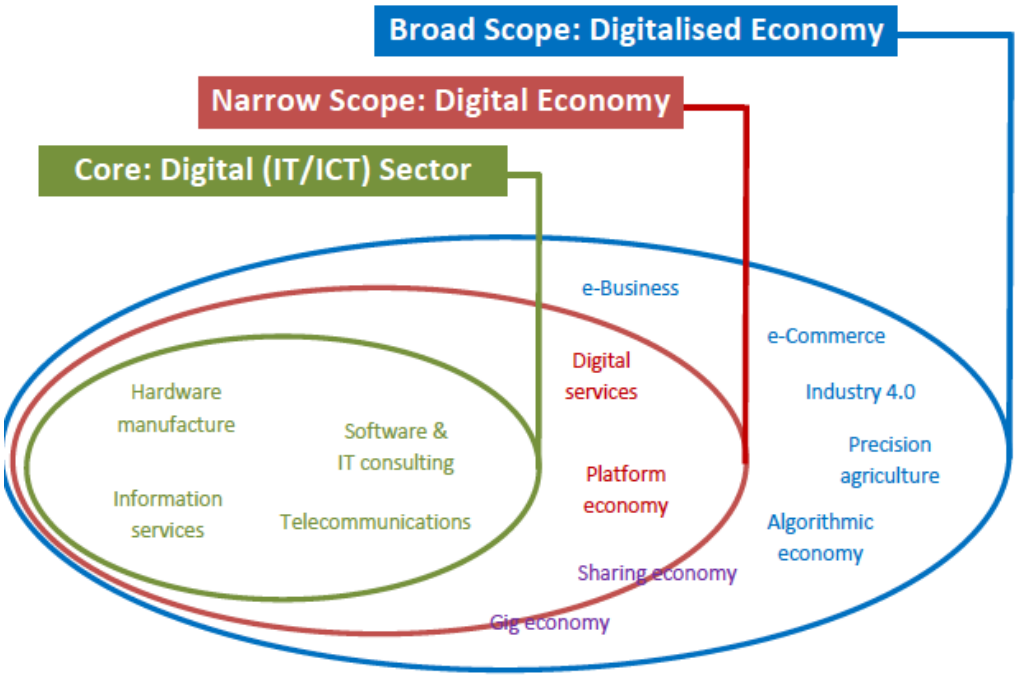

Figure 1: Taxonomy of the Digital Economy, Bukht and Heets, 2017

The **Narrow-scope digital economy** whose dominant feature is the Digital Platform economy which creates value by connecting two or more different sets of users or markets through electronic or digital means. It has services that rely on core digital technologies such as internet, web or mobile applications and payment services. The data markets and economy is to a high degree affected by innovative services in these domains, which are making a growing contribution to economies, as well as enabling potential spillover effects to other sectors.

The **Broader-scope digital economy** refers to digital technologies transforming traditional sectors, that is the cross-sector spill over that occurs when traditional ICTs are absorbed and used across the rest of the traditional economy such as in the digitally enabled Transport, Health, Tourism, Agriculture, Education or Manufacturing sectors.

3.2 The Digital Platforms

[Srnicek, 2017] defines Digital platforms as digital infrastructures that enable two or more independent groups to interact, very much in line with the Narrow-Scope digital platform economy taxonomy described in Figure 1. Digital platforms position themselves as multisided intermediaries that bring together two or more different users such as sellers and buyers in form of customers, advertisers, service providers, producers, suppliers, and even physical objects as shown in the figure 2 below.

A digital platform is therefore an enterprise that uses the internet to facilitate economically beneficial interactions between two or more independent groups of users. Digital platforms create value by facilitating exchanges/transactions and through fostering innovation. They provide a structure that can take advantage of digital technologies' low search costs to generate efficient matches between globally connected users.

Facebook (now Meta) provides the best example of a digital platform as shown in Figure 3 below.

ITU (2021) states that Facebook supplies a set of services to users and in response receives the attention and personal information of those consumers. Facebook then charges advertisers for targeted access to these consumers. In effect, Facebook produces audiences which it sells to advertisers. This means that the traditional metrics used in ICT competition analysis, for example, user prices, revenue shares, profitability or ICT traffic shares, are impossible or much harder to use for assessing competitiveness within specific national markets

[Srnicek, 2017] further states that Digital Platforms increase the efficiency of trade through

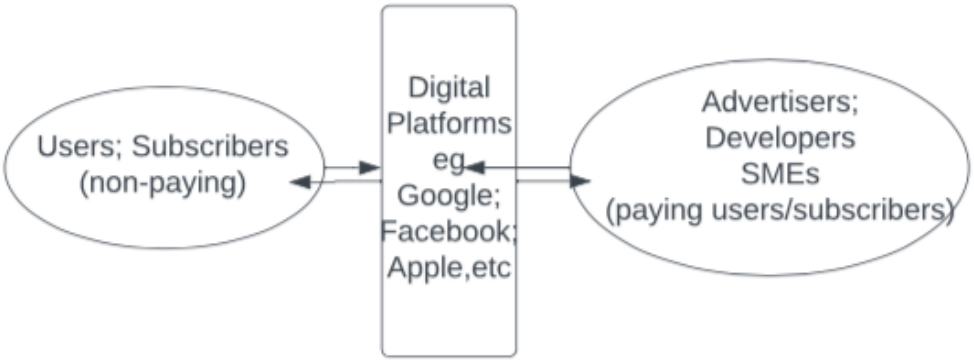

Figure 2: Digital Platform - multisided markets, Author (2022)

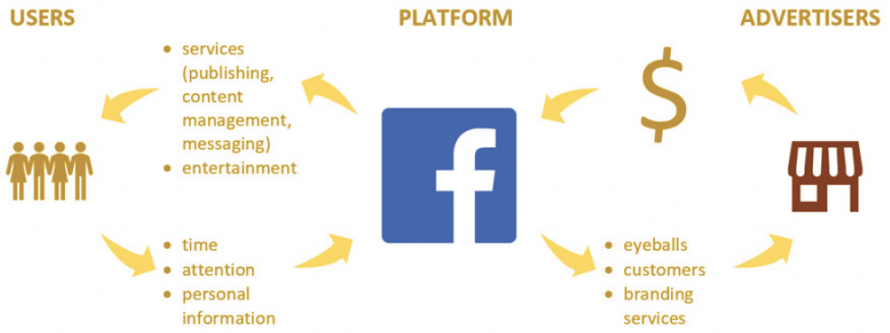

Figure 3: Digital Platform - Facebook Example, ITU (2021)

lower search costs and low reproduction and verification costs. They also facilitate innovation by enabling third-party firms such as software developers to build enormous quantities of complementary products or services on top of their platforms. According the UNCTAD 2019 the digital platforms are able to do so from massive data collections, analysis and subsequent monetization of the accrued digital intelligence to third parties.

3.3 The Data Market

The EU Data Market Study (2020) defined the **data market** as the marketplace where digital data is exchanged as 'products' or 'services' as a result of the elaboration or processing of raw data. It identified two key actors within the data market as being the Data Professionals and the Data Companies who could be playing the role of Data Suppliers and/or the Data Users.

The **Data companies** can be either data suppliers' and/or data users' organisations with the following differences.

- **Data Supplier Companies** have as their main activity the production and delivery of digital data-related products, services, and technologies. They represent the supply-side of the Data Market since they build digital tools and data infrastructure such as Cloud, Big Data, Data Analytics, Data Warehousing amongst others that are subsequently used by **Data User** Companies to provide data-driven business solutions. Examples of Data Supplier companies include but not limited to Meta(Facebook), Apple, Microsoft, Amazon, Alphabet (Google) often referred to as the MAMAA group of companies domiciled in the US.

- **Data User Companies** are organisations that generate, exploit, collect and analyse digital data intensively and use what they learn to improve business or organisational performance. Most of them are data-driven innovation startups providing solutions to mainstream businesses and organisations. They often build their data-driven innovations on top of the platforms and technologies provided by the MAMAA group of companies and so represent

the demand side of the Data Market since they are the firstline consumers of the MAMAA digital products and use the tools to create new products for the mainstream organisations as customised data-driven solutions.

