



IMPACTVEST
ALLIANCE

INCLUSIVE
INNOVATION

BRIDGING ACCESS TO
TECHNOLOGY

POSITIVE IMPACT IS AT THE
HEART OF WHAT WE DO

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EXECUTIVE SUMMARY

This paper addresses the strategies and approaches that businesses have taken to both understand and incorporate greater inclusivity in their practices. Throughout this paper we maintain a definition of inclusivity that goes beyond consumer outreach and into a business model that incorporates the needs and knowledge of communities and their services. This entails that businesses can target specific groups when creating products and services, without being exclusive as long as they have made strides to work alongside those same community members.

This paper explores inclusive access to technology through three different paradigms of social division. The first being that of economics, the second being that of digital education, and the third being that of geography. The first section deals not only with matters of how low socio-economic groups can gain access to technology, but also on how investment relationships affect a company's ability to create financially inclusive services. The second section is on the technological divide, which addresses the role of education in increasing access as well as the need for corporations to build trust with consumers prior to the introduction of their services. The final section, which is the rural-urban division, focuses on the ways in which different infrastructures pertaining in rural and urban areas contribute to the growing geographical inequality, and offers a solution oriented approach in analysing the need for multi-level partnerships and collaboration across governments and business.

A central idea that connects these three sections is the need for businesses to form real and meaningful connections with communities. It is not just markets that bring success, but also human relationships. Building relationships and integrating that into a business strategy requires not only time but knowledge. This paper maintains that the type of information businesses must strive to collect and understand, is that of local community knowledge. Cultivating this knowledge can occur through working with community leaders, ethnographic market research, targeting local markets (relative to the business in consideration), and user feedback. However, what is most important is that this information is respected and properly utilised in the establishment and selling of products or services. The interviews we conducted confirm that enterprises benefit through learning from local customers and creatively adapting to local conditions, as long as the resources allow it.

The foundation for this whitepaper consists of interviews with eighteen business leaders that work across a variety of sectors spanning from healthcare, logistics, education, artificial intelligence, digital technology, agriculture, and fashion. Not only do these leaders work across different sectors and countries, but they also maintain a variety of positions, from that of founders, chief executive officers, chief operating officers, chief

EXECUTIVE SUMMARY

continued

strategy officers, and chief growth officers. The breadth of sectors, geography, and position has enabled this paper to bring together a diverse range of experiences and strategies. It was integral to our research process to cultivate a pool of interviewees who reflected the mission of creating more inclusive business practices. These interviews are the foundation of this paper's research and content analysis. It is crucial to note that despite the range of backgrounds featured throughout our paper, they are not representative of the entirety of their industries, nor do they claim to be. These conversations did not provide a uniform solution to the problems with unequal access to technology. Instead the varied responses and experiences allow this paper to paint a full picture of the potential technology has to advance society, particularly for members in vulnerable communities. Although the means of achieving this differed, it is important to note that every business leader interviewed maintained a mission driven stance to create positive social changes within communities. This commitment is one that stands above the differences as their impact serves to unify them together.

Acknowledgements

We would like to extend our sincere thanks to all the participants in our research, who generously shared their time, experiences, and insights with us. Their willingness to engage with our study was essential to the success of this whitepaper, and we are deeply grateful for their participation.

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FORWARD

Aisha Williams

Founder CEO at ImpactVest



Aisha Williams

"Inclusive Innovation: Bridging Access to Technology" – these words represent not only the title of our whitepaper but also underscore the tremendous potential of impact investments in shaping our shared path forward in building a more inclusive future. In an era marked by rapid technological evolution, where innovation continually reshapes industries, companies, and investment strategies; we stand firm in our belief that strategic impact investments are the solution needed to address vast disparities in technology access and funding opportunities.

This whitepaper serves as a comprehensive exploration of the potential of strategic impact investments across the public and private sectors in narrowing the technology divide, ensuring that the benefits of innovation are inclusive and accessible to all.

Inclusive innovation requires a collective effort involving stakeholders from various sectors – government, industry, academia, and civil society. This whitepaper highlights the pivotal role of collaboration as a driving force behind our shared objective: creating a more equitable and technologically advanced society that provides equal access to technology across geographies. Through strategic impact investments, data-driven decision-making, and concerted collaborative action, we can collectively pave the way for a future where technology truly serves as a force for unity and progress.

Together, we aim to build towards a future where strategic impact investments in technological innovation leave no one behind and drive positive change. In a world often marked by global technological disparities, this whitepaper serves as a reminder that well-placed impact investments can serve as a unifying force, connecting individuals rather than dividing them. It calls upon us to view technological innovation as a catalyst for societal good, one that empowers and uplifts every individual to achieve their goals and vision.

FORWARD

Aisha Williams

Founder CEO, ImpactVest Group

May the narratives that follow inspire you, as they have inspired us, to advocate for a more inclusive future through strategic impact investment in bridging the technology gap. Together, let us work towards transforming today's possibilities into the realities of tomorrow, forging a world where innovation, inclusivity, and strategic impact investment converge to empower global technological inclusion.

Aisha Williams



Founder and CEO
ImpactVest

FORWARD

Tonya Love-Lamote

Managing Director, ImpactVest Alliance



Tonya Love-Lamorte

Innovation is touted in urban communities, and not enough is reported of the less obvious impact of equally important rural and suburban geographic regions. This whitepaper will provide awareness of impact-based companies, fueled by innovation and the benefits of inclusivity. It calls for the transformation of business models to incorporate nontraditional factors and economic variables, including rural-to-urban communities. It advocates for the broadening of our perspectives and deepening our understanding of inclusivity.

We concur that one size does not fit all. Businesses need a diversified portfolio to have broad appeal for their constituents. Inclusive and diverse innovation drives economic growth across the board. Some rural communities lack access to the infrastructure necessary for the adoption of certain technologies that hinder their ability to connect with the global economy and participate in digital platforms. It is for these very reasons that we need investments to strengthen innovation and ignite economic growth and technological advancement in these areas. Bridging the rural-to-urban technology divide is key to global growth across communities. Bridging the rural-to-urban divide is critical for promoting inclusivity and ensuring equal opportunities for all communities, regardless of geographical location. This yields dividends for the greater good, and importantly additional economic results to the bottom line.

This paper pushes the boundaries and illuminates systemic barriers and challenges to achieving greater inclusivity. We are planting seeds of opportunities, that when nurtured, can achieve great outcomes together. Purposeful, inclusive innovation can enable the transformation of new business models including financiers, consumers, and corporations. It can enable businesses to create tailored technological solutions that meet the unique needs and evolution of their constituents.

Let this paper ignite your creative thinking, and open the aperture of your geographic boundaries. Together we can bridge this gap, one investment at a time, as we build momentum to become more global, more diverse, and more inclusive.

FORWARD

Tonya Love-Lamote

Managing Director, ImpactVest Alliance

Sincere thanks to our ImpactVest companies, our fund managers and their portfolio companies, and the ImpactVest Alliance research team. Your diverse expertise and perspectives provide invaluable insights into inclusive innovation and the imperative to bridge access to technology across a variety of geographies.

Tonya Love-Lamorte



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INTERVIEW PROFILES

This section contains the profiles of ImpactVest portfolio companies interviewed for this whitepaper.

AGENT-CONNECT



Eddy Kubwimana

Founder CEO



Eddy Kubwimana is the Founder and CEO of Agent-Connect, a startup based in Burundi, providing access to microfinance services for rural and peri-urban populations focused around the agriculture sector. It is the mission of Agent-Connect to make the access to financial institutions easier in rural areas in Burundi where more than 80% of the population do not have access to formal way of banking. Eddy is particularly passionate about machine learning, artificial intelligence, robotics, as well as applied economics. Eddy especially enjoys challenging situations that help him learn and think about addressing the many critical issues that face several developing countries .

BeGENIO LTD



Dr. Grace Olugbodi

Founder CEO

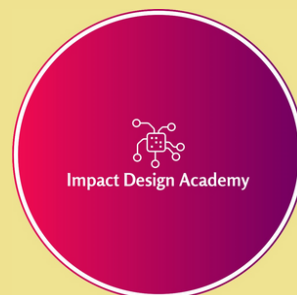


Dr. Grace Olugbodi is the Founder and CEO of BeGenio, a brand that helps children learn maths with ease. Dr. Grace has a strong background in computing and mathematics. She created her first board game "Race to Infinity" (first in the series), after volunteering in schools to help children struggling in mathematics. The BeGenio brand was launched shortly thereafter with a mission to help children fall in love with mathematics, make maths fun and enjoyable, build confidence, reduce and prevent maths anxiety and build opportunities for a successful future. The multi-award winning "Race to Infinity" board game series has been featured on BBC News and BBC World News. EasyMathSkills.com, part of BeGenio, is a hub of resources, learning aids and stories aimed at assisting children with their maths, supporting children in their learning and allowing parents to help their children.

INTERVIEW PROFILES

continued

BUY AFRICA / DEVELOPMENT DATA / IMPACT DESIGN ACADEMY



Panashe Taruwinga

Co-Founder

Panashe Taruwinga is Co-Founder of Buy Africa, Development Data and Impact Design Academy. Panashe is an avid technology enthusiast, combining his experience and interest in machine learning and artificial intelligence (AI). Through his passion for leveraging technological advances in AI, Panashe has a life-goal to equip youth in developing countries with AI skills while assisting small businesses to leverage data and technology to improve operational throughput. While he leads by example, Panashe is here to lead development of model back-ends for businesses that last. Panashe has a background in computer science and is an expert in Python, Java, Webflow, web-scraping, AI and machine learning.



Kelvin Tichana

Co-Founder

Kelvin Tichana is Co-Founder of Buy Africa, Development Data and Impact Design Studio. Kelvin is a passionate professional with a background in electrical and electronics engineering, specialising in the Internet of Things (IoT), embedded systems, and data analysis. His studies in electrical and electronics engineering from Ashesi University led Kelvin on a journey to explore the realms of intelligent automation, merging affordable hardware solutions with cutting-edge software that tackle everyday challenges. Through his proficiency in Python, C, and MATLAB scripting, Kelvin is on a continuous quest to bridge the gap between hardware and software.

