Unlocking the potential of technology for learning: the EdTech landscape in Rwanda

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Authors: Julien Christen, Jonathan Bower

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LIST OF ABBREVIATIONS

CAMIS	*Comprehensive Assessment Management Information System*
CPD	*Continuous Professional Development*
EdTech	*Education Technology*
EMIS	*Education Management Information System*
ESSP	*Education Sector Strategic Plan*
ICT	*Information and Communication Technologies*
MINEDUC	*Ministry of Education*
MINICT	*Ministry of Information and Communication Technologies*
OLPC	*One Laptop Per Child*
PII	*Personally Identifiable Information*
REB	*Rwanda Education Board*
TMIS	*Teacher Management Information System*

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1. Executive summary

Rwanda has joined the global trend towards Education Technology (EdTech), which seeks to improve learning outcomes using technology. In many low and middle income countries, children's literacy and numeracy rates are below expected levels and have largely remained stagnant. Rwanda is no exception: between 1991 and 2015, literacy rates among adult males increased by just 7 percentage points, making improving learning outcomes a top policy priority.[1] There is emerging evidence that EdTech may be an effective way to improve those outcomes at multiple levels of the education system.[2] This report seeks to map and understand the EdTech landscape in Rwanda by:

- Seeking to understand the major EdTech initiatives and players, and the policy environment on EdTech in Rwanda.

- Examining key opportunities for EdTech to improve learning outcomes and make the delivery of education more efficient.

- Outlining the supply- and demand-side challenges faced by EdTech providers.

To achieve these objectives, Laterite[3] carried out key informant interviews with 34 respondents engaged in the EdTech sector. We also integrate throughout this report relevant insights from the November 2022 EdTech workshop hosted by the Mastercard Foundation with the Ministry of Education, Rwanda Basic Education Board, and the Rwanda ICT Chamber.

Understanding the major EdTech players and the policy environment

Rwanda aspires to reach upper-middle-income status by 2035, and its policy frameworks demonstrate a political will to integrate the use of technology in education to improve teaching and learning outcomes. Respondents highlighted that COVID-19 provided a catalyst for demand for EdTech products in Rwanda, with many EdTech firms we interviewed noting that 2020 was their first year of operation. However, this effect has been fading since schools reopened and education went back to the status quo.

The government's ongoing work to prepare an agenda to develop the EdTech industry in Rwanda is laying foundations in policy, systems and digital literacy. This work is helping to keep momentum on the development of the EdTech industry in Rwanda. This is therefore an important moment for EdTech stakeholders to engage in discussions to ensure that the enabling environment for EdTech can be strengthened.

Respondents highlighted a number of challenges that policy needs to address to create a conducive environment for EdTech, including a perceived fragmentation and lack of communication and coordination between EdTech firms and government; a need to clarify

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[1] World Bank and Government of Rwanda, 2020
[2] Escueta et al., forthcoming
[3] Laterite is a data, research and analytics firm based in East Africa – www.laterite.com

and communicate approval and procurement processes; the need for regulation to safeguard vulnerable children and adults during the use of EdTech products; and the need to continue to build digital infrastructure, and more efficient information management systems so that data can be used for decision-making in the education sector.

Opportunities for EdTech to improve learning outcomes and efficiency

EdTech stakeholders in Rwanda are generally optimistic for the potential of the sector to improve learning outcomes at scale and in an inclusive way. According to respondents, EdTech solutions provide opportunities to tailor content to users, disseminate content at scale, and save costs on printing and textbooks for schools. It can build a support system for teachers to equip them with the training, lesson plans, knowledge products and tools they need, across the country.

However, this optimism should be nuanced by the reality of the situation. Great progress has been made in expanding digital infrastructure and internet access in Rwanda, but a lack of infrastructure and other enabling factors mean that the EdTech sector in Rwanda will be far from universal in its reach, at least in the initial stages. A shift to digital modes of education in the Rwandan context creates a real risk that EdTech solutions could reinforce existing inequities. These inequities will need special attention in the journey to scaling the EdTech industry in Rwanda.

Understanding supply- and demand-side challenges

Respondents reported that EdTech requires a chain of well-functioning components to succeed, such as quality infrastructure, hardware, and content. EdTech also relies on a range of background enabling factors, such as conducive policy, availability of funding and financing, and purchasing power of end-users. These two conditions are necessary and complementary to create the right environment for scaling up solutions.

On the supply-side, EdTech firms identified the following challenges: a lack of funding opportunities to develop digital infrastructure, increase the penetration of devices, provide relevant training, and enable the production of EdTech products and content; a lack of certain types of specialist skills as well as training matching those skills; and a need for a conducive policy and regulatory environment that promotes local firms, and optimizes resource allocation.

On the demand side, respondents shared that they were facing the following constraints: low purchasing power and/or willingness to pay from end users; a perceived reluctance from companies or public institutions to pay for training; lack of data available to generate evidence on which EdTech solutions work best in the Rwandan context, combined with a lack of user engagement to inform decision-making and production of content and platforms; and a digital divide that prevents many teachers and learners from accessing EdTech solutions if they are not supported to do so.

This report proceeds as follows: section 2 introduces the study; section 3 details the approach used in this study; section 4 describes EdTech initiatives in Rwanda; section 5 describes the policy environment; section 6 defines EdTech in Rwanda; section 7 analyzes supply-side challenges; section 8 analyzes demand-side challenges and section 9 concludes.

2. Introduction

> *The Rwandan education system faces constraints that EdTech interventions could help to address. Recent evidence shows that such interventions were effective in low and middle income countries, and Rwanda showed openness towards EdTech, which is promising for its development. This report presents the results of a study that aimed to:*
>
> - *Arrive at a definition of EdTech in Rwanda and understand stakeholders' perceptions of the current stage of development of the sector.*
>
> - *Understand the policy environment of EdTech in Rwanda, as well as the supply- and demand-side challenges faced by EdTech companies and NGOs.*
>
> - *Understand what the major EdTech initiatives are, including the level of education and users they target, and their funding sources; and who the major EdTech players in Rwanda are, both in the private, public, donor and NGO sectors.*
>
> - *Examine opportunities identified by EdTech stakeholders and by evidence, by which EdTech can improve learning outcomes and make the delivery of education more efficient.*

Increasing the use of EdTech is a global effort to improve learning outcomes by leveraging technology to provide quality education, which Rwanda has joined. Sustainable Development Goal 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".[4] However, children's literacy and numeracy rates in many low- and middle-income countries have remained stagnant or fallen below expected levels. This is driven by multiple factors.