The **Data professionals** are data workers who collect, store, manage, and/or analyse, interpret, and visualise data as their primary or main part of their day to day activity. Data professionals must be proficient with the use of structured, unstructured data, streaming, non-streaming data and are able to work with a huge amount of data and are familiar with emerging database technologies. They elaborate and visualise structured and unstructured data to extract insights that support the analysis and decision-making processes. They are highly sought after by both the data supplier and data user type of companies described above.

3.4 The Digital Economy, Data Market and Digital Platforms Linkages

The EU Data Market Study (2020) also defined the **Data Economy** as a measure of the overall impacts that the **Data Market** defined in Section 3.3 has on the overall economy. In other words, the secondary effects that data markets have in terms of generating new job opportunities, new supply value chains and cross-sector benefits as the data-driven innovations spill over and beyond its traditional ICT realm. The **Digital platforms** are at the heart of making this connections between previously un-connected groups in diverse sectors of the economy - including but not limited to Fintech (eg Mobile money lenders, Paypal, etc), transport (eg Littlecab, Uber, etc); Education (eg. Udacity, Coursera, etc) amongst others. Digital platforms are therefore the enablers and drivers of the Data Markets whose activities or transactions contribute to the Data or digital economy.

There is however very limited measurement and reporting on the nature, size and impact of the narrow digital economy as characterised by its dominant feature - the Digital Platform Economy. The Digital platform economy creates an entirely new digital value chain of Data markets, App Developers, App Store, Netowrk operators amongst others as shown in Figure 4 below.

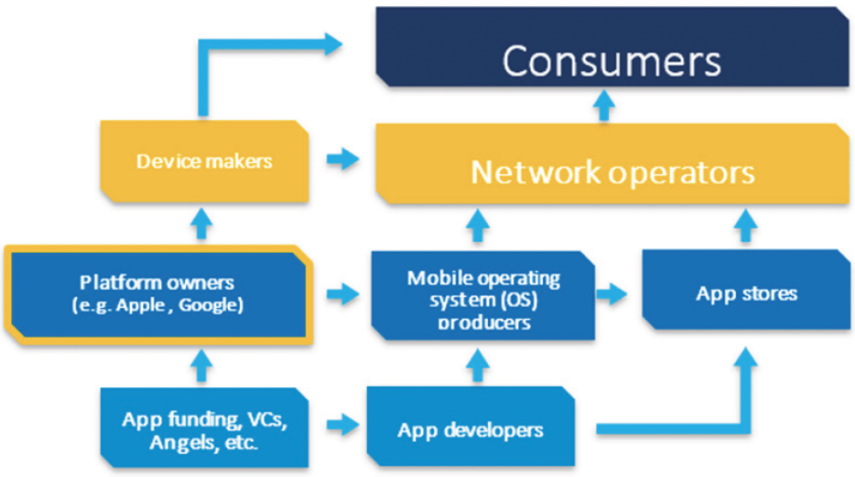

Figure 4: Digital Platform or App Economy Value Chain, ITU (2021)

[ITU Development Sector, 2021] found that the App economy is a major component of the digital economy. The App economy is an interconnected ecosystem of App developers, sources of capital, and device makers which is dominated by the 'digital platform owners' such as Apple and Alphabet (Google) who own and manage the mobile-device operating systems iOS and Android, respectively. Despite the dominance of the digital platform owners, digital services to consumers are ultimately delivered to final consumers via network operators as shown above.

4 Digital Platforms - their structure, characteristics and classification

Having defined digital platforms in Section 3.4 we now take a closer look at some examples, their structure, characteristics and classification (taxonomy). This allows stakeholders, especially

regulatory agencies to better understand and identify current and future digital platforms in order to better manage them.

4.1 The Global Big Tech Examples - MAMAA

The biggest examples of the digital platform economy is demonstrated by the global or super platforms commonly referred to as MAMAA (Meta(Facebook), Apple, Microsoft, Amazon, Alphabet (Google)) or the big technology companies domiciled in the US.

Facebook, now called Metaverse subscribes and connects users for free (the subsidy market-side) onto their platforms. It then mines the digital footprint of these user activities and transactions in order to monetize the same to advertisers and other paying customers (its money market-side). The platform thus connects one market, the freely subscribed users, to the second market, the advertisers who benefit from the precise and highly targeted advertisement made possible from analysing aggregated data points from its billions of users.

Apple is well known as a leading consumer hardware producer with its flagship iPhone and Macbook engineering products. However, Apple has a digital platform that is considered an innovation platform since it connects innovators (software mobile app developers) to Apple consumers who download Apple Software from its 'App-Store'. The digital platform also offers subscription based streaming services where it connects music or movie producers to its large base of Apple consumers.

Microsoft is a well known global software provider. It came slightly late to the digital platform markets given its very successful legacy as an on-premise software provider for its Microsoft office products. It has however converted most of its Office software onto the cloud and adopted a platform-based, software subscription business model. Additional, it is aggressively marketing both its Cloud provisioning (MS-Azure) as well as its Gaming products based around the Microsoft XBox platform.

Amazon has a similar cloud based digital platform model and provides an eCommerce Platform where millions of consumers are connected to thousands of suppliers of various goods and services. It makes a commission out of the transactions concluded between these two market sides transacting on its platform. Additionally, Amazon has a subscription digital service in the for its Cloud Service Provisioning,the Amazon Web Service - which has become an important clog in the digital economy as digital assets move off-premise and into the cloud.

Alphabet (formerly known as Google) also has the same business model based on their digital platform that connects web digital resources one one side of its market, with users searching for digital assets on the other side of the market. It essentially provides search directory services to users (its first market side) who have signed up for free and mines their online search requests to create digital value that is monetized through its Advertisers (its second or third market-side).

Beyond its search engine platform where search queries are monetized and served with paid up adverts, Google also provides an innovation platform - the Android Google Play platform where Software engineers connect and built software products for consumers who use the Android system on their mobile devices. Apple, Facebook, Huawei and others also too have a similar innovation platform that brings software developers together in order to build and sell software products to the various user communities.

In summary,[United Nations Conference on Trade and Development, 2019] and
[United Nations Conference on Trade and Development, 2021] states that the digital economy and its corresponding data market is hinged upon the digital platform market structure, with two broad spectrum of platforms - the transactional-based platform and the innovation-based platforms. Most of the global big tech players leverage on deploying both types of platforms to accelerate and retain their dominance.

4.2 Market Structure of Digital Platforms

Houtari (2015) described a digital platform as one that enables third-parties to directly interact with each other on the common platform, while capturing its share from those third-party interactions. Third-parties may include buyers and sellers (eg online taxi riders and online taxi drivers) that need to make platform-specific investments or affiliations in order to interact that with the platform. The figure below shows a two-sided market structure relationship that applies to all digital platforms some of which may have more than the two sides shown below on their platforms.

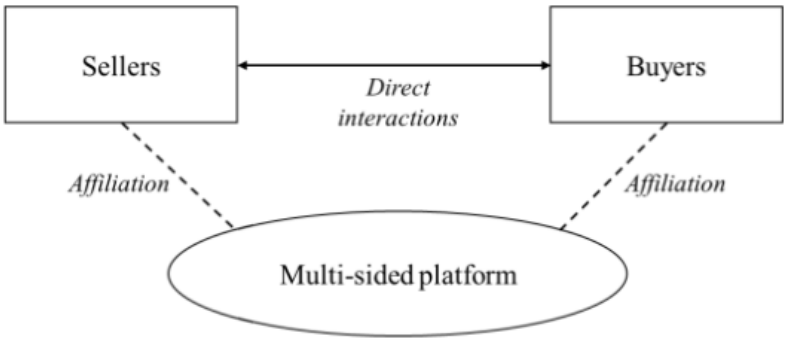

Figure 5: Multisided Platforms, Houtari 2015

[Evans and Schmalensee, 2016] introduced the terms 'subsidy side', the non-paying user side and the 'money side' the paying subscriber side of a platform in order to explain the simplest and most commonly adapted digital platform.