INTERVIEW PROFILES

continued

CANISA HEALTH



Favour Madubuko

Co-Founder CEO



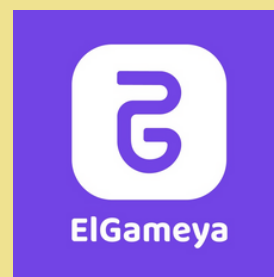
Favour Madubuko is the Co-Founder and CEO of Canisa Health, a tailored care platform aimed at helping hypertensive patients and other related non-communicable diseases. Currently pursuing a degree in computer science at Ashesi University, Favour is fueled by a deep passion for innovation and community betterment. His vision extends to providing telemedicine, health financing, and health insurance services tailored for the African market. He has a goal to merge his technical expertise and business acumen to deliver impactful solutions to his community, while embracing the principles of design thinking. Canisa Health was accepted into the prestigious FuturizeU incubator, a significant milestone for Favour as an entrepreneur. Favour recently became an ambassador for the African Digital Health Student Network, furthering his commitment to the advancement of healthcare technology on the continent.

ELGAMEYA



Ahmed Mahmoud Abdeen

Founder CEO



Ahmed Mahmoud Abdeen is the Founder and CEO of ElGameya, a financial technology startup that digitises the traditional money cycles of a rotating savings and credit association model (ROSCA), offering a hassle-free solution for anyone looking to achieve financial security. Despite his early start in the business world, by joining the family business at 14 years old, Ahmed never compromised on his academic pursuits. His dedication led him to pursue a degree in electrical, electronics and communications engineering at the prestigious Cairo University. Throughout his career, Ahmed has had the privilege to work with renowned organizations such as the British Council and IBM. Ahmed has also worked with software houses like Watheq, an electronic archiving company based in Saudi Arabia, where he successfully completed numerous impactful deals, including collaborations with the Saudi Ministry of Economy and the King Salman Center for Humanitarian Aid and Relief. Ahmed holds dear his creativity and sustainability values. He is also ambitious and driven with a passion for technology, leadership, and entrepreneurship.

INTERVIEW PROFILES

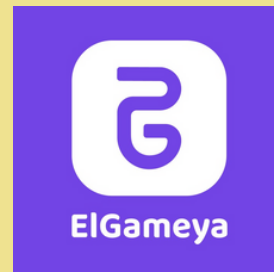
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ELGAMEYA



Basheer Hossam Torayah

Director of Engineering



Basheer Hossam Torayah is the Director of Engineering at ElGameya. Basheer holds a Bachelor's degree in electrical, electronics, and communications engineering as well as a Master of Business Administration (MBA) in marketing. His professional experience in engineering spans over several years, from Vodafone Egypt to Etisalat Misr, a major player in the telecommunications industry in Egypt. Because of his yearn and ambition to seek challenging opportunities that align with his values and expertise, without hesitation, Basheer accepted the role as Director of Engineering at ElGameya. Basheer holds his leadership position with pride and focus to achieve many goals for the company, a few among them, developing the technical aspects of ElGameya's strategy to ensure alignment with its business goals, as well as discovering and implementing new technologies that yield advantages over their competitors.

ELUME



Tinashe Blackie Kanukai

Founder



Tinashe Blackie Kanukai is a dedicated engineer and aspiring change-maker. Tinashe is an electrical and electronic engineering undergraduate from Ashesi University. With a solid foundation in engineering, Tinashe's expertise lies in research, design, and collaborative problem-solving. Through his passion for innovation and social change, Tinashe has led initiatives at Elume, a startup focused on combatting neonatal jaundice in Ghana. Awarded the Mastercard Scholarship for Academic Excellence, Tinashe is also an active mentor, guiding students through college and scholarship applications. Tinashe is part of an Ashesi research team, addressing Ghana's healthcare challenges. With practical communication skills and a collaborative approach to work, Tinashe is committed to leveraging engineering for positive change. Tinashe was also an electrical engineering intern at Emmanuel Consulting Engineers, a renowned engineering consulting firm.

INTERVIEW PROFILES

continued

FARMER FIRST TECHNOLOGIES AGRO LTD



Gyena Iliya

Co-Founder CEO



Gyena Iliya is the Co-Founder and CEO of Farmer First Technologies Agro Limited, an agrotechnology company that provides solutions to banking services, micro credit and market access challenges faced by over 30 million small scale farmers in Nigeria. The company's mission is to give farmers tailored solutions that address their specific needs. Farmer First Technologies Agro Limited is in partnership with AFEX commodities exchange, Lagos Commodities and Futures Exchange (LCFE). Gyena is on a project with the United States Agency for International Development (USAID), where farmers can gain easy access to inputs such as fertilizer, pesticides, insecticides, and herbicides.

FLERI



Sidi Saccoh

COO



Sidi Saccoh is an empowerment, entrepreneurship development expert/builder, programs manager, mobilization expert, entrepreneur, author and speaker who has worked and executed multiple programs in ecosystems across Africa, Europe, and the Middle East. He is currently the Chief Operations Officer of Fleri and was most recently appointed by the Ugandan Government Ministry of Science, Technology and Innovation as this year's Ambassador of National Science Week. Sidi has worked closely with international organizations like Seedstars, Cordsid SL, World Bank, World Health Organization, GIZ, Africa Business Heroes, HEC Paris, Africa Development Bank, and more, all in different capacities. Sidi is a multiple award recipient and nominee and was recently an honourable mention at the Black Tech Awards in the UK, was a finalist for the Great British Entrepreneur Award (GBEA) in the category of Entrepreneur for Good Award for the South East Region. GBEA is one of UK's most prestigious entrepreneur awards.

INTERVIEW PROFILES

continued

FLYSOL



Daniel Amoshie

COO



Daniel Amoshie is the COO of FLYSOL, a company revolutionising insect farming by automating the breeding process, using machine learning and computer vision to optimise breeding conditions. Daniel is passionate about electronics, machines and the Internet of Things (IoT). His open-mindedness and drive to learn new things enable Daniel to adapt quickly to this ever-changing world. With his enthusiastic and results-driven personality, Daniel strives to impact his community, while improving the lives of others. With his expertise and education background, Daniel envisions an exciting future delving deep into engineering and the technology world. Daniel holds the principles of being a team player, having integrity, and striving for excellence as fundamental guiding values in his life.

FLYSOL



Simbarashe Tanyanyiwa

CEO



Simbarashe Tanyanyiwa is the CEO of FLYSOL. He is an electrical and electronic engineer with an expertise in renewable energy integration, IoT applications, and healthcare technology. Simbarashe is passionate about driving sustainable change in agriculture, energy, and healthcare. He developed an impressive fuzzy-based energy management system that intelligently and automatically switches between different power sources and loads. This system efficiently adapts to changes in power production from renewable energy sources and load demands. By addressing economic constraints and reliability issues, it enhances the penetration of renewable energy systems (RES), making the use of RES-like solar more attractive and efficient in promoting the use of sustainable energy solutions.

INTERVIEW PROFILES

continued

ILLA LOGISTICS HOLDING



Mahmoud El-Zomor

Co-Founder, Group CEO



Mahmoud El-Zomor is Co-Founder and Group CEO of ILLA Logistics Holding, a digital platform that acts as an internal logistics department for fast moving consumer goods (FMCG) companies. Mahmoud is an experienced sales development manager with a demonstrated history of working in the consumer goods industry. Mahmoud worked at The Clorox Company as a Regional Sales Development Manager, as well as Coca-Cola Egypt where he held various roles including, but not limited to, Key Account Manager, Key Account Executive, and Sales Development Supervisor. Mahmoud El-Zomor holds a Bachelor's degree in Accounting and Business/Management from Cairo University.

ILLA LOGISTICS HOLDING



Mohamed Emera

*Partner
Group Chief Strategy Officer*



Mohamed Emera is Partner and Group Chief Strategy Officer (CSO) at ILLA Logistics Holding. Though his professional journey began as a mechanical engineer, Mohamed quickly realised his talents were more suited in the business aspects of the industry. Utilising his foundation in engineering, Mohamed co-founded Q-Performance, developing and implementing quality program strategies for clientele. Mohamed moved on to business development and strategy at Solasel before starting his journey at ILLA. Beginning as a business development manager, Mohamed advanced to Director of Growth before taking on the position of Group CSO at ILLA. Mohamed prides himself as an angel investor, having been an international partner with the World Business Angels Investment Forum for the past 4 years. Mohamed's interests also include tech entrepreneurship, fintech, climate technology, renewable energy and electrical vehicles.

INTERVIEW PROFILES

continued

O-NYUMBANI



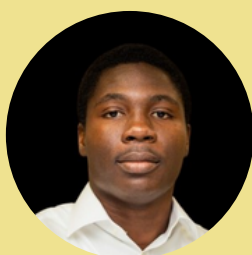
Jadis Azade Aganda

Co-Founder



Jadis Azade Aganda is Co-Founder of O-Nyumbani, as well as an aspiring mechanical engineer obsessed with change. Jadis has a keen interest in manufacturing processes, design, electronics, and entrepreneurship, which she hopes to use to drive transformative change in her community. Jadis is passionate about passing on skills to anyone willing to learn, a quality evident in the many mentorship programs she takes part in. She prides herself in her ability to perform tasks diligently, manoeuvre changes, and work well with people. She is eager to contribute greatly to a new technological era full of reimagined possibilities. Jadis constantly works to build her skills through projects in and out of school.