In Rwanda, although school enrollment has been rising sharply since 2000, completion rates remain low for several reasons. For example, though there are no schoof fees for basic education in Rwanda, caregivers are faced with out-of-pocket costs such paying for uniforms and materials needed for their children to attend school. Costs like these cause some caregivers to "underestimate the benefits [of schooling] relative to the costs" and this reduces school attendance.[5] Repetition rates in early grades are high in Rwanda (23% in Primary 1)[6], thus leading to large classes which include many over-aged children. A comprehensive study of student dropout and repetition in Rwanda found that repetition is not a one-time event during a child's primary education.[7] In 2017, by Primary 6 an estimated 56% of children had repeated a grade at least twice, and almost 30% counted three or more repetitions. 67% of students had repeated at least twice by the age of 18. Older students who have repeated more frequently and accumulated more delays to their education typically come from lower-income

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[4] United Nations Department of Economic and Social Affairs, 2015
[5] World Bank and government of Rwanda, 2020, p. 61
[6] Op. cit.
[7] Laterite, 2017

families and are more likely to drop out of school.[8] These factors have implications for the efficiency of the whole education system and on the physical capacity to provide education to a large cohort.[9]

Improving the quality of education is also important. Quality of education can be defined by improvement in learning outcomes when attending school. Focusing on education quality is critical in Rwanda, where literacy rate among adult males aged 15 years and above has only increased by 7 percentage points between 1991 and 2015 to reach 75%.[10] The World Bank found that "in P1, 60 percent of students could not answer a single reading comprehension question, and more than 85 percent were graded as reading 'below comprehension'".[11] One of the reasons might be the language of instruction. Students who are taught in their mother tongue in the early years learn to read faster than those who are taught in an unfamiliar language.

There is evidence that EdTech can improve learning outcomes at multiple levels of the education system at scale when done right. A study of 77 randomized controlled trials of primary education interventions in low income countries found that primary school interventions using EdTech yielded the highest average effect size (0.15 standard deviations) when compared to other interventions, such as monetary grants, deworming treatments, or treatments that improved school management or supervision.[12] The research therefore suggests that EdTech offers clear opportunities for improving education quality at scale in low and middle income countries. Indeed, a number of EdTech interventions have been implemented in East Africa, with accompanying research showing how technology can be leveraged to improve learning outcomes.[13] Rwanda has joined the global trend towards Education Technology, with attempts as early as 2008 to deploy computers in all classrooms across the country. Recent evidence shows how the country leveraged technology during the COVID-19 to support and enable distance learning.[14] In this context, Rwanda shows political will to integrate the use of technology in education. This represents a major opportunity to improve learning outcomes through EdTech.

The goal of this study is to map and understand the EdTech landscape in Rwanda. This report aims to:

- Arrive at a definition of EdTech in Rwanda and understand stakeholders' perceptions of the current stage of development of the sector.

- Understand the policy environment of EdTech in Rwanda, as well as the supply- and demand-side challenges faced by EdTech companies and NGOs.

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[8] Cheriyan, 2021
[9] Op. cit.
[10] World Bank and government of Rwanda, 2020
[11] World Bank and government of Rwanda, 2020, p. 24
[12] McEwan, P.J., 2015
[13] See for example the EdTech Hub, a global research partnership that gathers evidence to help make decisions about technology in education - https://edtechhub.org/
[14] Ngabonzima et al., 2020

- Understand what the major EdTech initiatives are, including the level of education and users they target, and their funding sources; and who the major EdTech players in Rwanda are, both in the private, public, donor and NGO sectors.

- Examine opportunities identified by EdTech stakeholders and by evidence, by which EdTech can improve learning outcomes and make the delivery of education more efficient.

3. Methodology

> *In this section, we detail the research methodology used to answer our research questions and present some limitations to our research. The findings generated and presented in this report are not intended to be exhaustive, but they provide useful insights on the current EdTech landscape in Rwanda.*

We followed a qualitative methodology to gather the findings captured in this report. We carried out key informant interviews with 34 respondents relevant to EdTech, including respondents from 17 EdTech firms, 3 government agencies, 3 educational institutions, and 11 NGOs and development partners. The full list of key informants is in Annex 1. We selected respondents in three ways:

- First, using a list of firms involved in EdTech provided by the Rwandan ICT Chamber;

- Second, using a list of government, development partners and NGOs provided by MINEDUC from the ICT and Education thematic working group; and

- Third, from respondents identified using a snowballing technique during interviews.

Our aim was to target as many relevant EdTech stakeholders as possible, and our sample was limited only by who did not reply to our requests for interview and by any lack of knowledge we had about which stakeholders do major work in EdTech. The key informant interview guide that we used for the firms, and for the other respondents, is in Annex 2.

After interviewing the stakeholders, recording the interviews and taking detailed notes on each interview question, we analyzed common themes. To do so, we placed answers to each question for each respondent in an Excel document[15] and grouped them in columns according to question and theme. We did this separately for the 17 EdTech firms and the 17 government/NGO/educational institution/donor stakeholders. The interview guide for firms focused on products/platforms they develop (e.g., type of targeted end-users and their numbers, the business-model of the company). The interview guide for government/NGO/educational institution/donor stakeholders focused on how they engage with EdTech in Rwanda (e.g., if they fund companies or products). In both versions questions on broad issues such as the definition and stage of EdTech in Rwanda and the supply- and demand-side constraints were very similar. This strategy allowed us to effectively pull out insightful findings for each group of respondents. Throughout this report however, for ease of reporting, we provide insights from all respondents together if not specified otherwise. When possible, we visually reported respondents' answers using graphs to display, for example, the number of employees and end-users, as well as number of firms by types of funding, starting year, areas of work, and sources of revenue.

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[15] With one column per question and one row per respondent

We note some caveats to our research. First, whilst we contacted over 60 stakeholders, we were unable to interview over 25 of them, either because they did not respond to our request or because they were unavailable during the period allocated to interviews. In addition, our knowledge of stakeholders was limited to the lists shared with us. It is therefore possible that we missed stakeholders that we were not aware of. However, we believe that we were able to speak to the most active stakeholders. Second, we interviewed respondents from University of Rwanda, Rwanda Polytechnic, and Rwanda TVET Board but did not interview stakeholders in other educational institutions such as primary and secondary schools. The reason behind this choice was to get insights from stakeholders actively working in the EdTech sector rather than collecting information on user experience. Representatives of schools were however present in the November 2022 workshop. Third, we did not ask about revenue numbers for EdTech firms because of the sensitivity of the topic; however, our figures on numbers of employees may be a good proxy for this as well as companies' size more generally. Fourth, whilst our profiles provide an overview of what companies do, we do not analyze existing EdTech platforms from an ICT perspective. Fifth, the graphs in this presentation have been constructed retrospectively from interview notes and are based on a small sample size, and are thus intended to convey only general patterns on EdTech in Rwanda.