On the subsidy side(s), as shown in Figure 5 the platform offers a free subscription service, or charges a price below average cost of production so that the 'Buyers' can sign up onto the platform. This creates a critical mass of users whose data can then be mined and monetized by providing insights to the 'money-side' of the platform.

The money side of the platform typically has 'Sellers' that want to sell products and services to the freely subscribed 'Buyers'.These Sellers would normally sign up or subscribe onto the platform at fee - unlike the 'Buyers'. Using data analytics tools and algorithms, the platform can mine the buyers data points and better match the sellers products to specific and highly targeted buyers. They would then typically charge a commission for each successfully transaction between the sellers and buyers.

At the heart of this digital economy and specifically Narrow-scope Digital or Data economy, (Figure 1), we find these types of digital platforms that connect two or more sides of the market segments. The digital platform collects data from users on one sides, transforming it into valuable insights and monetizes it through advertisement opportunities (Facebook, Google platform models), or establishes connection insights between potential passengers /riders and their potential drivers (Uber platform model) or connection insights between accommodation bargain hunters and their potential hosts (AirBnB models) or simply connecting cloud resources to cloud users (Amazon Web Services)

4.3 Characteristics of Digital Platforms

Digital platforms come in many shapes and across different sectors such as accommodation sharing (Airbnb), knowledge crowd sourcing (Wikipedia), social media (Facebook), on-demand transport service (Uber), gig economy (https://ajiradigital.go.ke/) amongst others. However, there is a common denominator: they all provide an 'open' digital infrastructure to an ecosystem of distinct but mutually dependent groups of users (market-sides) who produce and consume digital value. Depending on the specific type, each platform, has built-in mechanisms – based on data and algorithms – that enable users in these groups to find each other, interact, collaborate and/or transact much more easily on the digital platform than outside of it. Dermary and Rushe (2018), Economics of Platforms) identified key characteristics of digital platforms as having one or several of the following attributes: Network Effects, Positive Feedback or Market Concentration.

4.3.1 Linear Production vs Cyclic Production

In the traditional business, value is created through a Linear fashion, changing raw materials into intermediary input and finished products or services as shown in Fig 6. The finished products and services are then sold to consumers to create wealth to the producers - with little or no feedback loops going back into the production processes.

In the digital platform economy, data is the raw material that is collected, stored, processed, analysed and transformed into digital intelligence that can then be sold or monetized in a continuously revolving or circular fashion [United Nations Conference on Trade and Development, 2019].

The cyclic nature of the process through this feedback loop enables the digital platform owners to better learn their platform users' digital traits and puts them on a track to continuously create better and newer digital products for them. The figure 6 below shows and contrasts this linear versus cyclic characteristics.

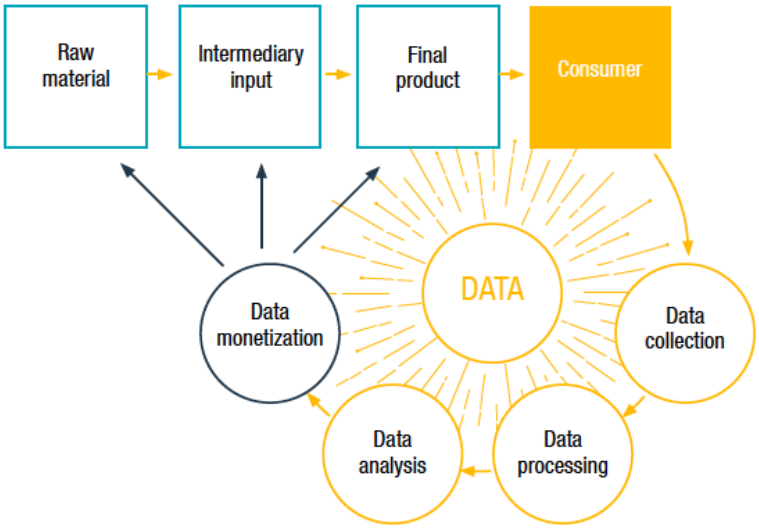

Figure 6: Production System - From Linear to Cyclic, UNCTAD 2019

The linear flow from Raw Material, Intermediary Input and Final Product to the consumers is the way the traditional but not the data-driven economy works. In data-driven, digital economies, the interactions the consumer has with the final product after they have purchased it is continuously captured, processed and analysed to give insights that could be both monetized to third parties or simply act as input to the next product cycle.

4.3.2 Network effects

Network effects are said to occur when the benefit of a good or service for one user depends to some extent on the number of other users consuming the good or service (Katz/Shapiro, 1985). Essentially the value a single user extracts from a platform increases with each additional users joining the platform. This is known as the 'same-side' network effect commonly seen on telephony networks or social media platforms where the more the additional users join or subscribe onto a platform, the better the value and reach they provide to the existing base of users and vice-versa.

The platform can also experience a 'cross-side' Network effect when an increase in the number of users on one side of the market produces increased value to users on the second side of the market. In an eCommerce platform, an increased number of buyers may attract in an increased number of sellers, leading to better benefit to the buyers since they now have more options and choices presented to them by an increasing number of suppliers. This creates a virtuous cycle that puts platform owners on an accelerated and upward trajectory towards being the dominant platform players in the sector as described in the next section.

4.3.3 Critical mass and Market Concentration

[Demary and Rusche, 2018] observes that a large number of real or expected users in one side of the market (group A), can then attract users in the second side of the market (group B) or vice versa. In other words, a large number of consumers in one group of the market may attracts a larger number of sellers on the other side of the market; who in turn attract more consumer users in the first group and vice-versa. There are effectively two network effects taking place simultaneously - the same-side network effect and the cross-side network effects reinforcing each other positively and quickly reaching a tipping point or as they say, the platform goes 'viral'. At that point the two market sides are said to be self-propelling and the platform gets on an exponential path towards market dominance. Furthermore the exponential growth of users has little impact on the margnial

cost of providing the servicing - enabling the platform to take advantage of the economies of scale. Recent example of this exponential growth of consumer and supplier bases include but not limited to Netflix, TikTok, Twitter, WhatsApp, Instagram and other global platforms.

4.4 Classification of Digital Platforms

Several studies have categorized digital platforms in various way. (e.g. Lichtblau et al., 2018; Arnold et al., 2016; Engelhardt et al., 2017; Schmidt, 2016). While their classification depends very much on the definition of the business model itself, the specific focus of the classification study also has a great influence. For instance, digital platforms may be grouped by the type of transaction they facilitate, i.e. search, networking or sharing goods (Arnold et al., 2016).

One can also classify Digital Platform by Sector that is by the domain they serve such as the Transport, Education, Healthcare, Entertainment, Real Estate, Travel, Hospitality amongst other verticals. Other classification look at the platforms in terms of whether they are B2B, B2C or C2C. In the UNCTAD Digital Economy (2019) report, N Srnicek (2017) classifies digital platforms by their business models as summarised below:

Social Network/Advertising platforms Commonly known as Social Media platforms, (Facebook, Google, Twitter) – they extract information on users, analyze it and monetize it by selling advertisement space to 'eye-balls' on their platforms. For instance, advertising accounts for over 80 per cent of the total revenues for global tech companies, Twitter and Google, and close to 100 per cent for Facebook and Snapchat.

E-commerce platforms which offer online market places with lower transaction costs for buyers and sellers to come together. Examples include Amazon, Alibaba, eBay and closer home Jumia and Masoko.com.