O-NYUMBANI



Kofi Sannie Amosah

Co-Founder



Kofi Sannie Amosah is a Co-Founder of O-Nyumbani and an aspiring mechatronics engineer. He has a passion for automation, agriculture, entrepreneurship, and electronics. Kofi is also passionate about improving the lives of people, which compels him to volunteer to help students manage their time while in school as well as other extra-curricular activities. Kofi is a leader capable of bringing the best out of his teammates, especially when handling projects which can be beneficial in a work setting. Kofi has regularly volunteered as a teaching assistant to high school students driven by his passion for developing the lives of youth. Currently, he is the president of the Time Management Clinic at Ashesi University, a peer-to-peer coaching service helping student achieve through time management.

INTERVIEW PROFILES

continued

ROLOGY



Salma Sakr

Chief Growth Officer



Salma Sakr is the Chief Growth Officer at Rology, a teleradiology platform solving the problem of radiologists' shortage and high latency in medical reports through matching cases from hospitals all over the world with the optimum radiologist remotely and instantly. Salma has a decade of experience in fast moving consumer goods (FMCG) at large corporations like Proctor & Gamble. Salma pivoted into start-ups approximately five years ago, and has not looked back. Salma is committed to Rology's mission of saving lives, and looks forward to impacting more people in more places in her current role. Salma is exceptionally skilled at, but not limited to, brand building, people management, marketing management, growth strategy, sales, business planning, organisational development and consumer products.

VAZEY



Safari Mugendi

Founder



Fueling a sustainable revolution, Rachael (Safari) Mugendi is the visionary force behind Vazeey, a startup on a mission to democratize fashion's sustainability. Vazeey makes fashion accessible and sustainable by providing products that reduce the fashion industry's carbon footprint and empower its partners to feel confident and express themselves fully. With unwavering commitment, Safari propels innovation in sustainable products, driving positive change. Vazeey pioneers a new era of impactful entrepreneurship with the potential to bring value to stakeholders.

INTRODUCTION

Bridging the digital gap between the developed and developing world has emerged as a central concern for impact investors, always looking at investment opportunities that reduce inequalities and increase inclusive growth. To this extent, digital transformation is stimulating job creation and contributing to addressing poverty, facilitating the delivery of goods and services, and contributing to the achievement of the UN Sustainable Development Goals for the Agenda 2030 (African Union, 2020). The COVID-19 pandemic has accelerated the transition towards a digital economy and underscored how a lack of internet access can hinder social inclusion and economic empowerment. While this digital revolution has brought numerous benefits, it has also exposed deep disparities in access to technology, leaving marginalised communities at a disadvantage. Impact investors, guided by a dual commitment to financial returns and societal impact, are at the forefront of efforts to bridge this divide.

The motivation of this paper goes beyond the wide acknowledgement of technological developments and innovations as driving forces of disruptions and growth. Through impact investing, we see the emergence of technology-driven social enterprises committed to narrowing the technological divide, ultimately creating a world where access to technology is equitable and inclusive. Together, digital entrepreneurs and impact investors are pioneering a future where technology becomes a tool for empowerment.

This report delves into the critical intersection of impact investing and the digital divide, exploring the opportunities and challenges that arise as technology continues to drive change on a global scale. Firstly, on the economic divide side, there is this challenge for digital entrepreneurs to create an efficient product that promotes technological advancement to precarious communities, while at the same time, responding to investor's investment criteria, and the remaining struggle within the methodology of combining business models with mission driven goals for social entrepreneurs. Secondly, on the technological divide side, digital entrepreneurs are putting considerable efforts in addressing the gap between marginalised communities by combining a human centred approach and the use of new technologies. The transformative power of technology is not without ethical and societal considerations. Thirdly, on the rural-urban technology divide, building digital infrastructure across marginalised communities has become a cornerstone for inclusive economic growth. This includes partnering with both public and private sectors to incentivise technology companies in expanding to rural areas by providing cost-effective solutions. These three characteristics will be the main focus of this whitepaper.

ECONOMIC DIVIDE

The introduction of digital technology has brought forth many changes and disruptions across societies. However, technology has not just affected groups who have access to these digital tools but also those without. It has strengthened communities as well as created further divisions in societies without it. In this sense, digital technology has transcended traditional social inequalities over geography and economics through the creation of a new inequality. Digital inequity has become a central point for social analysis, and has amplified past and current divisions particularly within the African continent. Our focus on the ways in which digital technology affects socio-economic divisions goes beyond the issues of affordability, it goes into how technology is creating economic inequalities. This is not to say that technology is inherently harmful, but more to point at the neutrality that lies innately within these tools. Ultimately, it is the businesses beyond these products and services who will determine whether technology benefits or harms communities. Digital technology can be both a force of equality and inequality.

The African continent has great economic potential that can accelerate business growth, particularly within the technology sector. The population growth occurring throughout the continent as well as the improvement to business conditions and regulations are contributing to an increase in household consumption and spending power. Household consumption is estimated to be over \$2.5 trillion in the year 2030 (Signé, 2018). Furthermore, income levels are rising among every socio-economic group and encouraging further demand in goods and services, particularly within digital technology. In the coming decade, 43% of Africans are predicted to identify with the middle or upper class (Signé, 2018). The growth rate and class mobility offers lucrative opportunities for businesses to invest and benefit from African consumer spending power.

Despite the potential held within Africa, many businesses and investors avoid this market due to high levels of perceived risk and political instability (Lashitew, 2022). While these concerns may hold validity over particular countries, they do not hold up when applied to the continent as a whole. Accessing the African market requires proper research and insight to specific countries and communities. Oftentimes this is knowledge that only domestic businesses and investors possess. This means that foreign investors are missing out on potential financial returns and development. In 2015, domestic investment in sub-Saharan Africa grew to amass more than \$322 billion. This number is expected to rise to over \$400 billion by 2025 (Iheonu, 2019, p.64). Meanwhile foreign investment into sub-Saharan Africa was \$23.8 billion in 2020, which marked a decline of over 13% from the prior year (UNCTAD, 2020). While domestic investment grows dramatically, foreign direct investment is in a period of decline despite the growth and potential occurring throughout the region.

TECHNOLOGICAL DIVIDE

It is undeniably saying that the world has become more connected, increasingly defined by connectivity. All manner of products, services and processes are now digital and digitised. Yet, there are still a few inhabited communities of the world left behind this digital connectivity era, leaving the impression that a global digital revolution is underway.

The UN's Broadband Commission for Sustainable Development estimates that nearly 3.6 billion people remain totally unconnected to the internet, representing 46.4% of the global population. This means that half of the world's population remains deprived of internet access, with penetration rates ranging from 12% in Central Africa compared to 90% in North America and Europe (Muller, 2022).

To begin with, there is a risk of seeing the "digital divide" deepen inequalities between countries and between individuals. Progress in digitisation has indeed been profoundly uneven. While one in every three people in sub-Saharan Africa is illiterate, female literacy rates of less than 50 percent (UIS, 2017). However, digital technologies could enable the global south to leapfrog and experience ground-breaking economic progress.

Whether it is by choice or lack of access, digital adoption in the global south lags behind that of developed economies. In this section, we identify the barriers to the adoption of new technology within communities.

RURAL-URBAN TECHNOLOGY DIVIDE

In the ever-evolving landscape of the digital age, where innovation shapes our economies, education systems, healthcare, and daily communication, access to technology and the internet has transcended the realm of convenience to become a fundamental necessity. Yet, as we stand on the precipice of an interconnected future, we are confronted with a stark and sobering reality; not all communities have equal access to the transformative power of technology. Nowhere is this divide more apparent than in the profound disparity between urban and rural areas—a divide that is not merely an issue of geography, but a complex interplay of economics, infrastructure, and social inequalities.

The status quo reveals a significant divide in global internet access. In 2022, 82 percent of urban dwellers worldwide were connected to the internet, a percentage 1.8 times higher than that of their rural counterparts. While this digital chasm is gradually narrowing, it remains a formidable barrier to progress and inclusivity. In Europe, this gap has been essentially bridged, with a narrow ratio of 1.1 between urban and rural internet users. However, elsewhere in the world, the divide persists, although with signs of hope. In Africa, for instance, 64 percent of urban residents were online in 2022, compared to only 23 percent in rural areas – a ratio of 2.8 (ITU, 2023). Yet, this ratio has improved from a staggering 4 in 2019, highlighting progress in narrowing the urban-rural technology divide. In the Asia-Pacific region, the ratio stands at 1.8, down from 2.4 three years ago, indicating a similar trend (ITU, 2023).

Inevitably linked to this unavailability of internet connectivity in Africa is the lack of access to electricity. Across the vast continent of Africa, access to electricity remains a sharp differentiator between regions. In the more developed regions such as North Africa and certain advanced countries like South Africa, Gabon, Ghana, and Botswana, a substantial majority, ranging from 68% to 100%, have access to the internet. However, in stark contrast, a significant proportion of countries in East, Southern, and Western Africa exhibit markedly lower levels of internet access, falling within the range of 36% to 67.9%. Central Africa, in particular, grapples with an acute digital divide, where access to the internet plummets to as low as 0% to 35.9% across both urban and rural

areas (IEA et al., 2020). This digital divide further permeates various rural communities across the African continent, highlighting disparities in electricity access among these distinct rural areas. For instance, in the rural regions of North Africa, a commendable 90% of the population enjoys the privilege of electricity access. In Southern Africa and East Africa, that number hovers at around 40%, marking a significant disparity. Venture into West Africa, and you will find that slightly less than 30% of the population has access to this vital resource. Meanwhile, in Central Africa, the figure drops to a mere 20% (IEA et al., 2023). These numbers are not just statistics; they are a reflection of a deep-seated inequity that persists, an inequity that denies millions of individuals the opportunity to harness the full potential of the digital age.