This report also includes insights from participants at an EdTech workshop hosted by the Mastercard Foundation Regional Center for Innovative Teaching and Learning in ICT in Kigali, Rwanda on 17-18 November, 2022. This workshop was hosted in collaboration with the Ministry of Education, Ministry of ICT & Innovation, and the ICT Chamber. It brought together around 80 participants, a majority of whom were EdTech entrepreneurs, while the rest were representatives from development partners and ministries, and school teachers. The goal of this workshop was to bring together all relevant EdTech ecosystem stakeholders in Rwanda to discuss the kind of ecosystem they desire and agree on a concrete plan to strengthen this ecosystem. The event was therefore structured around discussions to give a chance to everyone to raise their point of view. Those discussions were organized in the form of panels, break outs, and moderated open floors.

Insights stemming from this workshop are shared in yellow boxes to differentiate them from the results of the qualitative study.

4. EdTech initiatives in Rwanda

This section describes EdTech Initiatives in Rwanda, including firms and work by educational institutions, NGOs and funders. EdTech initiatives by firms and NGOs work on a wide range of educational subjects and levels in Rwanda, including primary to tertiary level, TVET and job-market readiness.

Box 1. Key facts about EdTech initiatives in Rwanda from our sample

EdTech initiatives by firms and NGOs work on a wide range of educational subjects and levels in Rwanda, including primary to tertiary level, TVET and job-market readiness.
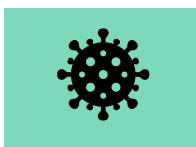
An outsized number of EdTech firms (8 in our sample of 17 firms) were founded or began work in Rwanda in 2020 as COVID-19 lockdowns took hold.

EdTech firms and NGOs most commonly create content and platforms but also provide technical assistance & training, and work on hardware and infrastructure.

All but 4 of the 17 EdTech firms in our sample have less than 10 employees in Rwanda.

The nature and number of EdTech users per firm varies widely (from less than 100 users to over 600,000).

Grant funding from development partners/NGOs is the dominant form of funding or financing for EdTech, but an increasing number of EdTech firms generate revenue through a business-to-business model.

4.1 EdTech initiatives in Rwanda

EdTech initiatives are spread across multiple educational levels and aimed at different users within those levels. Table 1 below shows private sector EdTech initiatives up to the end of Secondary 6 and TVET level 5; Table 2 shows development partner and NGO EdTech initiatives also up to the end of secondary 6 and TVET level 5; and Table 3 shows EdTech initiatives catering to the polytechnic and tertiary levels.

Table 1. Private sector EdTech initiatives, by educational level and user

Group	Primary	Secondary S1-S3	Secondary S4-S6	TVET Level 1-5
Management and admin	Ejo App	Academic Bridge, Ejo App	Academic Bridge	-
Parents	Twis, Ejo App, Diolichat, HAAPA Store	Ejo App, Diolichat, HAAPA Store, Academic Bridge	Academic Bridge	-
Teachers/ trainers	School Nest	School Nest, Academic Bridge	Academic Bridge	O'Genius Priority
Students	School Nest, Augmented Future, Twis, Eneza Education	School Nest, Eneza Education, O'Genius Priority	O'Genius Priority	O'Genius Priority

Source: KII respondent interviews, desk research

As Table 1 shows, EdTech initiatives by firms focus on the primary and secondary S1-S3 levels. Only Academic Bridge and O'Genius Priority focus on S4-S6 levels, and only O'Genius Priority focuses on TVET Levels 1-5. No firms that we are aware of focus on the pre-primary level.

Table 2. Development partner and NGO EdTech initiatives, by educational level and user

Group	Pre- Primary	Primary	Secondary S1-S3	Secondary S4-S6	TVET Level 1-5
Management and admin	World Bank	UNICEF, World Bank	UNICEF, World Bank	UNICEF, World Bank	-
Parents	-	-	-	-	-
Teachers/ trainers	VSO – Twigire Mumikino World Bank	Right to Play, World Bank, EDT, VSO, British Council – BLF, Elimu Soko/Dalberg	VVOB, World Bank	World Bank	Rwanda TVET Board, EDC-BRITE, World Bank, ADMA
Students	World Bank	UNICEF, World Bank	World Bank, UNICEF	World Bank	World Bank, Rwanda TVET Board

Source: KII respondent interviews, desk research

As Table 2 shows, development partners' EdTech initiatives focus across all levels, and unlike firms they have good coverage of pre-primary and TVET levels. However, they appear to have little focus on parents, an interesting contrast to EdTech firms. In particular, the World Bank has a broad range of involvement in EdTech and as such is a very important player in the space.

Table 3. EdTech initiatives at polytechnic and tertiary level

Group	Rwanda Polytechnic and IPRC Colleges	Universities and Teacher Training Colleges
Lecturers	Rwanda Polytechnic, ADMA, World Bank	UR-CODEL/moodle Other universities World Bank, Enabel
Students	Rwanda Polytechnic, ADMA, Talent Match	UR-CODEL/moodle, BAG Innovations, Training Hub, Talent Match, JICA, Enabel

Source: KII respondent interviews, desk research

As displayed in Table 3, EdTech initiatives at polytechnic and tertiary level aim at better instruction and learning outcomes, and at job market readiness. As for other educational levels, the World Bank has broad involvement at the tertiary and TVET level. Talent Match and BAG Innovations have especially innovative approaches to connecting students and graduates to the job market and helping them to foster relevant skills and experiences.

4.2 Rwanda's EdTech initiatives in numbers

EdTech firms and NGOs work in several key areas, including content production, creation and/or hosting of learning platforms, technical assistance and training, education management systems, hardware, and infrastructure and connectivity. As shown in Figure 1, content production is the category of EdTech activity that most firms and NGOs are working on, followed by learning platforms and technical support and training. Hardware, infrastructure and connectivity have fewer players but a high level of investment. This broad picture is a reminder that any program or policy aiming to support EdTech in a holistic way should take into account the different types of activity undertaken by EdTech initiatives, and not focus only on a single area. After all, the EdTech industry is an ecosystem.