Gig Economy platforms A subset of eCommerce platforms where participants complete short tasks for each other. Sometimes referred to as Lean Platforms within the context of the "sharing economy". Lean platforms exists where traditional ownership of the operational assets (e.g. taxis for Uber or accommodation facilities for AirBnB) is not a core part of the platform owners. They simply provide a digital marketplaces and generate income by charging a commission for each transaction. AirBnB and Uber both charges upto 25 percent from each accommodation or ride transaction exchanged over their respective platforms. Apple, on the other hand has been taking a 30 per cent commission on every App sale made on their AppStore. These platforms can also mine the data they collect from buyers and sellers interactions to offer increasingly more targeted and better services.

Cloud /Data Center platforms (Amazon Web Services, Google Cloud/IBM Cloud /MS Cloud/ Huawei Cloud and others) – they make, own and rent out basic hardware and software infrastructure for clients on an "as needed" basis and collect data on client activities. They enable the outsourcing of a company's ICT departmental roles, often pushing on-premise technical staff out of their roles by automating most of their routine tasks like backups amongst others. They however create new data-oriented jobs and roles such as cloud developers, cloud architects, cloud engineers amongst others.

Innovation Platforms:-they serve as a foundation on top of which other firms develop complementary technologies, products or services. One can consider them as the Operating system of digital platforms and examples include Google Android, Apple iOs, Facebook Development Platforms.

Product platforms aim to take a traditional good and turn it into a rentable service. Mobike, for example, a Chinese bike-sharing startup, has taken the standard purchasing of a bike and transformed it into a rentable bike-sharing service. This platform type also includes, for example, Rolls-Royce's jet engine division, which no longer sells engines but rather 'rents out thrust' to various airlines. This enables the company to retain control of the data generated from the use of their engine products in order to better inform the next generation of jet-engines. With the growth of IoT these types of platforms are set to become increasingly useful, particularly within the context of the 4th Industrial Revolution.

Integrated platforms Some platforms may straddle more than one category, for example Amazon which offers both a marketplace and a cloud service. Their success is mainly hinged on three factors: Network Effects, platforms increasing ability to attract, extract,control, analyse and monetize consumer data as described in Figure 6, (Cyclic Production) as well as building

and maintaining Market Concentration. Market concentration could be through their increasing integration of the their service into the traditional economy or simply through acquisitions of similar or complimentary digital service offered by startups. Either way, it makes it harder for users to switch to competing products.

5 Data Markets and Digital Platforms - Opportunities, Threats and Challenges

[ITU Development Sector, 2021] provides a visualisation of how digital platform services intersect with traditional telecommunication service operators.

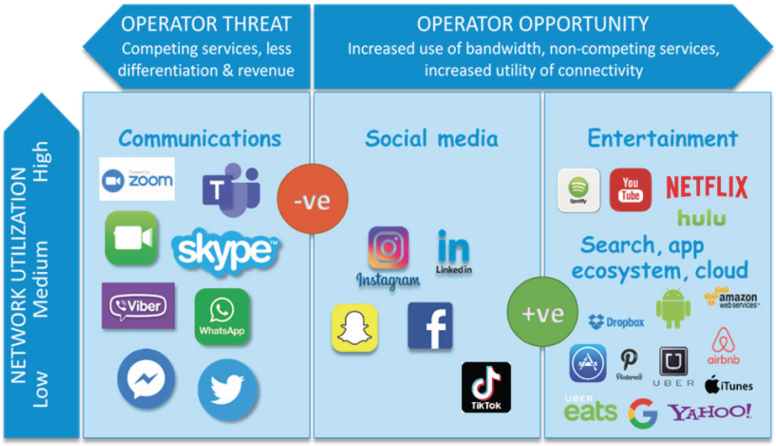

Figure 7: Digital Platforms - Threats and Opportunities, ITU (2021)

On the left panel of Figure 7 are the digital platform services that most directly compete with traditional communication services. These include Skype, Apple FaceTime, and WhatsApp. More recently, group videoconferencing applications have risen to prominence including Zoom and Microsoft Teams. In the middle panel are social media platforms, which are dominated by Facebook. Besides enabling users to publish a range of content, these platforms also typically provide messaging services. Thus, while social media platforms may compete, in part at least, directly with traditional messaging services, they also benefit ICT operators by stimulating demand for bandwidth. On the right-hand panel are entertainment, search, cloud and other services which are not provided by ICT operators and drive increased demand for bandwidth.

Thus, there are positive and negative effects on ICT operators arising from the growth of digital platforms and their associated services. This means that the final impact on operators is ambiguous and will vary from one jurisdiction to another.

5.1 The Threats and Risks

According the [United Nations Conference on Trade and Development, 2019] Digital economy report, the so called super platforms have global implications given their strong, dominant market positions. For example, Google has some 90 per cent of the total global market for Internet searches. Facebook accounts for two thirds of the global social media market, and is the top social media platform in more than 90 per cent of the world's economies. Amazon boasts an almost 40 per cent share of the world's online retail activity, and its Amazon Web Services accounts for a similar share of the global cloud infrastructure services market.

Countries at all levels of development risk being mere providers of raw data while paying for the digital intelligence offered by the platform owners - and harvested from their user digital footprints. Global digital platform providers introduce regulatory concerns that are privacy and security related since they collect and process a lot of personal citizen data in the process of providing services to local markets.

5.2 Challenges to traditional Business Models

Price Structures Platform providers have the advantage of being able to define prices of services by maximizing their knowledge of both sides of the market. They essentially can set prices below marginal costs or even zero-rate in one market to attract customers and above marginal cost in the second market to attain profit maximization. The challenge of digital platforms to traditional businesses are best defined by the long battle between over-the-top service providers and the traditional telcos as exemplified in the diagram below.

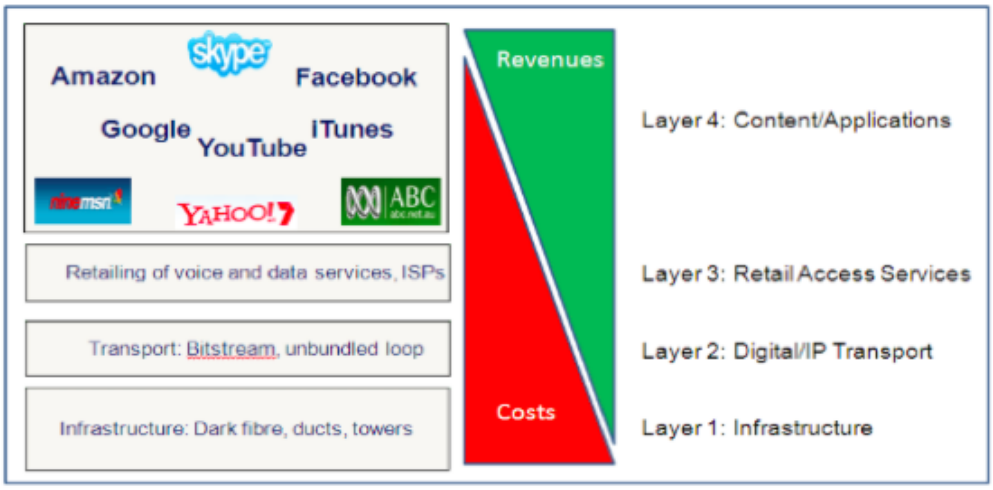

Figure 8: Investments Costs vs Revenues, ITU

Domestic Telco providers or operators argue that they have to invest huge amounts to lay down the core infrastructure that includes fiber, communication masts and others – which is the most expensive component in the Telco ecosystem. On the other hand, their OTT competitors, the Content and Application providers do not incur this investment cost but still reap the most from the ecosystem through their massive revenues. In essence, the OTT or Content providers are seen to be investing the least in the underlying infrastructure while reaping the most as depicted in the Figure above. Furthermore these OTTs provide similar or substitute services to the traditional operators at a lower prices.

Most enterprises would approach the above digital disruption challenge wrongly if they fail to realise that the OTT providers (digital platforms) have an entirely different business model from theirs - the multisided business strategy which offers free services to attract subscribers in order to use algorithms to mine and monetize the data to third parties such as advertisers. An attempt to apply traditional regulation interventions such as price regulation in order to force the digital platforms to charge non-zero prices for their competing products will therefore fail (KICTANet Study, 2019) [10].