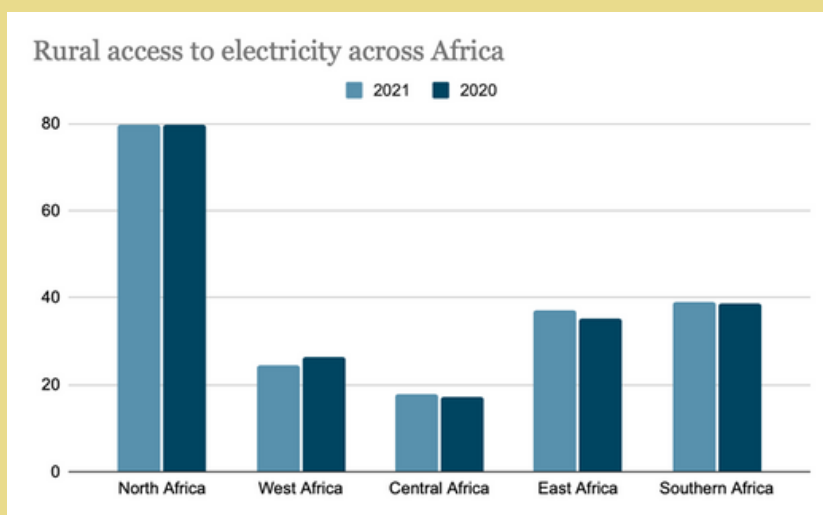


FIGURE 1. RURAL ACCESS TO ELECTRICITY ACROSS AFRICA (IEA ET AL., 2023)

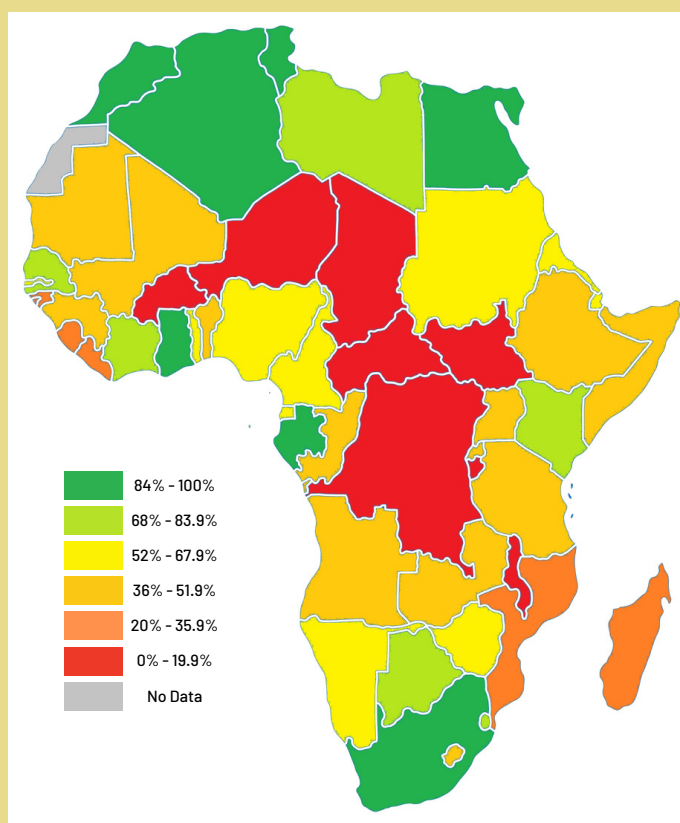


FIGURE 2. TOTAL ACCESS TO ELECTRICITY IN AFRICA (IEA ET AL., 2020)

Market forces play a pivotal role in perpetuating this digital disparity. Internet service and technology providers often find themselves disincentivized to expand their products to rural areas due to lack of necessary infrastructure for technology development in most rural environments, hence lower returns on investment. Moreover, factors such as lower population density, the absence of existing digital infrastructure, and less profitable markets create suboptimal conditions for business operations in rural areas. In contrast, urban centres present a more attractive prospect, characterised by wealthier and better-educated individuals, making them ideal markets for technology providers (Broadband Search, 2022).

Furthermore, a profound correlation exists between income and internet access. In the vast majority of sub-Saharan African states, rural areas bear the brunt of poverty, while urban areas experience greater economic mobility. This economic disparity further deepens the digital divide (Ngubula, 2017).

The consequences of this disparity extend far beyond mere connectivity. The untapped potential of bridging this gap is immense. Internet access obviates the need for businesses to be physically tethered to their customers, enabling expansion beyond geographical boundaries and unlocking hitherto unexplored opportunities in rural economies.

Efforts have been made to transition away from this status quo and reduce the rural-urban technology divide. The rapid expansion of mobile internet, which requires less extensive digital infrastructure compared to wired internet, is a beacon of hope. By the end of 2017, nearly 33 percent of sub-Saharan African residents owned a mobile phone, which is more than double the percentage in 2014 (Silver and Johnson, 2018). However, challenges persist, as prices for mobile internet remain relatively high, often exceeding 15 percent of gross national income per capita—a notable gap compared to the global average of 10 percent GNI per capita (Guerriero, 2015). Nevertheless, optimism arises from large-scale infrastructure improvements and investments, with projections indicating that an additional 300 million users, twice the current number, will come online by 2025 (Guerriero, 2015).

In this whitepaper, we delve into the heart of this digital divide, examining the multifaceted challenges, promising solutions, and innovative strategies that can bring about transformation in the lives of millions. We call for a collaborative approach—a united front among technology providers, governments, and communities to bridge this divide. Our journey takes us through the landscape of inclusivity, where technology is not a privilege but a right, accessible to all, regardless of geographical location. We recognize that the digital divide is not merely about unequal access to technology; it is about levelling the playing field and empowering individuals and communities with the tools they need to thrive in the digital age.

ECONOMIC DIVIDE

Balancing Impact and Economics

IMPACT AND FINANCIAL GROWTH

Impact companies place inclusivity at the centre of their mission, as they are ultimately human-focused. A human-centred approach means understanding the potential of individuals who will utilise the product and designing products with their needs in mind. In considering these factors, impact-driven companies understand inclusivity in different ways from the traditional definition. Inclusivity under the interpretation of corporate impact does not necessarily mean that businesses cannot create solutions that target problems endured by specific individuals, but rather that businesses will incorporate the direct experiences of those individuals. Thus, this paper calls for the expansion of the understanding of the word inclusivity within the business sphere to not only mean the incorporation of a wide variety of people, ideas, or services, but a transformation of business models into one that includes financiers, consumers, and corporations. Inclusivity in this sense, is the incorporation of corporate stakeholders and shareholders into the business model. This incorporation can occur through customer surveys, increased business interaction, research with consumers, and working with community leaders to be more informed on the problems that specific groups face. The expansion of understanding enables businesses to better tailor solutions to meet unique needs and developments.

"The most important challenge is finding people within the local community willing to partner and provide information."

Tinashe Kanukai, Founder at Elume

"You can create a beautiful product, but if it does not meet consumers' needs, they will not use it. I strongly believe in the importance of listening to consumers and understanding their unique needs before developing products. This is the only way to build products that endure and genuinely address our partners' needs."

Safari Mugendi, Founder at Vazeey

Localised knowledge not only provides companies with a competitive advantage over their global counterparts but also forms the basis for consumer trust and innovation itself. Ultimately, technology is the development of scientific knowledge in application to human practice. At its core, it is a tool in which to advance human activity. In maintaining this simple definition of technology, we can understand that technology necessarily involves and intersects with human practice. The creation of technology must be rooted in an understanding of human customs and behaviour, and not just within scientific invention. Therefore, innovators must possess both scientific knowledge and knowledge of the culture, so products can function for communities. If a product does not

meet the needs or desires of people within its market, it will not be used nor will it demonstrate its potential value. In order for technology to go beyond the theoretical and for it to achieve a usable value, it must meet the needs of the people. An impact-based approach to technological invention, places the needs of humanity first and recognises the importance of understanding the communities in which the technology will be used.

“You do not need to build the most complex model of technology. You need to build usable technology that is tailored towards the client.”
Mahmoud El-Zomor, Co-Founder and Group CEO at ILLA Logistics Holding

Investment strengthens innovation and propels economic growth and technological advancement across society. However, innovation is often risky as it offers new means to solve challenges that often remain untested or require prior funding to demonstrate the function of the technology. This means that innovation poses an inherent risk on behalf of investors, as products require funds upfront in order to prove their efficiency. This has a counter problem for companies who cannot gather the additional funds to produce data that can potentially take away some of the risk for the investor. These companies are often forced to cut funding from the development phase in order to finance niche data sets that benefit the investor rather than the consumer. Rather than increasing efficiency and technological advancement, this squanders a lot of innovation and makes it more difficult for products to be reached and used. Innovation is inherently risky, but with great risk comes high reward. This is a dilemma that either requires further funding on behalf of financiers or a willingness to accept higher investment risks.

“Low funding creates low expectations for innovation and potentiality. Increasing funding increases not only my expectations, but my creativity in establishing new technologies.”
Favour Madubuko, Founder and CEO at Canisa Health

The risk associated with technology is furthered when that innovation is occurring in regions of the global south. The African continent, due to both perceived and real risk, remains a geographical region in which investment funds are limited, despite the growing talent and ideas being produced. This means that technology companies that may originate from Africa face additional financing pressures to base themselves within countries in the global north to avoid deterring potential investors from their companies. However, this brings with it new challenges, as African-based companies have an advantage over foreign competitors in their ability to access local forms of knowledge to better inform them of the market in which their business operates. While registering a company outside of the global south may increase their ability to access foreign funds, it can also lead to a loss of connection and inside knowledge over the domestic market. This entails that many entrepreneurs face a struggle in adhering to the needs of investors or the needs of their consumers. One of the approaches that our featured companies have taken to bypass this dilemma is by registering their companies outside of Africa but maintaining a base within the continent to insure their company's ability to adapt to the needs of the local market and community.

“Finding the investors from the region that understand the opportunity and are not concerned about the political climate. They know the barriers that founders face, and the impact that has been already made, as well as the potential impact that can be made.”

Salma Sakr, Chief Growth Officer at Rology

“Many funding opportunities require companies to be based in the United States, which poses a significant challenge for African-based companies. Additionally, much of the funding flowing into Africa demands well-established companies, making it challenging for new start-ups to access essential investment opportunities.”