Figure 1. Types of work done by EdTech initiatives
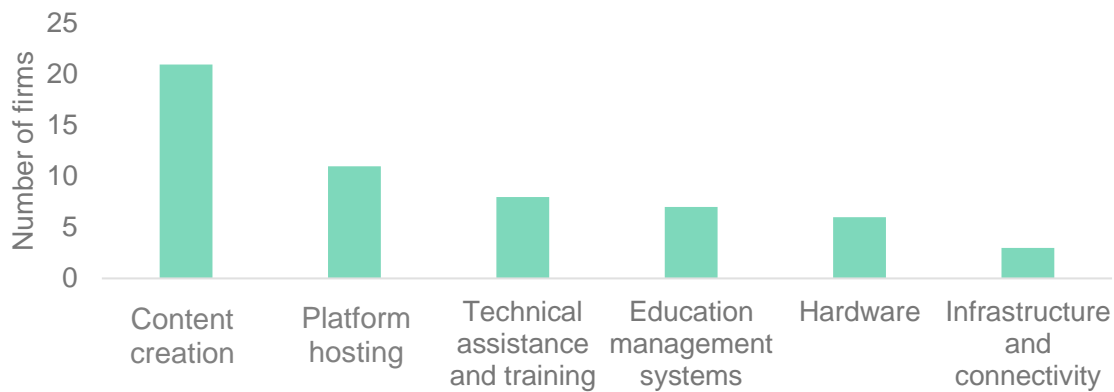
Source: KII respondent data, n = 29, which includes all respondents except for government; however some respondents are doing more than one type of work

Figure 2. Year in which companies were founded or began working in Rwanda
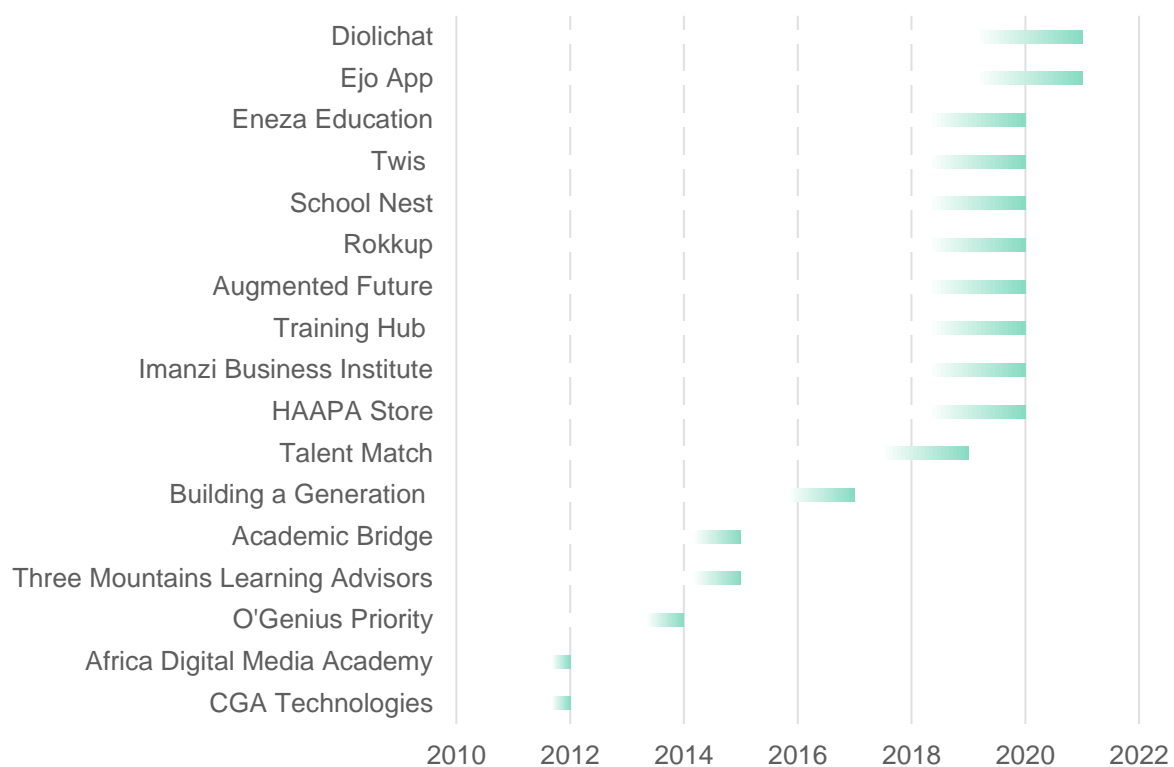
Source: KII respondent data, n = 17 firms that answered this question

As Figure 2 shows, 2020 was the year in which the highest number of EdTech firms were founded or began work in Rwanda. In our sample of respondents, 47% of firms were founded or began work in Rwanda in 2020, reflecting the influence of COVID-19 on demand for EdTech. Most of the firms we interviewed were founded in Rwanda except Eneza Education and CGA Technologies. In the case of Eneza Education, it is working in Rwanda

building on its potential in Kenya and gaining the highest number of users; however, the strong presence of local firms is encouraging.

Most EdTech firms are small and have less than 10 employees in Rwanda, as shown in Figure 3. Based on our sample, we estimate that there are 125 people currently employed at the 16 firms that answered the question about number of employees. Four firms in our sample employ more than 10 people: BAG Innovation, O'Genius Priority, Twis and Academic Bridge, the largest with 19 employees. These firms have been especially successful in EdTech but the small size of the average number of employees reflects the early stage of development of the EdTech sector.

Figure 3. Number of employees by firm
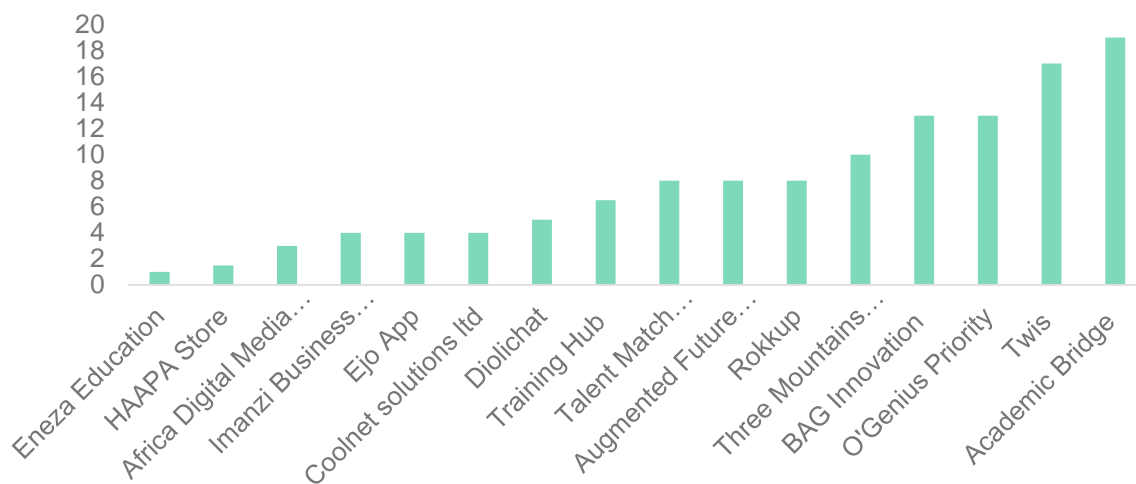
Source: KII respondent data, n = 16 that answered this question. Part-time employees are assumed to be employed at 50%