Until and unless traditional businesses both in the telecommunications, financial, retail and other sectors acknowledge this strategic difference between their business models, it will remain impossible to compete. Domestic business should instead have data-centric strategies as part and parcel of their overall production process.

5.3 Challenges to traditional Regulatory Models

There are several challenges arising from the digital economy as shown in in Appendix A.3 - particularly as dominated by super platforms based in the northern developed countries. First is the issue that profits are rarely distributed equitably between the platform owners and their subscriber base. Indeed the subscribers do gain some benefit from the services but the there are arguments that a more equitable distribution of those benefits could be realised using various interventions including but not limited to Taxation, Data Protection, Competition policy amongst others.

[10] KICTANet Study (2019) Regulating over the top Services - Challenges and Opportunities, from https://www.kictanet.or.ke/?mdocs-file=42014 assessed June 2022

Kenya adopted the recommended Unified (Converged) Licensing framework since 2012. It means that the operators are free to provide licensed services using any technology commonly referred to as service and technology neutral licensing. Nevertheless, development in the digital space - particularly in form of Over the Top Services (OTTs) where global players are able to offer the same voice, video and broadcast services as those given by the traditional licensed operators continues to provide challenges to the regulator.

Strong and mutual network effects clearly have the potential to increase market concentration of digital platforms. Scale economies lead to bigger and dominant digital platforms as well. On the other hand, multi-homing users, a pronounced platform differentiation, congestion, economies of scale and strong market dynamics tend to result in less concentrated markets and set limits to the size and market power of platforms [Demary and Rusche, 2018].

All these developments bring new challenges to the regulatory agencies since the regulatory toolbox are more often than not based on the regulating older business models and technologies. To manage the ever changing technology and service landscape ITU (2022)[11] recommends a collaborative approach with other independent regulators given that the the new digital economy has cross-cutting and spill over effects into other economic sectors such as finance, consumer protection, data protection and competition.

5.4 Challenges to traditional Tax Regimes

ITU (2021) states that the rise of digital platforms has had profound implications for taxation policy and its implementation across many industries but, in particular, the ICT industry. Traditionally, corporation taxes have been structured so that they are owed where the service is produced, but this framework is ill-suited to the effective taxation of digital platforms and OTT services.

Digital marketplaces enable suppliers, consumers and platform operators all to be located in different jurisdictions. Indeed, the physical location of digital platforms and the geographic definition of where value is created in their production processes is highly ambiguous and, to a large extent, arbitrary.

The digitalization of the economy has created further issues for taxation of multinational companies. Large technology companies are able to provide a service in one location, but recognize the income in a different jurisdiction, where the tax rate is lower, thus raising one of the central questions caused by the digitalization of the economy: who should be allowed to tax digital services?

5.4.1 Digital Taxation - The OECD approach

The OECD Inclusive Framework[12]has created a two-pillar solution to taxing the digital economy. The two pillars are:

- Creating solutions for determining allocation of taxing rights ('nexus and profit allocation');
- Designing a system to ensure Multinational Corporations pay a minimum level of tax on profits.

These two pillars are hoped to form the basis of an international consensus on tax of digital services. However, implementation of the two pillars has stalled, due to lack of global consensus is lacking. In the meantime, many countries have created their own taxation laws notwithstanding the lack of consensus, which potentially leads to conflicting laws and high risks of double taxation.

5.4.2 Digital Taxation - The African Approach

As there has been no global taxation framework created by the OECD, the African Taxation Administration Forum (ATAF) recently published a suggested approach and model law[13]for African countries seeking to tax digital service providers directly. African countries such as Kenya and Nigeria have already implemented suc a law through their digital service tax. The ATAF suggestion is for a Digital Service Tax of between one and three per cent and with the suggested scope of revenue to be taxed to include amongst others:

[11]5th Generation Regulatory Frameworks, https://app.gen5.digital/benchmark/about, accessed June 2022

[12]OECD/G20 Inclusive Framework on BEPS, page 2, available at: https:// www .oecd .org/ tax/ beps/ flyer -inclusive -framework -on -beps .pdf

[13]ATAF Model Law on DST https://events.ataftax.org/index.php?page=documentsfunc=viewdocument$_id$ = 79$token$ = 78635ae1045e50eb7ad370b1afb7fcf1$thankyou$

• Digital services revenue arising from online advertising;
• Digital services revenue arising from data services;
• Digital services revenue arising from the provision of online marketplace services or real property and rental services;
• Digital services revenue derived from users of vehicle hire services; and
• Digital services revenue derived from users of digital content services, online gaming services and cloud computing services.

In all instances, taxation is imposed based on where the user of the service, rather than the service provider, is located.

5.4.3 Digital Taxation - The Kenyan Approach

The Kenya Revenue Authority Digital Tax Policy Identifies taxable digital services in line with the African Tax Administration Forum (ATAF) and includes: - Supply of downloadable digital content; subscription based media, Software programs, supplies on online market places, digital media content, data management services, search engine services, online education, Cloud provisioning, OTT service providers amongst others.

From 1st of January 2021, the Finance Act (2019) imposed a DST of 1.5 per cent in Kenya. The applicable tax base is gross revenue from the digital marketplace. The digital marketplace was defined in the Finance Act as "a platform that enables the direct interaction between buyers and sellers of goods and services through electronic means.

Whereas the digital tax initiative is in line with other nations trying to expand their tax bases into the digital realm where the businesses are migrating to, there will be need to have a coordinated approach to ensure the local digital data companies are not stifled or overwhelmed by multiple tax and other payments arising from multiple international, domestic, uncordinated regulatory and other statutory payments. This is particularly true as most of the EU countries that initiated the digital tax regimes consider repealing[14] them due to the US-retaliatory moves, who view the digital tax as discriminatory against the US based global tech companies.

6 The Kenyan Data Market Ecosystem - Key Actors, their Digital Platforms and Measurement

In mapping out the Kenyan Data Market ecosystem, we considered the above digital platform categorisation as well as the EU Data Market Study [15] which outlined the Data Market as being a subset of the overarching Data Landscape.Specifically, it identifies the Data Markets as constituting the following data driven companies:

- Data Analytics Companies, who provide a wide variatey of software products including Analytics Platforms, Business Intelligence, Artifical Intelligence, Machine Learning, Visualization amongst others
- Data Vertical Software companies, who produce various software products that are sector-specific such as Fintech, Health, Agriculture, Transport related mobile and web-based apps.
- ICT enabler Companies, the 'middle-ware' companies who produce data-driven technologies including cloud infrastructure, cluster-software, Hadoop technologies amongst others.
- Cross Infrastructure Providers who work closely with ICT enabler companies to sell and deploy middle-ware, analytics and vertical software to organisations
- Market Places where all these digital products that are data-driven are stored, curated, and exchange electronically; the digital platform.

[14]EU Digital Tax Status, https://taxfoundation.org/digital-tax-europe-2020/ accessed June 2022
[15]EU Data Market Study https://datalandscape.eu/study-reports/final-study-report-european-data-market-monitoring-tool-key-facts-figures-first-policy, accessed June 2022

6.1 The Kenyan Data Markets

Based on this background, we provide a selected list of what constitutes the Kenyan Data Market, Digital Platform and Services in Appendix A.1 and based on the classification of digital platforms described in Section 4.4. The list recognises that the majority of the service providers in the data market are currently global players with significant local impact in each the seven digital platform categories identified, namely: the Social media,eCommerce, Gig-economy, Cloud, Innovation, Product and Intergrated Platform categories.

The global players identified earlier in Section 4.1, under the acronym MAMAA ((Meta(Facebook), Apple, Microsoft, Amazon, Alphabet (Google)) feature prominently across the seven categories. At a regional and local level, the sampled players identified include Jumia.com, LittleCab, Safaricom and eCitizen for the eCommerce, Gig-economy, Cloud, Innovation and Integrated platform categories.