Safari Mugendi, Founder at Vazeey

The difficulty and the lengths that companies undergo to access foreign funding is a large deterrent to a business's success. For this reason, many turn to domestic sources of funding. The approach to seek investment opportunities from domestic sources is favoured by companies, as these are financiers who can understand the market. This can be a huge benefit as it entails that businesses do not have to waste critical resources on educating and informing investors. This is not to say that the latter approach is an easier option, as locally sourced funding remains limited in Africa compared to the amount of foreign funding. But more to highlight the struggle that companies bear within Africa in attempts to either receive limited funds occurring domestically or to inform foreign investors that the reality of the African market pertains beyond that of news headlines. This is a frustrating dilemma for entrepreneurs to face.

“Investors bring a lot of support in terms of on-ground experiences and partnerships in new markets, so if an investor is coming from outside of your sector or market then it is just going to be money that is going to less than optimised deployments. Start-ups have a higher success rate working with investors that can map out the ecosystem properly and who understand the risk within that economy.”

Mohamed Emera, Partner and Group CSO at ILLA Logistics Holding

Investors provide more than financial assistance; they also serve as an invaluable guide for companies to contextualise and better understand the market. Their investment goes beyond financial exchange, it is an integral social relationship where knowledge and communication become just as important as money. Finance and innovation are closely intertwined in that of a symbiotic relationship. Investment provides monetary resources and knowledge to develop and propel innovation, while innovation provides economic growth that can increase future investment opportunities. The relationship between these two elements is at the core of economic and technological progress.

INVESTMENT CAPITAL AND INNOVATION

For social entrepreneurs, a struggle remains within the methodology of combining business models with mission-driven goals. This combination challenges the traditional lines between philanthropy and business, and questions why the business sector has historically had limited interaction in humanitarian and benevolent pursuits. Impact businesses, demonstrate that profit and impact can coexist and can actually benefit and support one another. This is not to say, impact businesses are non-profits, but rather to affirm that businesses can be both impactful and profitable.

"We need to pursue solutions imbued with empathy that contribute to the betterment of society, all while differentiating ourselves from a charitable organisation."

Daniel Amoshie, COO at FLYSOL

"Impact does not necessarily lean towards non-profit organisations. As long as you have a start-up that is tailored towards solving a problem, that has an impact on its own."

Kofi Sanni Amosah, Co-Founder at O-Nyumbani

However, ultimately what distinguishes a business-run model for impact and that of a charity is profit. For a business to survive and to create impact, it must first make profit. This is not to necessarily say that the most important thing is profitability, but without it, positive social change cannot occur from within the organisation. Balancing profitability and being mission-driven does not have a uniform answer. Business leaders interviewed in this paper approached this equilibrium in a variety of ways, but critically all respondents dismissed the notion that impact would limit their company's financial returns.

"Because we are mission-driven, we understand the importance of our product to impact people's lives. We put serving people first and the profits will follow through the mission we are trying to achieve."

Dr. Grace Olugbodi, Founder and CEO at BeGenio LTD

"Just because we are making an impact by saving lives does not mean that we are not making money. We have a scalable solution and scalable solutions ultimately make profits because they can travel. Also, the infrastructure required is very low, which makes our product profitable and cost-efficient to the final consumer."

Salma Sakr, Chief Growth Officer at Rology

For some, financial gains stemmed directly from the positive influence their products had on communities. Their human-focused business approach meant that investment and financial return were secured on the understanding of the product having a higher use than just utility but for that of the common good. Impact-driven businesses seek like-minded investors, which enables the flourishing of profitability towards these businesses. These financial interactions serve to cement the idea that businesses have not only a responsibility to remain fiscally afloat but also to benefit society. Companies working with impact investors must not only demonstrate their profitability, but also the practicality of positive change within the world. This means that investors must be willing to spend additional time to listen and understand complex problems for humanity. The development of mission-driven products lies in the stories of individual humans, and understanding these experiences and motivations are critical pieces of information that investors must seek out. The very possibility that profitability can align with humanitarian goals further establishes a new business model that seeks to further distinguish and separate itself from a business tradition that has placed profit over that of people. It is for this reason that companies must identify and clarify their positions, so as to mark themselves as distinct.

In slight contrast, some founders described a slightly different approach to managing financial returns and profit, by highlighting the unique challenges that start-up companies faced in establishing impact. Start-up companies face large pressures from investors to properly demonstrate their ability to be profitable before receiving funding. This means that businesses in early stages must prioritise making a profit, to ensure they can create an impact in the future. Companies in this position do not ignore impact, but rather recognise that the impact-based benefit will occur in the long run. This is furthered by the understanding that positive impact-based change does not happen overnight, particularly when it comes to inequities within social structures and infrastructures.

“There is no point in building a whole technology if you do not have the capital to drive it. You will just be running your business to bankruptcy.”
Gyena Iliya, Co-Founder and CEO at Farmer First Technologies Agro LTD

“If I don’t have external funds, I cannot be impact focused. I have to ensure that the costs of my business are covered before I consider the potential for impact.”
Eddy Kubwimana, Founder and CEO at Agent-Connect

Start-up companies must become more established before further developing their impact-based missions. This is not a position that dismisses impact but rather redirects it to practicality. Impact and profit can co-exist to the aid of the other, but the organisation pertaining to them must be at a certain level of development. Furthermore, companies in the position to prove profitability in order to receive funding do not have to prioritise it over impact. Instead, entrepreneurs facing these circumstances understand that profit is a means to achieve impact and that being mission-driven necessarily entails needing to maintain sound financial returns. This may mean that companies will focus at first on establishing their services in areas that have a higher potential for financial return before targeting areas with lower potential profit margins but higher impact margins.

“Most of the time companies end up doing profit-based activities rather than impact-based activities. This can be seen in the predominance of businesses operating in urban areas rather than rural areas.”

Eddy Kubwimana, Founder and CEO at Agent-Connect

FINANCIAL INCLUSION

Creating impact goes beyond the establishment of technologies into product-based solutions and leans into the product’s ability to reach and influence consumers. Consumers who have the greatest potential to be positively impacted by products are usually those within vulnerable communities. Targeting impact-driven business products and services towards vulnerable community members has many challenges, particularly within the technology sector. This is primarily due to the nature of technology and vulnerable communities being more sensitive to change. When individuals are subsisting in precarious situations where a small alteration to their way of life could have drastic consequences, change takes on greater risk and responsibility. This means that companies promoting technological advancement to these precarious communities have a larger burden of proof when it comes to their product’s efficiency. This is a challenge for any company, but especially for start-ups who must pay not only for the cost of the service but also for extensive testing. However, it is not just testing that must occur but also verification and trust within communities.

“We need to evaluate the existing ecosystems in a country and how they are structured, to ensure that there is an infrastructure that can unify drivers and make them into a community, provided with basic rights and health insurance.

This ensures that you can truly leverage their skills and outcomes.”

Mohamed Emera, Partner and Group CSO at ILLA Logistics Holding

Interviewees tackled this challenge by incorporating local community leaders and knowledge into the development process of their product, to ensure that the technology is being tailored for maximum efficiency within specific communities. In addition, companies ensured that prior to entering markets with vulnerable communities, proper evaluation and research took place. The spread of knowledge and increasing communication between businesses and stakeholders became a critical means of decreasing technological risk. While these solutions unfortunately come at the expense of higher costs, particularly within the development stage of the product, these became necessary strategies for companies to ethically work with marginalised communities. Critically, impact businesses are not only working *for* vulnerable communities but are working *with* them. This is an important distinction for impact and development goals because businesses are not just providing individuals with useful services but are also serving to empower their customers to improve their own lives. Understanding and incorporating communities into business models allows for greater product efficiency, but more importantly gives consumers the opportunity to expand their own knowledge alongside that of companies.

"We deliver value to our customers through our products while simultaneously being inclusive, encouraging consumers to participate in fostering positive environmental changes. This enables local communities to make meaningful contributions to their own well-being through our products."

Daniel Amoshie, COO at FLYSOL

"So I think as a society, we all have a responsibility to support impact initiatives and give what we can give. We're all helping to raise citizens, responsible citizens that can contribute effectively to their own countries, to help their countries improve their economy, and make the world a better place."

Dr. Grace Olugbodi, Founder and CEO at BeGenio LTD

The value provided by companies under this approach is two-fold: consumers receive useful products that have been tailored to fit their unique needs as well as a product that enables individuals to give back to their own community. Approaches taken to achieve this empowerment had different forms that largely varied on the product or service offered by the company. For some, this consisted of creating sustainable products that with consistent use over time, will create positive effects in communities. And for others, it included educational services that infuse users with knowledge and confidence that can help propel themselves and their communities towards progress in the future. The idea of a product having both a use-value and a personal value is a part of a larger theory of development. This idea of development maintains and understands that progress, particularly within marginalised communities, must not come entirely from outsiders but also from within those groups. It is integral to recognise and work together with communities to identify leaders and to aid in the establishment of internal progress.

"Healthcare is human centred rather than profit-orientated.
Profit occurs in the long term horizon."

Favour Madubuko, Founder and CEO at Canisa Health

In addition, companies addressed the potential financial risks associated with working within a vulnerable community, by expanding the horizons for profitability. This is critical for early stage start-ups, who moved to transform this dilemma into opportunity by looking at the long term profits and impact that the company can make. Particularly for mission driven companies, evaluations must evolve beyond short-term profit margins and incorporate long-term measurements. However, it is important to clarify the context within human-centred businesses. A human-centred approach does not dismiss profit, but rather offers alternative interpretations over business orientation. Being profit-orientated necessarily implies that a company's goals pertain firstly towards that of financial return, factors occurring outside of its financial goals do not affect the goals of the company. Impact, under this orientation, is an independent result that does not have any consistent bearings or holdings on a company. A human orientation necessarily implies that in order for a

business to achieve its mission, a positive impact must be established and demonstrated. The impact is then the direct cause rather than an independent result of one's business operations. One can be orientated towards impact goals and ideas while still being profitable. Profit is then placed within a causal relationship, rather than being that of a result. Achieving financial returns in this sense is not the primary factor driving the business, but one that occurs as a cause of the mission of a business.