The estimated number of EdTech users, as at the time interviews took place in August to September 2022, varies widely from less than 100 to over 600,000, as Figure 4 shows. However, the term "user" can have a very different meaning for different companies – for example people who have accessed USSD-based content on their phone compared to teachers who have followed intensive blended training courses.

Figure 4. Estimated number of EdTech users as of August/September 2022
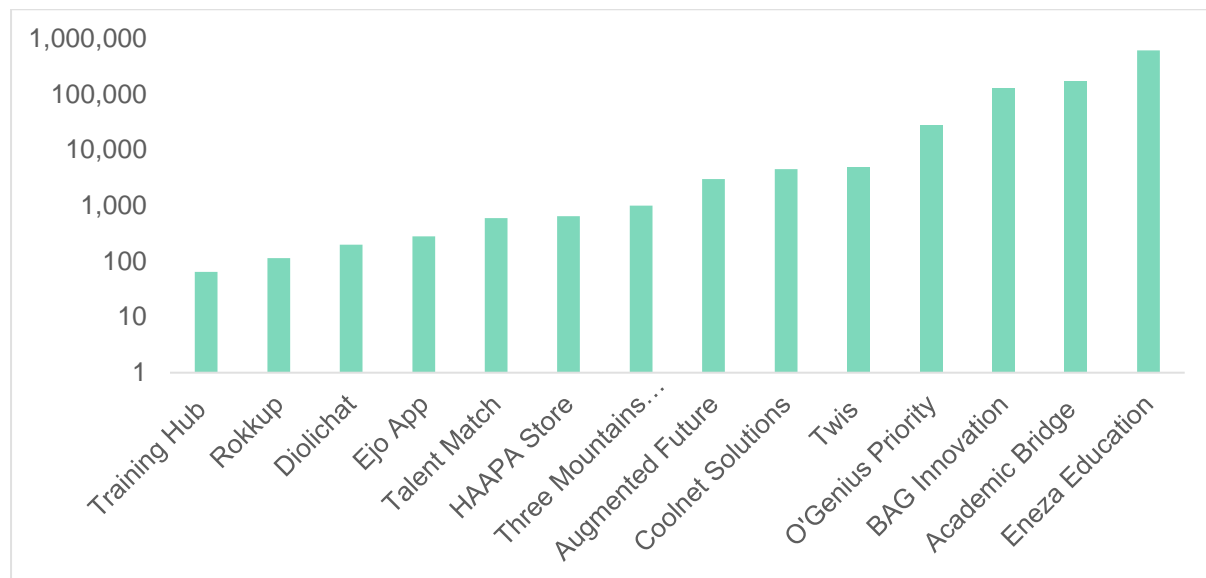
Source: KII respondent data, n = 14 that answered the question of number of users. Graph is adjusted for a base 10 log scale.

Figure 5. Sources of funding or financing for EdTech companies
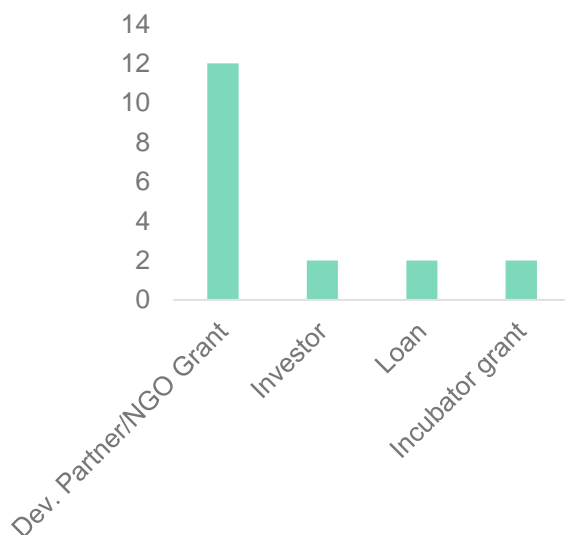
Source: KII respondent data, n = 16 firms that answered the question, but some firms specify more than one funding type

Figure 6. Sources of revenue for EdTech companies
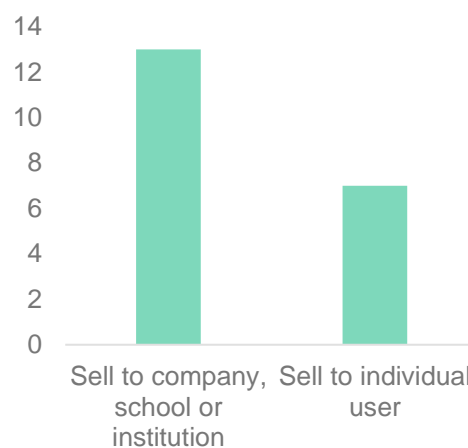
Source: KII respondent data, n = 14 firms that answered with a revenue source; there were firms that sold to companies / schools / institutions and to individual users

Development partner/NGO grants fund the largest number of firms – 12 in our sample (Figure 5). Investors, loans and accelerator/incubator grants are not a major source of funding – they fund 2 firms each in our sample. One firm borrowed money from MINICT. Other than

these sources, several firms are self-funded. Accelerator/incubator grants are usually made for small amounts, of between USD 2,000 and 15,000.

However, an increasing number of EdTech firms appear to be generating revenue. In our sample, most EdTech firms have a business-to-business model and sell to companies and schools, but some firms do sell to end-users. An online survey by the Rwanda ICT Chamber from 2020 found that just 6% of firms sell to parents or schools, and around 75% of firms put their content out as "freemium" or "free for now".[16] However, 14 out of our sample of 17 firms (our sample of 34 interviewees included non-firms) generate revenue by selling their products to firms, schools, institutions or individual users (see Figure 6). This is a huge increase in the percentage of firms that generate revenue.