In terms of how the data companies monetize their platforms, three options exist - the free subscription, the subscription and the charge-per-transaction models. In the free subscription model, the platform owners collect and data mine digital profiles in order to sell insights to third parties as targeted advertisement space. A few of the platforms offer a freemium model where the platform is free but becomes subscription based once a certain service threshold is exceeded.

In Appendix A.2 we present an additional sample list of Kenyan data-driven companies from a Sectoral perspective. The Seven sectors sampled include: Financial, Agriculture, Telecoms & Broadcast, Media & Entertainment, Gaming & Betting, Education and Health sectors. Global players with impact on the local markets include Paypal, Farm21.com, Skype, YouTube, Sony, Coursera and Health Wearables in the seven respective sectors.

Regional and local sectoral digital platform players sampled include MPESA, Pesapal, Cellulant for the Fintech sector. TwigaFoods, DigiFarm and FarmDrive are cited from the Agricultural sector, while the global players WhatsApp, Instagram and Skype are sampled as having a local impact on the local Telcom and Broadcast sectors the impact of which is covered in another study titled Regulating Over The Top Services (OTTs) (KICTANet, 2019) [16]

With regards to Media & Entertainment, local artists are using the same MAMMA platforms to sell their concerts online. Mobile gaming apps as well onlne betting firms have also become prominent and popular with the youth. On the Education front, local actors like Kytabu.Africa, Elimu.org are cited as online educational providers. Finally, on the Health front, local players cited as examples include Daktariafrica.com, DialDaktari.com amongst others. The monetization strategies across the sectors seems to be largely subscription and commission based, except for the Telecoms sector where OTTs are offered for free.

It is instructive to note that these sampled lists are not exhaustive but serves as a guideline for various regulatory agencies and other interested stakeholders to reflect upon in terms of appreciating the scope and breadth of the Kenyan Data Market.

6.2 Measuring the Data Markets - the Key Dimensions and Indicators

As mentioned earlier, there are several state agencies such as the Communication Authority, quarterly Statistics (CA, 2022)[17], the Kenya National Bureau of Statistics Economic Surveys (KNBS,2022)[18], the Kenya Institute of Public Policy and Analysis, Economic Report (KIPPRA, 2021)[19] that are measuring the traditional or Core-scope digital economy and to some extent the Broader-scope Kenyan digital economy as discussed in Figure 1 of Section 3. However, there is little or no regular measurement being done to with respect to the Data Markets, or what is described as the Narrow-scope Digital economy.

Using the EU Data Monitoring tool (2020)[20], as a guideline we propose the following as six key Indicators for comprehensively measuring the Kenyan Data Markets and the associated data

[16]Regulating Over the Top Services,KICTANet 2019 Study, https://www.kictanet.or.ke/regulating-over-the-top-service-otts-challenge-and-opportunities/ accessed June 2022

[17]CA Qaurterly Statistics https://www.ca.go.ke/consumers/industry-research-statistics/statistics/ accessed June 2022

[18]KNBS, Annual Economic Survey https://www.knbs.or.ke/ accessed June 2022

[19]KIPPRA, Annual Kenya Economic Report https://kippra.or.ke/download/kenya-economic-report-2021/ accessed June 2022

[20]EU, Data Market Monitoring Tool, https://datalandscape.eu/european-data-market-monitoring-tool-2018, accessed June 2022

economy.

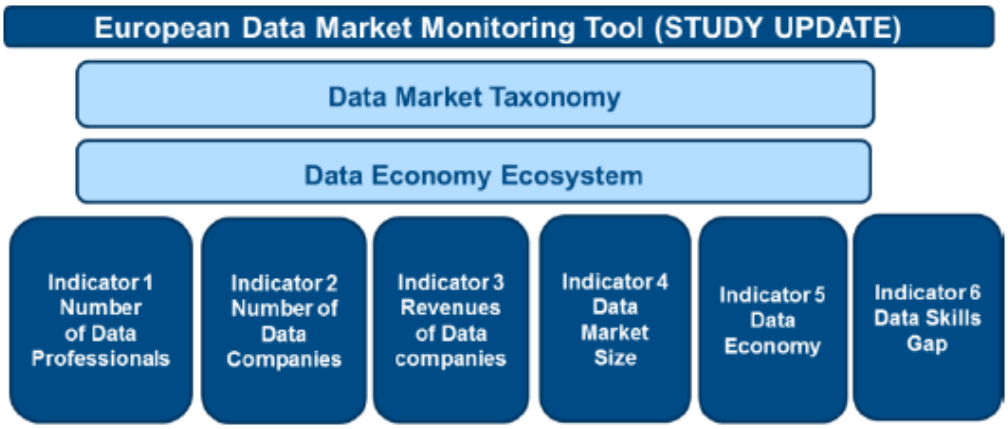

Figure 9: Data Market Monitoring Tool EU 2020

1. Data professionals are data workers who collect, store, manage, and/or analyse, interpret, and visualise data as their primary or as a relevant part of their activity. Data professionals must be proficient with the use of structured and unstructured data, should be able to work with a huge amount of data and be familiar with emerging database technologies. They elaborate and visualise structured and unstructured data to support analysis and decision-making processes. They included but not limited to Data Scientists, Data Analysts, Machine Learning/AI Software Engineers amongst others.

2. Data companies can be both data suppliers' and/or data users' organisations:
   • Data suppliers are data companies that have as their main activity the production and delivery of digital data-related products, services, and technologies. They represent the supply side of the Data Market and mostly build data infrastructure software (eg Data Center, Cloud, eCommerce, AI-ML Software amongst others).
   • Data users are data companies or organisations that generate, exploit, collect and analyse digital data intensively and use what they learn from data to improve business outcomes. They represent the demand side of the Data Market and deploy data-driven solutions such as business analytics within their operations.

3. Data companies' revenues are the revenues generated by data companies for the products and services specified in the defined Data Market. The revenues correspond to the aggregated value of all the data-related products and services generated by the respective country-based data supplier companies, including exports outside the country.

4. The Data Market is the marketplace where digital data is exchanged as "products" or "services" as a result of the elaboration of raw data. EU (2020) defines its value as the aggregate value of the demand of digital data without measuring the direct, indirect and induced impacts of data in the economy. The value of the Data Market includes imports (data products and services bought on the global digital market). That is, it includes digital products and services bought from other data suppliers not based within the country - but excludes the exports of the local data companies.

5. The Data Economy measures the overall impacts of the Data Market on the overall economy. It involves the generation, collection, storage, processing, distribution, analysis elaboration, delivery, and exploitation of data enabled by digital technologies. The Data Economy also includes the direct, indirect, and induced effects of the Data Market on the economy.

6. The Data Professionals' Skills Gap captures the potential gap between demand and supply of data skills in the country, given that the lack of skills may become a barrier to the development of the data-driven industry and the rapid adoption of data-driven innovation. It is based on a model balancing the main sources of data skills (from the education system and re-training and other carriers) with the estimated demand (by all data companies).

Using this as a framework, we make the following observations regarding the Kenyan data markets.

6.3 Measuring the Data Markets - the comparative case for EU

Before looking into the specifics of the Kenyan Data Market, we review the EU Data Market statistics as a way of contextualizing and internalizing the new indicators and their metrics. The EU Data Monitoring Tool identified the six parameters or indicators for measuring their data market as shown in Figure 9 and further grouped them under the following three Data Market 'Dimensions'.

1. ***The Workforce Skills Dimension***:-which covers both the size of data professionals and the skills gap of data professionals as described below.
   Indicator 1, No of Data Professionals - which measures the size of those who collect, store, process analyse, manage visualise data as their primary activity. It is measured as a share or ratio of the total employment figures. The (EU 2020) figures had 6million data professionals which was 3.3% of the total employment)

   Indicator 6, Data Professional (data) Skills gap - It is measured as the gap between demand and supply of data skills as a share of total skills demand.The (EU 2019) figures placed the skills gap at four hundred thousand (400K) which represented 6% of the total data skills demanded/vacancies.