TECHNOLOGICAL DIVIDE

Barriers to Adoption

IDENTIFYING EDUCATIONAL BARRIERS IN TECHNOLOGY ADOPTION

"People have their unique cultures and traditions, and some may not readily embrace technology or change. It is essential that we concentrate on individual communities and tailor products and solutions that specifically address their unique challenges, taking into account their cultures and beliefs."

Simbarashe Tanyanyiwa, CEO at FLYSOL

In examining areas that lack access to digital services, many corollary factors occurred. The first being distrust in technological products and the services provided. The second being a lack of education surrounding digital adoption and education. The lack of information within some communities can also lead to a distrust in technology adoption, stemming from several major catalysts. For instance, cultural differences and beliefs as well as lack of technology infrastructure can lead to low interest in technology usage.

"Technologies that are working in Europe and the United States might not be applicable to us here in Africa, due to infrastructure differences. Lots of people try to copy and paste innovation. But that does not work. Technology must be built around particular issues to create impact."

Gyena Iliya, Co-Founder and CEO at Farmer First Technologies Agro LTD

Many African entrepreneurs recognise the importance of technology in improving and advancing societies and have sought opportunities to be a part of this spread. However, it soon became apparent that the business models used abroad were not only unsuitable for many African markets, but also the products themselves. In recognizing that foreign business model templates could not be simply replicated, African entrepreneurs realised that what was needed was significant product modification, that is contextually rooted in local communities. However, in order to develop locally relevant knowledge, they needed to be able to learn from the experiences of communities.

"Finding people within the community to work with is the best way to reach the targeted community. If you can convince these people within the community, then you are able to penetrate the community."

Tinashe Tinashe Kanukai, Founder at Elume

One strategy is to build trusted long-lasting relationships. Most communities will not accept change unless someone they trust inspires them to do so. The strategy is to find someone who grew up within the community, who understands the field, and can apply that connection to help lead technology providers. To help individuals better understand technological products, it is integral to employ trusted members of a community who can guide and embody the role of facilitators, intermediaries, or ambassadors. They have the ability to provide financial as well as digital literacy in communities who have been left behind. African digital platforms can also engage in direct customer engagement. For instance, through the providing of care coordinators that deliver a physical interaction rather than digital to help build up this baseline of trust.

Community engagement can also be fostered by adding functionalities in mobile applications such as the customer value management (CVM). Upon further investigation into community wide delays of technological adoption, it became clear that problems and given solutions were complex and required outreach that extended beyond traditional business approaches. In recognising this complex, featured companies implemented projects to increase community engagement to better understand their unique needs and aspirations. This leads to businesses being able to effectively offer users tailored services, making sure there are offers and promotions for the users to ensure their continual benefit of the product. Incorporating community feedback and responses into the decision-making processes, enables public as well as private decisions to be better informed to meet the needs of communities. It also has a dual effect on the targeted population, as it makes users accountable to change and contributes to better decisions. This ensures a slow shift in mindset to adopt new technologies by making the user an active actor of change. As companies evolve, so do the consumers. Companies need to recognise this change and evolve to meet the needs of the users of the product.

*"Overtime drivers became our client, and not just tools that give us the ability to deliver our product. Once we established this we took a lot of steps to ensure that our product was tailored and personalised to our drivers."
Mahmoud El-Zomor, Co-Founder and Group CEO at ILLA Logistics Holding*

Moreover, one of the leading factors in companies being able to facilitate greater community connection lies in their proximity to that social group. Once the entrepreneurs are clear about the needs of communities, they can establish a functional digital product and test the market response. This approach calls for creating products or initiatives that are customised to address the unique challenges and circumstances of individual communities. Instead of offering a one-size-fits-all solution, they are working within communities to create practical solutions and services that have been adjusted to local conditions, infrastructure, and institutional challenges. Therefore our analysis suggests that becoming localization experts can result in optimal strategy for most digital enterprises.

WORKING TOGETHER TO REDUCE THE DIGITAL DIVIDE

It is not just cultural and social differences that are contributing to inequities in technological adoption, but also differences in infrastructure and education. Providers and other support services have to find a way to make access to technology affordable and equitable. This section analyses how African digital enterprises can succeed and grow, while adapting their business model to the local population and resources.

“Simplifying the user experience is the most important thing when we want to impact change within a community. We don’t want to make it difficult, but make it as easy, as convenient and as fun as possible.”

***Kelvin Tichana, Co-Founder at Buy Africa, Development Data,
Impact Design Academy***

Many studies suggest that communities adopt technology at different rates due to ways in which technology is presented and perceived. As such, it is believed that the adoption of new technologies largely depends on how companies implement marketing strategies and educational programs towards communities. Businesses can overcome the varying levels of adoption by simplifying the user experience. From the provider side, making platforms simple, intuitive, and useful is the best way to increase technology adoption and utilisation. Democratising access to technology is undeniably linked with reaching more people and achieving a bigger impact on the population's degree of connectivity. It should be the developers first priority when conceiving a mobile application to make sure the majority of users benefit from it. Consumer usability is critical for tapping into the potential for progress that is held within technology and achieving bigger impacts on population. Moreover, the relatively high cost of internet access is part of the reason for low access rates, particularly in low-income communities. This means internet distribution networks must adapt their offering prices to the average salaries of the local population and find ways to lower their costs.

“The introduction of AI can be a great tool to analyse the user’s behaviour and consumer preferences and anticipate users’ needs by recommending services.”

Basheer Hossam Torayah, Director of Engineering at ElGameya

Another strategic move to increase customer’s trust in new technologies is to gain credibility within consumer’s networks. Gaining credibility through partnerships with accredited institutions can help mitigate perceived risks associated with new technologies. Customers may be more willing to adopt innovative solutions when they perceive a lower level of risk. This comes by amplifying valuable connections with accredited institutions. By forming partnerships or collaborations with these institutions, technology companies can leverage their credibility to validate their products or services. Their recommendations can directly influence customer’s trust and increase customer engagement. Additionally, digital platforms developers need to take into account the concept of combinatorial innovation: new generations of digital technology can

integrate with and build on previous generations, without the need for creators of the original technology to stay involved. This can enable African digital entrepreneurs to scale quickly and reach a wider audience. Combinatorial innovation allows for the rapid development and deployment of scalable solutions by building on existing platforms and infrastructure. This scalability is essential for making a significant impact in marginalised communities.

If improvements must be made from the provider's side, the user also has to increase their digital literacy skills. Without those required skills, users cannot effectively engage with digital technologies and leverage these platforms to their benefit. The introduction of new technology requires an educational phase by which individuals adapt new tools to their lives. Many users find it also difficult to adopt new technologies because of the technological language barrier and lack of digital literacy. For instance, the language diversity within Nigeria poses both a challenge and opportunity for inclusion of technological tools. It requires businesses to provide technological education and services that can be used in a variety of languages. There is a need to increase digital literacy and provide educational programs at a young age. Bridging the technology gap is not just a matter of providing further financing for technology companies, but also funding more infrastructure projects. Technological access requires adequate funding and operations of both the educational and business sectors. When it comes to matters of digital equity, business and education have the potential to simultaneously improve while benefiting the other. Technological inequality is not just a matter of injustice or unfairness, but about the waste of human potential and talent.

"To tackle technological infrastructure challenges in rural areas, we should broaden our efforts in the field of education. Since individuals in these areas may not possess the same level of digital literacy as their urban counterparts, it may be necessary to provide additional training before they can fully embrace technology."

Simbarashe Tanyanyiwa, CEO at Flyso

"Tech is a cross border that can reach every segment. We are not a bank that has an offline physical branch at a very high cost, we are a mobile app that is agile enough to penetrate segments."

Ahmed Mahmoud Abdeen, Founder and CEO at ElGameya

Digital entrepreneurship within communities can be a key driver in enabling change. Entrepreneurs must work alongside rural representatives to share knowledge that is accessible, affordable, and available to the youth, so that they can become impact makers themselves. This depends on establishing education systems and ecosystems that are supportive of businesses and entrepreneurs. Providing the youth population access to explore technology and to be creative in its applications to society is crucial to developing future generations of entrepreneurs and digital development. The cultivation of entrepreneurs in marginalised communities is offering new hopes of bridging the digital gap. These future business leaders can effectively create products that can be integrated into the lives of community members. In addition, entrepreneurship can be a solution to decrease youth unemployment in local areas. It has the double effect of being a remedy to create jobs for themselves, but also for others within their community.

Digital entrepreneurs are more agile than the government in adapting to market constraints. Given the competitive landscape, active players must be flexible enough to quickly adapt to market forces, customer demands and emerging technologies. It is entrepreneurs' role to find creative solutions to such market constraints. Mobile apps stand out as a cross border that can reach every segment. It is the role of the government to provide a supportive tech digital ecosystem, but then only digital entrepreneurs have the power to accelerate the transition to a digital economy by diversifying tech initiatives. Entrepreneurs have this ability to be flexible and tailor proposition offers to communities. They can have a more rapid response of action and accelerate the transition to a digital economy. Moreover, it is their role to find creative solutions to market constraints. In contrast, government agencies often face bureaucratic processes and regulations that can hinder their ability to respond quickly to changing market dynamics.

CORPORATE TRANSPARENCY AND DATA RISK MANAGEMENT

The massive adoption of digital technologies also means that policymakers must be aware of and address the complex legal and ethical impact of technology in society. There are systemic barriers preventing digital growth and ecosystem evolution, such as resources and databases.

"Governments and NGOs should ensure that they collect accurate data. One of the issues that we have in terms of research is that the available data is not necessarily accurate."