The overview of the current initiatives in place in Rwanda leads to two conclusions. On the one hand, EdTech firms focus on all aspects of the education system, at all educational levels, and aim at all users within those levels. On the other hand, most of those firms have been newly created and do not yet operate under sustainable business models. This suggests that they still need support to develop and expand their operations until they become self-sufficient. This creates an opportunity for funders to play their part in this development. Solutions like business accelerators and incubators programs would allow those firms to scale-up their operations and improve the quality of their services. In addition, creating a platform where EdTech start-ups can interact regularly with government bodies, development partners, and end-users would allow for direct feedback on the needs and provision of solutions.

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[16] Rwanda ICT Chamber, 2020

5. The EdTech policy environment

> *This section turns to the policy environment around EdTech in Rwanda. This environment is centered around core policies that set the stage for enabling the development of the EdTech sector. We focus on Rwanda's Education Sector Strategic Plan (2018-2024) and the ICT in Education Policy and discuss the government's plans to develop a new EdTech policy. Participants at the November 2022 EdTech workshop highlighted key issues to consider in developing the new policy, such as a lack of communication between stakeholders and government, a lack of standards, a tedious approval and procurement process, and a need to clarify the new data security regulations that will soon enter into force.*

5.1 EdTech policy to date

Previous and current Rwandan government policies indicate a willingness to promote the use of EdTech in the country. This starts from Rwanda's Education Sector Strategic Plan (2018-2024), henceforth ESSP, a key policy document in the education sector. The ESSP states that "ICT will continue to play an increasing role in enhancing the quality of teaching and learning at all levels".[17] This policy focuses strongly on continuous professional development (CPD); however, any mention of ICT focuses not on its use as a means to deliver teacher training but on training in the use of ICT to educate students. This document illustrates nonetheless the general interest in leveraging the use of ICT in education.

When it comes to ICT-specific policies, in 2016 the Government of Rwanda launched the ICT in Education Policy. This is an important document for EdTech, and has the following vision:

> *To harness the innovative and cost-effective potential of world-class educational technology tools and resources, for knowledge creation and deepening, to push out the boundaries of education: improve quality, increase access, enhance diversity of learning methods and materials, include new categories of learners, foster both communication and collaboration skills, and build capacity of all those involved in providing education.[18]*

This vision statement makes clear the political will of the government to promote EdTech, and recognizes the breadth of uses of technology for the education sector. It creates room for stakeholders to operate and create the conducive environment for EdTech that the government is trying to encourage. The policy officially expired in 2020 but is still an important guiding document for EdTech until it is replaced. The policy contains four strategic objectives focused on an adequate ICT professional base, digital infrastructure and access,

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[17] Rwanda Ministry of Education, 2020ᵃ, p. vi
[18] Rwanda Ministry of Education, 2016

capacity to use ICT among education professionals, and integration of ICT into higher learning institutions.[19]

As a concrete example of those objectives, MINEDUC completed the National Open Distance and E-Learning (ODeL) Policy in May 2016. This document has the strategic goals to increase access to relevant, high-quality education and training at all levels in a competitive labor market; to integrate the provision of ODeL programs in the education system; and to guide ODeL institutional providers in the development of their own internal ODeL policies. This policy does not mention the use of e-learning for the purpose of teacher training. It does however create a framework in which teaching institutions and EdTech firms would benefit from working together to tailor content to the needs.

In an earlier EdTech-focused effort, in 2008 the Ministry of Education had started a major program, One Laptop per Child. However, Rwanda's program encountered operational challenges relating to charging, electricity, usage and other matters, as did several other countries that rolled out the same program. Over the past decade, the ICT in Education Policy pivoted away from the one laptop per child principle and towards the smart classroom principle. The policy gave the reason for this as "changing technology", and "to reduce costs and increase access and equity". The goal of smart classrooms is to "ensure that technology is integrated in all education processes i.e., preparation, delivery of lessons, assessments and research."[20]

Smart classrooms have been rolled out in classrooms across the country in a geographically equitable manner. However, a review in 2019 found that "while there is a lot of investment in the ICT in education, the rolling out and dissemination of Smart Classrooms has met a challenge of funding to have the desired model of classrooms, and access to infrastructure especially electricity".[21] In this context, the same operational challenges that prevented the success of the One Laptop per Child program are likely to remain unless large amount of investments are made on infrastructure, which also implies that funders would therefore have an important part to play in this strategy. The ICT in Education policy moreover recognises the need to provide infrastructure to remote and underserved areas. Relevantly, the Giga project is an important partnership focusing on EdTech infrastructure, between the Government of Rwanda, UNICEF and International Telecommunication Union, which is the United Nations' specialized agency for information and communication technologies. By 2030, Giga aims to provide 1 laptop per 3 students, 1 laptop per teacher and 50 desktops per school, improve internet speed and train all teachers on digital literacy.[22]

The government has also developed and is working to improve systems to use technology to manage the education system more effectively. These systems include the

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[19] The ICT in Education Policy has the following strategic objectives: 1. Develop a competent & relevant ICT professional base to meet industry needs; 2. Increase ICT penetration and usage at all educational levels; 3. Develop education leadership and teachers' capacity and capability in and through ICT; 4. Enhance teaching, learning & research through ICT integration in HLIs. It covers the following major themes: ICT in formal education; ICT in non-formal education; access and equity; infrastructure; curriculum design, delivery and assessment; training and capacity building; management, support & sustainability; open distance and e-learning; multi-stakeholder partnerships; research & development; and monitoring & evaluation.
[20] Rwanda Ministry of Education, 2016, p. 4
[21] KT Press, 2019
[22] Giga, 2022

Teacher Management Information System (TMIS), Education Management Information System (EMIS) and Comprehensive Assessment Management Information System (CA-MIS). Development partners are involved in some of these, especially UNICEF on TMIS and the Building Learning Foundations project on CA-MIS.

The government is making considerable efforts to promote digital literacy. The government is running a lot of training in digital literacy for teachers and public servants as noted by the Ministry of ICT Joint Sector Review (May 2022). The Digital Ambassadors Program is led by the Rwandan Ministry of ICT and Innovation; it aims to increase the number of digitally literate citizens and contributes to a MINICT goal that 43% of the population is trained in basic digital literacy. For broad country context, the computer literacy rate among people aged 15-24 increased from 6.5% in 2005/2006 to 15.2% in 2019/2020[23] and 31% of teachers have received digital literacy training.[24]

Overall, the current EdTech policy framework indicates willingness from the government to leverage the use of technology in education. A concrete plan to move from the text of those documents to the implementation of strategies however seems to be missing, and would benefit from engaging stakeholders in the sector. This will also help address the challenges that were highlighted by respondents during interviews and which are discuss below. As some new policies are currently being discussed, funders and other stakeholders willing to support the sector would be in a good position to create a meeting platform for those discussions to happen.