2. ***The Supply and Demand Dimension***:-which covers the scope of data supplier companies as compared to the data user companies.

   Indicator 2a, No of Data (supplier) Companies :-which measures the number of data companies that produce digital products and services (big data tools eg Hadoop, AI and ML software) to be used by other companies. It is measured as a ratio of the total ICT related companies with the (EU 2019) figures showing one hundred and fourty nine thousand (149K) data supplier companies. This was 11% of the total registered ICT related companies.

   Indicator 2b, No of Data (user) Companies :-these are data-driven companies that intensively use digital products and services (Data Analytics/AI) to improve their business performance. They include those within the traditional ICT sector and beyond. It is measured as a ratio of data-driven companies over all the registered companies/enterprises. The (EU 2019) figures found that 535K data-driven companies which is 11% of the total business enterprises/companies.

3. ***The Business and Economy dimension***::-which reviews the revenue size of data supplier companies, value of the data market and its impact in the wider data economy.

   Indicator 3, Revenues of Data Companies (Supplier) :- which measures the aggregated value of all the data-related products and services generated by country's data supplier companies. The (EU 2020) figures were at Euro 71 Billion.

   Indicator 4, Value (size) of Data Market :- which measures the value of the market place (digital platform) where digital data is exchanged as products or services as an elaboration(result of processing) raw data. The (EU 2020) figures were at Euro 58 Billion.

   Indicator 5, Value of Data Economy:-the overall impact of the data market on the economy as measured as a ratio of the GDP. The (EU 2020) figures were at Euro 325 B, which as 2.6% of EU GDP. This indicator measures how the data market has spread and impacted on other sections of the economy.

The overall impact of the data economy has three dimensions - Direct impacts, Indirect Impacts and Induced Impacts. The Direct impact are those sales from data suppliers companies in that territory. The indirect impact is further broken down into:

- Backward indirect impacts:-value chain benefits for those 'supplying' services to data suppliers and the
- Forward indirect impacts:- improved business outcomes for those using data-driven innovations (more efficient production-distribution systems; better targeted marketing; improved management practices.

Induced impacts:-are secondary effects eg new jobs categories; higher salaries for specialised jobs; leading to more consumption in the economy.

6.4 Measuring the Data Markets - the case for Kenya

Based on the above European analysis, it is clear that Kenya has some preliminary work to do before being able to collect and consolidate statistics related to its data markets. We however make the following observations as the first step towards measuring the Kenyan Data Markets.

1. ***The Workforce Skills Dimension:***
   Indicator 1, No of Data Professionals as measured by the number of data workers as a percentage of the overall workforce. There is no evidence of any agency regularly and actively monitoring this indicator even though the a study by the Kenya Private Sector Alliance, KEPSA (2021)[21] on the government sponsored Ajira Digital Program[22] indicated that there were 1.2 million digital online workers, sixty four thousand (64K) of whom were considered data scientists.

   Indicator 6, Data Professional (data) Skills gap - measured as the gap between demand and supply of data skills within the country. There is no agency in place to carry out this but the regulations about Data Companies needing to register under the Kenyan Data Commissioner would be an easy place to start regularly collecting data about professionals under the registering data companies.

2. ***The Supply and Demand Dimension:***-as measured by the number of of data supplier and data user enterprises with the metrics as a percentage of the overall registered organisations and enterprises.

   Indicator 2a, No of Data (Supplier) Companies Kenya has an agency called Business Registration Service (BSR) that keeps a list of all registered companies[23] in Kenya - both local and foreign. The statistics provided do not however drill down to whether a company is within the data market sector or not. The study provides Appendix A.1 with sample data companies as well as their taxonomy as a possible guide for adoption in terms of identifying and categorising data companies at the point of registration.

   Indicator 2b, No of Data (User) Companies Similar to the above point, we provide a sample list of Data-oriented companies by Sector in Appendix A.2 as a possible guide for adoption by the BSR agency. In both cases however, it is important to remember that a good number of global data companies operate in Kenya without necessarily being registered in territory.

3. ***The Business and Economy Dimension***: which measures the revenue size of data supplier companies, the value of the Data Market and that of the Data Economy.

   Indicator 3, Revenues of Data Companies (Supplier) Once the local data supplier companies have been identified and registered, one can compile and consolidate the annual total revenues filed publicly or privately with the various regulatory authorities including but not limited to Communication Authority of Kenya, Data Commissioner, the Central Bank Governor, the Kenya Revenue Authority amongst others.

   Indicator 4, Value (size) of Data Market : as measured by the demand expressed for data driven digital products and services and exchanged or fulfilled over digital platforms. This would include aggregated sales made by both the local and global players in the Kenyan market.

   Indicator 5, Value of Data Economy:- which measures the direct and indirect value generated by data data companies as percentage of the GDP of the local economy.

   The International Trade Association[24], the general ICT contribution to the Kenyan GDP was projected at 8% for the year 2021. The KNBS (2022) reported that the ICT output was at Ksh 560 Billion against a GPD of Ksh 9.3 Trillion for the year 2021. This means that the contribution of the share of the core ICT value to the GDP was about 6%. Either way, the statistics do not drill to the data-driven or data market contribution to the GDP.

[21] Ajira Digital Program Survey, https://www.kbc.co.ke/there-are-1-2million-digital-online-workers-in-kenya-report/ accessed June 2022

[22] Ajira Digial Program, https://ajiradigital.go.ke/ accessed June 2022

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7 Data Market Policy and Regulatory recommendations

7.1 Recommendation 1 - Activate Council of the Future

Having observed that there is no single agency or advisory council tasked with the responsibility of coordinating, collecting and maintaining a repository of data driven market related information as evidence in the European Union' Expert Group on Online Platforms (2019)[25]. It is recommended that the Council of the Future as envisioned in the National ICT Policy (2019) be commissioned and tasked with this noble task.

The National ICT Policy states as follows: *'The Cabinet Secretary shall appoint an advisory group known as The Council for the Future. The Council shall consist of industry leaders, cutting edge entrepreneurs, academia and global thinkers as key participants dedicated to the generation and development of new thinking and strengthening of new ideas that can be brought to bear on challenges of globalisation in the 21st century and shape the role and future of the ICT landscape in Kenya in the next 50 years'.*

One key task for the group would be to develop the Kenyan National Data Strategy as completed by many countries including the UK (2020) , Germany (2020) and SA (2021)

7.2 Recommendation 2 - Adopt Joint Regulatory Approach

Regulation in digital economy needs to consider impact on different actors (individuals, businesses, govt, general public) -with the objective of chosing regulation that has a positive net effect. To effectively address the diverse, cross-country, cross-sector regulatory demands of the digital economy, ITU (2021)[26] recommends the Fifth-generation collaborative regulation. Sometimes called the G5 Regulations in short, it is part of an International Telecommunication Union (ITU) concept of continual technological development, with successive "generations" evolving from command-and-control public monopolies to collaborative regulation across institutions and stakeholders as part of a digital economy.

The main ICT sector regulator, Communication Authority has so far commissioned a study on OTTs, having previously adopted a wait and see attitude, even as other regulators such as the Kenya Revenue Authority stake a claim by introducing the digital services tax on some of these emerging digital services.

Regulators should however be mindful of the consumer benefits offered by online services/digital platforms since suppressing data driven innovation as developed and offered by the data economy can be detrimental to competitiveness of the economy as a whole and may not be sustainable.

Based on the regulatory gaps identified, Kenya needs to improve its Collaborative Governance structure by having deeper and more formal engagements within and between other digital economy regulators such as the Competition Authority, Consumer Protection body, the Kenya Revenue Authority (KRA), the Central Bank of Kenya, the Office of the Data Protection Commissioner, self regulated Internet Agencies, the Energy Regulator amongst others. The global nature of digital markets or economy will require more dialogue, consensus building and policy making at both domestic and international levels.