Jadis Azade Aganda, Co-Founder at O-Nyumbani

"We should be intentional about the data that we are using and make sure that the data is representative of the target audience."

Panashe Taruwinga, Co-Founder at Buy Africa, Development Data, Impact Design Academy

Data is important to make informed decisions to enter the technology marketplace as quality data can either make or break a business. However, identifying solutions and problems that individual communities face is hindered by the lack of data and problems with the accuracy of the data available. Many African digital entrepreneurs complain about the absence of reliable data. This adds an extra challenge for digital entrepreneurs to not only create solutions, but also to identify and understand the scale of the problem. This greatly limits the quality and speed of decision-making compared to their peers in the global north that already have access to a variety of data sources. This is equally problematic because they provide invalid and unreliable depictions of realities of markets, slow down the process of understanding regions, and delay potential ways to alleviate problems. The unavailability of high-quality data forces many local businesses to make business decisions without access to important market knowledge and material. The data gap not only affects a company's ability to make accurate predictions on the outcomes of their business decisions but may hinder a business's ability to expand their products or venture into new markets.

This in turn can negatively impact the company. The lack of reliable data calls for the implementation of a centralised data authority or organisation that could allow better control over data quality and consistency. This reduces the chances of errors and inconsistencies that often occur when data is collected and managed in a decentralised manner.

**"AI can help collect data and then use this data to ensure we can reach out to more people living in the same area."
Basheer Hossam Torayah, Director of Engineering of ElGameya**

Artificial Intelligence (AI) can be a solution to data collection and reaching out to marginalised communities. Traditional methods of data collection are often resource-intensive and time-consuming, making it difficult to obtain accurate and up-to-date information, particularly in remote or underserved areas. AI-powered data collection tools, such as automated surveys and machine learning algorithms, revolutionise this process by efficiently gathering and analysing data on a large scale. This newfound efficiency not only saves valuable time and resources, but also ensures that decision-makers have access to real-time insights. The introduction of AI can also be a great tool in analysing the user's behaviour, consumer preferences and anticipating the user's needs by recommending services. By leveraging natural language processing and predictive analytics, AI can customise communication strategies to resonate with the specific demographics and preferences of the target audience. This personalised approach enhances engagement and the effectiveness of outreach initiatives, ensuring that critical information and services reach those who need them most. Additionally, AI's ability to provide real-time translation services breaks down language barriers, facilitating more inclusive and accessible communication with diverse populations. In essence, AI empowers organisations and governments to collect data more efficiently and communicate more effectively with marginalised communities.

"We believe that AI will never replace radiologists, but radiologists that use AI will replace those who don't use it. We have seen AI fuel our growth in terms of productivity of radiologists, accuracy, matchmaking, early detection, and so forth. What's important is that we handle it in a responsible way."

Salma Sakr, Chief Growth Officer at Rology

"As entrepreneurs are trying to implement AI, the data acquisition process must be as transparent and ethical as possible to ensure they don't not infringe the rights of people."

Kelvin Tichana, Co-Founder at Buy Africa, Development Data, Impact Design Company

RURAL - URBAN TECHNOLOGY DIVIDE

Overcoming Geographical Hurdles

COLLABORATIVE PARTNERSHIPS: FOSTERING TECHNOLOGY ADVANCEMENT IN RURAL AREAS

In today's rapidly advancing digital landscape, it is imperative that rural areas are not left behind in terms of access to technology. Achieving this goal requires a coordinated effort involving collaboration between the government, private sector, and rural communities. These partnerships hold the key to increasing technology adoption rates in rural areas while maintaining and even enhancing existing technology advancements.

The government plays a pivotal role in ensuring that technology is accessible to rural communities. It must be intentional in allocating resources and creating an environment that fosters inclusivity. This involves investing in infrastructure development, such as broadband internet access, to overcome connectivity barriers. Additionally, the government can facilitate technological adoption by implementing educational policies that promote digital awareness and literacy. By offering resources and policies that enable digital inclusion, governments can empower rural communities to participate actively in the digital age.

"If the government is intentional with offering some resources and making sure that those resources are put in place, societies will be more inclusive."

*Kelvin Tichana, Co-Founder at Buy Africa, Development Data,
Impact Design Academy*

Collaboration with the private sector is equally essential. The private sector brings innovation, expertise, and resources that can drive technology adoption in rural areas. To maximise the positive impact of digital entrepreneurship, all stakeholders must adopt a long-term perspective. This means focusing on local assets and strategies tailored to rural communities' specific needs and capabilities. Private sector initiatives should extend beyond profit motives, with a genuine commitment to enhancing technology access and digital skills in rural areas. This can involve supporting local start-ups, providing mentorship, and investing in technology training programs.

There is also the transformative power of knowledge within rural communities. Once individuals in these areas gain digital literacy and technology skills, they become empowered to address local challenges using technology. This knowledge-sharing dynamic is crucial for community-driven technological advancement. Rural residents can identify problems within their communities and use their newly acquired skills to develop innovative solutions. This grassroots approach not only addresses local issues but also fosters a culture of technological innovation in rural areas.

“Once people have knowledge, it is easier for them to look into their community and figure out the problems that other people within their community are facing and use the learned skills to solve those problems.”

***Kelvin Tichana, Co-Founder at Buy Africa, Development Data,
Impact Design Academy***

Collaborative partnerships between the government, private sector, and rural communities are essential not just for introducing technology, but also for sustaining and expanding technological advancements over time. A continuous commitment to digital education and support networks is crucial. This ensures that as technology evolves, rural areas can keep pace and even contribute to technological advancements. It also prevents the expansion of the already existing technology divide between rural and urban areas.

“It is necessary to have strategic partnerships with governments who can provide low-band internet solutions to consumers in very remote areas. We have had cases of hospitals which are located in very remote areas, and those collaborations were helpful in making our platform accessible and utilised in those areas.”

Salma Sakr, Chief Growth Officer of Rology

“We are more agile than the government to bridge the digital gap. Government on its own cannot do the job all by itself, but it can help facilitate access to funding and market, and reduce taxes.”

Ahmed Mahmoud Abdeen, Founder and CEO at ElGameya

BRIDGING THE RURAL-URBAN TECHNOLOGY DIVIDE THROUGH RURAL INFRASTRUCTURE DEVELOPMENT

In today's rapidly evolving technological landscape, access and adoption of cutting-edge technologies are critical drivers of economic growth and social development. While urban areas are often at the forefront of technological advancement, it is equally essential to ensure that rural areas are not left behind. The rural-urban technology divide is a stark reality, with many rural communities lacking access to the infrastructure necessary for technological advancement. In this context, the importance of developing infrastructure in rural areas cannot be overstated. Without adequate infrastructure, rural communities face significant barriers in accessing education, healthcare, and economic opportunities. Furthermore, the lack of technological infrastructure in rural areas hinders their ability to connect with the global economy and participate in digital platforms, limiting their potential for growth and development. Bridging the rural-urban technology divide is crucial for promoting inclusivity and ensuring equal opportunities for all individuals, regardless of their geographical location.

**"The market is already there in rural areas,
what is lacking is resources and infrastructure."**

***Panashe Taruwinga, Co-Founder at Buy Africa, Development Data,
Impact Design Academy***

**"There is a grey area when it comes to development; we cannot develop in
tech without considering the people that have the least access to them."**

***Kelvin Tichana, Co-Founder at Buy Africa, Development Data,
Impact Design Academy***

To bridge this rural-urban technology divide and unlock the untapped potential of rural communities, governments must undertake strategic initiatives aimed at infrastructure development in rural areas. Pivotal areas for government investment are energy infrastructure and the establishment of a conducive regulatory framework that not only fosters private sector investments but also prioritises environmental sustainability. Moreover, international collaboration plays a crucial role in supplementing these efforts, providing support systems and opportunities for entrepreneurs eager to invest in rural technology development.

**"Two things the government can invest in to improve the investments of the
private sector is to invest in energy and showing energy is at a level that does
not become an overburden cost on private sector players. Second, to provide
a framework to allow the private sector to compete equally and uplift the
environment, collaborate with international partners to provide support
systems and entrepreneurs opportunities looking to make investments."**

Eddy Kubwimana, Founder and CEO at Agent-Connect

Investment in energy infrastructure is a cornerstone of rural technology development. Rural areas often face significant challenges when it comes to energy access and affordability. To catalyse private sector investments, governments must prioritise the development of reliable, cost-effective, and sustainable energy sources in rural regions. This involves harnessing renewable energy solutions like solar and wind power, modernising the energy grid, and implementing policies that ensure energy costs remain reasonable. By doing so, governments can create an environment where energy does not burden private sector players, making rural areas more attractive for technology-related investments.

Simultaneously, the establishment of a supportive regulatory framework is crucial. It should create a level playing field for businesses of all sizes and sectors, removing barriers that hinder private sector participation. To achieve this, governments can streamline bureaucratic procedures, reduce red tape, and harmonise regulations with international standards. Environmental considerations should be embedded within this framework, encouraging sustainable practices and responsible technology development. Additionally, the regulatory framework should prioritise transparency and accountability to ensure fair competition and prevent corruption. It is essential for governments to actively engage with stakeholders, including businesses and civil society, to gather diverse perspectives and ensure that the regulations are effective and responsive to the needs of all parties involved. This collaborative approach will foster innovation, promote economic growth, and contribute to a more sustainable and inclusive business environment.

“Governments should work with private companies to ensure that they reach areas that are often forgotten in terms of technology, such as rural areas. They could provide grants and tax reductions to these companies to ensure that they are properly motivated to get to these places because it’s a high risk for the companies to invest in the areas that have not been exploited before. Risk mitigation to these companies through funding, consulting, and implementing strategies that make it easier for the companies to go to these places.”

Jadis Azade Aganda, Co-Founder at O-Nyumbani

“Government needs to build policies that allow private sectors to be incentivised enough to take those recreational investments, in hospitals, internet provision and electricity power. That is the only way sustainability can be reached in those rural areas.”