5.2 Plans for a new EdTech policy

Since the ICT in Education Policy expired in 2020, the government plans to establish a new EdTech policy. This policy will be definitive for the field and will draw upon all the insights from the public sector, private sector and NGOs and development partners that have emerged in the post-COVID era. It is important in this context to create a platform where such actors can interact to address their specific concerns.

An important current EdTech policy in the pipeline is the Education Digital Transformation Strategy (2023-2030). This policy has been drafted and has a focus on facilitating teaching, learning, assessment and research, building digital skills of teachers, staff and students, and creating the foundations for data and analytics. This draft is not yet complete and awaits further consultation with EdTech players especially with the private sector. MINEDUC has also expressed interest in setting up a framework through which government and EdTech companies can communicate, collaborate and coordinate efforts to meet education sector needs. On the other hand, EdTech companies shared their impression of being left out from such discussions about strategic framework with government bodies and other stakeholders. Again, setting up a discussion and collaboration platform therefore appears to be a priority.

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[23] Rwanda Ministry of Education, 2021
[24] Giga, 2022

5.3 Policy challenges faced by EdTech firms

Respondents also cited a range of policy challenges that should be considered in the development of new EdTech policies including the Education Digital Transformation Strategy. This included a lack of coordination between EdTech firms and government; challenges obtaining government approval to roll out EdTech products; unclear procurement processes; and a 2021 data security law that is expensive to comply with. In order for data to be used for decision-making in the education sector, there is a need to ensure access to digital infrastructure and devices, to have oversight of evidence-based and coordinated allocation of resources to EdTech, and to provide more efficient management information systems. These challenges are explored further below.

5.3.1 Communication and coordination

Our qualitative research highlighted a lack of communication and coordination between EdTech firms and government. EdTech firms stated that there is a need to clarify how this relationship works, including the practical junctures at which firms tend to interact with government such as approval processes to work with educational institutions, and procurement processes. We discuss these in more depth in section 5.3.2.

Box 2. EdTech workshop insights – Improving collaboration among EdTech stakeholders

Insights from the November 2022 EdTech workshop: A call for improved collaboration among EdTech stakeholders

Participants highlighted a need for collaboration and coordination among EdTech stakeholders: between the government and the private sector, and between EdTech firms. The workshop represented a rare opportunity for different types of players in the EdTech sector, in the public sector, private sector, development partners and NGOs, to come together to discuss common issues and come to a common understanding. Honorable Minister of State Irere said:

> *"we have not had a session where we have had a heart-to-heart conversation like this [but] now is the time to have these conversations".*

At the workshop, the government gave a number of strong signals of openness to engage with EdTech players in the private sector: the Ministry of Education co-hosted the event along with the Rwanda ICT Chamber, and senior Ministry and REB officials were in strong attendance. The Minister of State asked EdTech firms what kind of support they need and appreciated the open dialogue. The Director General of REB announced his intention for REB to host a workshop in the near future at which EdTech companies can present the solutions they have and discuss commercial possibilities. Minister of State for ICT and TVET in MINEDUC Claudette Irere reiterated the government's plans to establish a new EdTech policy to replace the previous ICT in Education Policy. The Chief Digital Officer at MINEDUC stated the intention of the government to consult EdTech firms both during the drafting of this new EdTech policy and the next draft of the Education

Digital Transformation Strategy. Inputs from companies will be particularly important on issues like mechanisms for content creation and the acquisition of devices for teachers and students.

The Mastercard Foundation highlighted that it has already established an EdTech forum with a WhatsApp group and a series of radio programs on KT Radio called EdTech Mondays, in partnership with the Rwanda ICT Chamber. Origene Igiraneza, founder of O'Genius Priority, is an EdTech-expert board member for the Rwanda ICT Chamber demonstrating the inclusion of private sector stakeholders within the Chamber. EdTech Mondays discuss a wide range of topics related to EdTech from girls' education through digital learning,[25] to creating a resilient education system.[26] The show promotes dialogue on EdTech in Kinyarwanda and welcomes a wide range of guests from the private sector, educational institutions and government.

5.3.2 Government approval processes and procurement

EdTech companies and startups tend to have more difficulty than NGOs accessing government decision-makers or senior decision-makers in education institutions for the purpose of approvals to pilot or roll out interventions. Firms mentioned difficulty accessing decision-makers and completing interactions with them, and described approval processes to work with schools as inefficient and discouraging. EdTech firms do not have clarity about the approval process for EdTech companies to work with schools. There is room to improve communication of this process and the criteria by which EdTech companies can be approved to work in schools, and there is a strongly perceived need to make that process faster and more efficient. The following quotes from respondents highlight this fact:

> *"We can talk to them, but it's not initiation of the contact that's a challenge, it's seeing through the conversation."*

> - Interview respondent from an EdTech firm

> *"You have to go many steps above [a relevant] person. It's hard to get that kind of introduction. You are always talking to the wrong person."*

> - Interview respondent from an EdTech firm

Government procurement processes were described as "not very friendly"; they do not readily permit schools to buy EdTech products. For example, a recent change to the school fee structure has led to EdTech companies' contracts being cancelled because schools no longer have the resources. EdTech firms are perceived to not be prioritized in government procurement anyway. Moreover, the harmonizing of school fees, which was ostensibly done to make the education system fairer, has led to several EdTech company contracts being dropped.

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[25] KT Press, 2022a
[26] KT Press, 2022b

However, a new public procurement for innovation law was recently passed. Current discussions to finalize this new text revolve around very practical issues such as methods on how to procure pre-commercialized products, how to set up a design contest or how to finance a proof of concept. Participants at the November 2022 EdTech workshop called for the inclusion of EdTech companies during the consultation phase of procurement. Government participants expressed their intention to engage local firms to a greater extent.

Box 3. EdTech workshop insights – A call for consistent regulation and standards

Insights from the November 2022 EdTech workshop: A call for consistent regulation and standards

Participants at the workshop raised the need for a certification process by the public sector so that private EdTech firms can engage directly with schools and be confident that their product meets the needs of the system. Stakeholders also raised the need for clear instructions on how EdTech firms seeking to roll out solutions in schools can be endorsed by the public sector. Another interesting idea raised was a marketplace for approved and certified EdTech products.