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[25] EU Expert Group on Online Platforms, https://digital-strategy.ec.europa.eu/en/policies/eu-observatory-online-platform-economy

[26] 5th Generation Regulation, ITU, https://gen5.digital/ accessed June 2022

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A List of Kenyan Data Market & Regulatory Imbalance

A.1 Kenya Data Market - Generic View

A.2 Kenya Data Market - Selected Sectoral View

A.3 Regulatory Imbalance - Operator vs Over the Top (OTT) players

Kenyan Data Market Taxonomy - Selected Players and Platforms, Generic View			
Generic Categories	**Global /International Players**	**Regional /Local Players**	**Data Monetization /Revenue Model**
Social Network Advertisement Platforms:	FaceBook; WhatsApp; Instagram Twitter; TikTok, YouTube Google Search Engine	Local Enterprises/Businesses operating on Global Social Networks and maintaining their own local audience/customers	Users and SMEs (eg Facebook Business) sign up and host for free and Advertisers Pay-per-viewed advert
e-Commerce Platforms:	Amazon; eBay; AliBaba, etc	Wasoko.com, Masoko.com; Jumia.com; Kilimall.co.ke; MarketForce360;Jiji.co.ke, Traditional Supermarkets with their online portal, etc	Suppliers upload items for sale and Customers buy online; platform owner charges a commission
Gig-economy Platforms	Uber, AirBnB, UberEats, GlovoApp.com; Freelancer.com, UpWork.com	LittleCab; Kuhustle.com; ajiradigital.go.ke ke.sweepsouth.com,Sendy, myjobsinkenya.com, etc	Commission charges on transactions between market participants
Cloud (Data Center) Platforms:	Amazon Web Services (AWS); AppleCloud(iCloud) Microsoft Cloud (Azure); Gloogle Cloud IBM Cloud, Huawei Cloud, etc	Safaricom Cloud; LiquidCloud; JTL Cloud; KENET Cloud; Node.Africa Cloud Dimensiondata.com, etc	Subscription model for SaaS, PaaS, IaaS;Freemium model (free services upto a limited data volumes and beyond which payment is triggered
Innovation Platforms:	iOS Platform (Apple AppStore); Android Platform(Google PlayStore) Harmony OS Platform (Huawei Apps); Sony Playstation Platform Store, Microsoft Xbox Platform Store	Safaricom API Portal, developer.safaricom.co.ke, Africa is Talking africastalking.com/	3rd party Developers build software and upload on the Platforms for Users to Purchase or Subscribe to;Platform owners get commission on each software deployed or sale transaction
Product Platforms:	Rent a Bike Services (https://abike.nl/) Rent a Tractor Service (https://hellotractor.com/) etc	None Identified at the moment	Charge commission on each transaction (market participants)
Integrated Platforms:	Big Tech Players (MAMAA; Meta(Facebook), Apple,Microsoft, Amazon, Alphabet(Google) provide several or all the above platforms as a Super-Platform	Government eCitizen Platform as well as Safaricom MPESA platform have potential to be a Super Platform	All the above; freemium, subscription, commission, etc

Table 1: Kenyan Data Market Taxonomy - Generic View.

Kenyan Data Market Taxonomy - Selected Players and Platforms, Sectoral View			
Sector	International Players	Regional /Local Players	Data Monetization /Revenue Model
Fintech:	PayPal.com; GooglePay, ApplePay; Skrill.com;Stripe.com; Branch,CryptoCurrency Exchanges (eg Binance, Coinbase) etc	MPESA;PesaPal,Cellulant; m-kopa.com; Paylend.africa, Flutterwave.com; CredRails https://www.credrails.com/ azafinance.com,Mobile Lenders(eg Tala.co.ke, Branch.co.ke,LocalBitcoin.com, etc	Commission and Interest charges on all financial transactions
Agriculture:	www.farm21.com; www.mfarm.co.ke; www.mkulimayoung.com; precisiondev.org; etc	TwigaFoods(twiga.com); www.mkulimayoung.com; Safaricom DigiFarm App; Digicow.co.ke; FarmDrive (farmdrive.co.ke), etc	charge a fee for Connecting Small Scale Farmers to Markets (eliminate middle men) or to Credit/Loans or to farming data
Telecoms and Broadcast:	Skype; WhatsApp; Instagram, YouTube, Telegram, Signal; Zoom; Webex; MS-Teams; SocialMeida Live Broadcasts (FacebookLive, InstagramLive,etc), etc	Global Platforms terminating local and International SMS, Voice and Video calls; Local Media Houses broadcasting news over Global Platforms (FB, InstaGram, TikTok) amongst other platforms like viusasa.com	Onboard free subscribers and data mine their personal digital footprint or profiles for Targeted advertisement markets
Media and Entertainment:	YouTube,Facebook Live; Instagram Live, TikTok Live; Netflix; Amazon PrimeVideo; DSTV; Showmax; Hulu.com; iTunes.com, Spotify.com; EventBrite, etc	Local Artistes broadcasting Shows on Global(FB, InstaGram, TikTok) and other Platforms lik viusasa.com	Subscription charges or one-time fees to attend online concerts or artiste shows
Gaming and Betting:	Sony Playstation (www.playstation.com);Microsoft XBox (www.xbox.com); Betting Companies (Betway; SportPesa; OdiBets), etc	Local Mobile Gaming Apps; Local Online Betting Companies	Subscription charges to the platforms and or Gamers shows; Users place bets and win or lose based on game outcomes
Education:	Udacity.com; Coursera.org; Learning.Linkedin.com; Edex.com; www.khanacademy.org; Melimu.com, etc	Local Providers kytabu.africa; elimu.org; mshule.com; enezaeducation.com, etc	Subscription charges to educational platforms;Per unit course charges or Free Course offered (with data mining option)
Health & Fitness:	Health Wearables (Garmin.com, Apple; Huawei; Samsung, etc); Health Digital Based Insurance Health Data Exchanges (www.midata.coop),etc	myhealthafrica.com; daktariafrica.com; www.dialdaktari.com; CarePay Digital Health Insurance www.carepay.com	Commission charges on each transaction; regular consultation fee

Table 2: Kenyan Data Market Taxonomy - Sectoral View.

Regulatory Imbalances - OTT Players vs Traditional Network Operators			
Serial No	Areas of Regulation	Network Operatos	OTT Players
1:	Applicable Laws	Domestic Laws	Home jurisdiction maybe; many gaps in applicable laws
2:	Taxes	Local and domestic taxes	Located in low-cost locations and tax havens
3:	Licensing	Must be granted or acquire licence from national governments	Mostly exempt
4:	Operating area	Only serve customers within the jurisdiction	Serve any user globally
5:	Network Infrastructure	Investing in new technology networks to deliver services to end-users	No investments in networks that reach end users, while telecom operators must deliver services to competitors
6:	Competition	Strict rules applying including ex ante and per se rules, mergers and acquisitions restrictions	Mostly exempt except mergers and acquisitions if OTT subject to domestic competition law
7:	Fees	Customers' charges contribute to the costs of network provisioning	Services offered without any relationship to the underlying costs - often free of charge due to two-sided market properties
8:	Quality of Service, QoS	License requirements include service-level agreements and or mandatory QoS standards	No QoS guarantee; QoS issues often blamed on network provider
9:	Interconnection	Required as part of regulatory regime; Additional costs	OTTs have no interconnection requirements for calling or messaging
10:	Network Neutrality	If applicable, best-effort data transport without discrimination, independent of source or nature of data. Only typically traffic management permitted	No obligations (control over content and freedom of choice concerning customers). OTTs could be affected if network operators apply traffic-management restrictions
11:	Universal Service	Mandated. Universal Service Obligation contributions as a percentage or network revenues	No obligations
12:	Privacy	Strict data protection and privacy requirements for users	Practiced on a limited and generally voluntary basis

Table 3: Regulatory Imbalance between OTTs and Operators.