Sidi Saccoh, COO at Fleri

Incentivising technology companies to expand into rural areas is a recommendable strategy for governments to improve access to technology. A practical approach in providing business incentives for technology companies to expand their operations to rural areas, includes risk reduction. This includes offering grants and tax reductions for technology companies who expand into rural areas. These incentives can offset the higher costs and uncertainties associated with entering untapped markets. Grants can be used for infrastructure development, employee training, and community engagement initiatives. Tax reductions can provide long-term financial relief, making it more attractive for technology firms to invest in these regions. Moreover, governments can offer consulting services to technology companies, connecting them with experts who understand the nuances of rural markets and who can facilitate rural operations expansion, a move that often comes with unique challenges and demands. These consultants can help navigate regulatory requirements, assess local market dynamics, and design effective strategies for sustainable growth.

Another obvious aspect that often increases this divide is the significant contrast in population density between urban and rural areas. In urban settings, people live in close proximity to one another, creating an environment that is naturally conducive to businesses seeking to market and educate the population about their products and services. In contrast, companies operating in rural communities often face lower returns on their investments due to the dispersed population and the associated challenges of a smaller consumer base with limited access to resources and infrastructure. This can make it challenging for businesses to reach and engage with potential customers and expand their operations effectively, which makes it difficult for companies to establish a strong presence and generate sufficient revenue in rural areas.

"In urban areas people live in close proximity to one another. This makes it easier for companies to market and educate the population on their products and services. Companies that operate in rural communities have lower return on investments. It is harder to choose the former but is integral for development."

Eddy Kubwimana, Founder and CEO at Agent-Connect

To bridge this gap and ensure that rural areas can also benefit from technological advancements without putting a financial burden on technology providers, governments can take deliberate steps to reshape rural communities, by making them more conducive to technological adoption. This would include creating technology-focused clusters in rural areas. Examples include establishing special economic zones or technology hubs in rural areas to provide a conducive ecosystem for technology companies to thrive, deploying broadband infrastructure to rural areas, ensuring that remote regions have access to fast and affordable internet services, providing access to modern utilities such as electricity and water to support technology-related activities, and developing transportation networks to enhance the overall connectivity of rural areas.

Nonetheless, the government's endeavours to extend technology solutions to rural areas can only yield meaningful results through robust collaboration with the private sector. Thus, it is essential for technology companies to show a deliberate commitment to customising technology solutions for rural communities. This includes enhancing their engagement with these communities to identify their precise technological requirements and subsequently tailor solutions that align with these unique needs. It also involves making the products easier to use, which fosters inclusivity in technology through a diverse consumer base.

"Fleri uses a community approach meaning that for every system they built, they understand their impact on people, involving community outreach, understanding their needs and family back home."

Sidi Saccoh, COO at Fleri

By actively involving rural communities in the development process, technology companies can gain valuable insights into the challenges and limitations they face. This collaborative approach ensures that the solutions provided are not only effective but also sustainable in addressing the specific needs of these communities. Additionally, by prioritising user-friendly interfaces and intuitive designs, technology companies can empower individuals with limited technological experience to easily adopt and benefit from their products.

COST-EFFECTIVE CHANNELS FOR RURAL TECHNOLOGY ACCESS

In the ongoing effort to bridge the rural-urban technology divide, one of the key considerations is identifying cost-effective channels that align with the technological landscape of rural communities. This involves understanding the specific needs and challenges of communities and tailoring technological solutions to the specific needs and capabilities of rural areas, where traditional internet access and smartphone ownership may be limited. One size does not fit all in bridging the technology divide. Understanding rural communities means recognising that internet connectivity may be limited, smartphone ownership may not be widespread, and digital literacy levels can vary significantly. Therefore, successful initiatives must be versatile, incorporating channels like short message service (SMS) and phone calls, as well as leveraging in-person agents to deliver services effectively.

“Identifying cheaper channels that are conducive to the technology landscape of the communities in rural areas, such as SMS, phone calls, or even using agents would help in making our technology accessible to consumers in rural areas.”

Kofi Sanni Amosah, Co-Founder at O-Nyumbani

In rural communities, where high-speed internet access can be scarce or prohibitively expensive, text messaging and traditional phone calls remain viable means of communication. Leveraging these channels to deliver essential services and information can bridge the gap between rural and urban technology access. SMS-based services are particularly advantageous in low-technology environments, as they require minimal data bandwidth and can be accessed on basic mobile phones. Rural individuals who may not own smartphones can still receive important updates, access educational resources, or receive healthcare information through simple text messages. Furthermore, utilising phone calls for interactive services ensures accessibility for those who may have limited literacy skills or physical barriers to using digital interfaces. In addition, text messages can also be a cost-effective means of communication in low-technology environments where internet connectivity may be limited or expensive. This not only extends technological access but also alleviates the need for rural residents to travel long distances in search of digital services. This makes it easier for organisations and governments to reach a wider audience and disseminate crucial information efficiently. Moreover, the simplicity of text messages allows for easy translation into different languages, making it inclusive for diverse populations with varying linguistic backgrounds.

While digital communication channels like SMS and phone calls are valuable, they may not be accessible to everyone in low-technology environments. In such cases, the role of in-person agents is highlighted. In rural areas, where technology literacy can vary widely, having local agents who are well-versed in technology can be a game-changer. These agents can provide hands-on assistance, training, and troubleshooting for technology-related issues. They serve as a crucial bridge between the digital world and rural communities, ensuring that individuals can access services and information without having to navigate complex digital interfaces independently. In-person agents can also play a pivotal role in building trust and familiarity with technology, making it more approachable for those who may be hesitant to embrace it. Moreover, where necessary, traditional methods like radio broadcasts or printed materials can still play a crucial role in reaching out to the population. These methods ensure that important information is delivered to those who may not have access to digital devices or internet connectivity.

While it is crucial to acknowledge the immediate need for access to technology, simply distributing low-technology devices is not a sustainable solution. These devices may serve as temporary measures, but they often lack the capabilities required for full participation in the digital age. Moreover, they can quickly become outdated, necessitating frequent replacements and increasing e-waste. Instead of perpetuating a cycle of dependence on outdated technology, a more efficient and sustainable approach involves collaborative efforts.

The public sector, as emphasised previously, plays a pivotal role in addressing the technology divide. Beyond traditional solutions, like offering resources and policies, public sector collaboration should extend to the creation of shared technology spaces in rural areas. These spaces could be public technology hubs or libraries equipped with advanced technology that is accessible at subsidised prices, making it affordable for rural communities. These shared technology spaces would not only provide access to technology but also serve as centres for training and education, offering workshops and programs to enhance digital literacy skills. By promoting equal access to technology and fostering a culture of innovation in rural areas, the public sector can contribute to bridging the technology divide and driving more inclusive and sustainable technological progress.

“Partnering with the public sector is critical for engaging with the community and ensuring that children who don’t have access to personal mobile devices have access to our product outside of the home.”

Dr. Grace Olugbodi, Founder and CEO at BeGenio LTD

“Reaching rural areas demands multi-level partnerships with other sectors. By collaborating with strategic partners, we can provide data services and devices, enabling vendors and users to access our platform.”

Safari Mugendi, Founder at Vazeey

CONCLUSION

This paper calls for the advancement of more inclusive business models, that encompasses knowledge and understanding over the needs of marginalised communities. The structure of this paper follows the strategies that fifteen companies have employed to ensure product accessibility across three traditional societal divisions: economics, education, and geography. The approach that this paper follows is a testament to our commitment to examine technology access among vulnerable communities whose needs and ideas have traditionally been forgotten. In addition to our examination of the ways that technology companies can adapt services for marginalised communities and consumers, this paper maintains a call for unity on a multi-level scale. Consumers, businesses, and governments must come together to better understand the unique needs and perspectives of each other. In conclusion, inclusive technology entails greater communication and understanding between these key players.

In placing individuals rather than quantity at the heart of inclusivity, strategic interventions into accessibility are those that understand the needs of specific communities. Inclusivity then lies within human understanding and connection rather than mere customer expansion.

In this sense, it matters not that a product or service is used by consumers, but that it benefits and provides value for its users. Ultimately this model entails the expansion of local communities and knowledge within a traditional business sphere. In placing communities at the centre of inclusivity, business models are able to incorporate both stakeholders and shareholders. This will not only shape the way that businesses make decisions, but also enhance products and services so they can be tailored around the needs of specific communities more efficiently.

LIST OF TERMS AND DEFINITIONS

CUSTOMER VALUE MANAGEMENT (CVM)

The process of creating and delivering value to customers while maximising the value captured by the company. It is all about understanding what your customers want and need, and then providing them with products and services that meet those needs. It involves understanding the customer's perspective and tailoring the company's offerings to meet those expectations. CVM is not just about providing good customer service, but about creating a value proposition and continuously, incremental value that meets the customer's needs at every touchpoint.

LOCALIZATION EXPERTS

The objective of localization experts is that services and/or products provided should appear to the user as though it had been designed in their country & culture and not imported from elsewhere. It is often confused with the translation method, as a way to adapt a message in the home country language. While translation and localization are two different processes, adapting the message is usually a part of adapting the digital experience. Translation is often the starting point of the localization process, which extends to adapting every aspect of your app to fit your target market's preferences: unit and currency conversion, date formats, imagery, legal regulations, and different technological standards.

COMBINATORIAL INNOVATION

Combinatorial innovation is another strategy used by digital entrepreneurs to improve innovation. It is a tool to combine existing technology and localised knowledge to co-create new inventions or solutions to complex challenges. In other words, it is the art and science of creating something new from a diverse range of available resources. To do it effectively, three actions must be taken: combine, cluster and complement. This approach can be very beneficial to African entrepreneurs seeking to adjust their business ventures to their community and effectively integrate them in the community's daily lives.

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INCLUSIVE INNOVATION: BRIDGING ACCES TO TECHNOLOGY

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