MINEDUC stated that the new EdTech policy will address standards and requirements, and will allow for companies that do not yet meet the standards to be able to participate in a regulatory "sandbox". A sandbox exists under the National Bank of Rwanda for FinTech companies, which allows FinTech companies to test their product with real users before getting license from Central Bank. A similar model was suggested for EdTech.

An important challenge raised in the workshop to strike a balance between the need for EdTech standards on the one hand, and the need to not stifle innovation on the other. The distinction was made between certifying companies, which would stifle competition, and certifying products, for which competition can be preserved.

5.3.3 The cost of complying with data security regulation

There was strong agreement from EdTech firms and NGOs alike that compliance with Rwanda's law relating to the protection of personal data and privacy is currently costly, possibly prohibitively. The law, which was passed in October 2021 and comes into force in October 2023, requires that personal data is stored in Rwanda. However, the cost of data storage in Rwanda is several orders of magnitude higher than the cost of data storage in the cloud would be if sourced from international providers. Moreover, the quality of data storage by local providers was also questioned. However, the law involves strong penalties for non-compliance including a jail term and a fine of between 7 million and 10 million Rwandan francs.[27] One respondent from an EdTech firm suggested that the law could undermine the presence of EdTech firms in Rwanda, stating that without data security policy reform, "all the

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[27] Rwanda Ministry of Justice, 2021

EdTech companies [and other software companies] will set up abroad and sell their services to Rwanda".

Box 4. EdTech workshop insights – Compliance with data security regulation

Insights from the November 2022 EdTech workshop: Compliance with data security regulation

In response to the concerns raised by workshop participants, MINICT and MINEDUC stated that there will be ways to reduce the cost of compliance, and that the government will discuss with companies about how to reduce this cost "and identify the things in the law that are problematic." To avoid inhibiting innovation, government participants at the EdTech workshop reported that they were working to facilitate and reduce the costs related to the hosting of Personally Identifiable Information (PII) locally. One strategy to achieve this objective is the education network initiative led by MINEDUC that aims at linking all public schools in terms of data sharing. This increase in scale should help reduce the marginal cost of storing data locally incurred by EdTech firms and should create a conducive environment.

One workshop participant also emphasized the lack of regulation to safeguard vulnerable children and adults from abuse during the use of EdTech products. As EdTech products will be used with all categories of people, including some who are unable to provide informed consent, protective regulations need to be put in place.

6. Defining EdTech in Rwanda

This section details the key enabling factors needed to create a conducive EdTech environment and the key elements required to implement any EdTech intervention, as reported by EdTech stakeholders. The EdTech system is complex and consists of interrelated components, which presents opportunities to maximize the impact of interventions if they are thought through and implemented carefully. This section outlines some of the reasons to be optimistic about the future of EdTech in Rwanda, including some recent successes and acceleration of interest in the sector due to the COVID-19 pandemic. There are, however, several constraints to consider before EdTech solutions can become universal, in particular consideration of digital divides which play out across several dimensions, such as gender, income status, or rurality.

EdTech in Rwanda is a rich, multi-layered industry involving multiple stakeholders, target educational levels, users and challenges for the public and private sector. However, it is still an emerging industry without a representative body or clear definition of what is – or what is not – EdTech. Having a shared definition would allow for an improved understanding of how to engage with the sector and how to coordinate support. In this context, we asked EdTech stakeholders about their opinion on a definition of EdTech. All interview respondents generally agreed that:

> ***EdTech involves the use of technology to deliver content that enhances teaching and learning, for everybody, and the use of technology to deliver and manage education services.***

Respondents also agreed that EdTech can be used in multiple educational levels and settings including pre-primary, primary and secondary levels, tertiary level, TVET, teacher training and informal settings.

This section describes the overall stage of development of EdTech in Rwanda and contributes to reaching an agreed definition. It outlines the key elements needed to establish a well-functioning enabling environment for EdTech; details the current state of the infrastructure to support EdTech in Rwanda; and finally lists some of the reasons for Rwanda to be optimistic about the future of EdTech.

6.1 Enabling factors and elements of EdTech

All respondents agreed that the EdTech sector in Rwanda is an ecosystem. This ecosystem consists of underlying enabling factors together with a chain of well-functioning components that interact with each other dynamically as part of a system. Enabling factors therefore create an environment that is conducive for EdTech to develop, while the components actually bring it to life. In more metaphorical terms, enabling factors would therefore be the body and organs, while the components would be the nervous system and

the pysiological mechanisms that bring a human being to life. Figure 7 shows factors of the enabling environment required for EdTech to thrive. We see that an enabling environment for EdTech includes not only the presence or availability of infrastructure and devices but also an accommodating policy and governance framework to unlock funding streams for innovation, as well as human capital and digital literacy skills. Understanding the usefulness and potential of technology to lift the constraints faced by the Rwandan education system is also important.

Figure 7. Enabling environmental factors for EdTech to thrive

Governance	Financing	Human capital	Digital literacy & skills	Cost
• Policy frameworks • Data availability & management • Coordination	• Funding for EdTech infrastructure and content	• Skills to create EdTech products and host/run them	• Openness to technology • Digital literacy of instructors and learners • Pedagogical skill of instructors	• Purchasing power of educational institutions and learners (to buy internet bundles, EdTech products)

Figure 8 summarises the components that are necessary for any EdTech intervention to be rolled out successfully. Compared to enabling factors, these components allow implementers to reach end-users. They include infrastructure and hardware, a delivery mode that is fit for purpose, quality content, and support for educators and learners to use EdTech in the classroom as part of a blended learning approach.

Figure 8. Necessary components of EdTech

Infrastructure	Hardware	Delivery mode	Software & content	Instructional support
• Electricity • Internet • Connectivity	• Devices • Smart classrooms • ICT labs	Online platform or learning management system, e.g.: Zoom calls, MP3s, USSD, IVR, VR, SD cards	Digital materials/ courses that: Deliver curriculum-relevant content or support; Build professional skills	Use of EdTech in classroom / lecture room setting to support blended learning

Box 5. EdTech workshop insights – Opportunities and challenges for EdTech in Rwanda

> **Insights from the November 2022 EdTech workshop: Opportunities and challenges relating to the factors needed for EdTech to thrive**
>
> Participants at the Mastercard Foundation EdTech workshop in November 2022 confirmed that both the enabling factors and necessary components outlined above are essential to the development of EdTech products. The good functioning of the EdTech industry as an ecosystem presents both challenges and opportunities for Rwanda. It is an opportunity in the sense that targeting a single element is likely to have externalities on the system as a whole. However, it requires that interventions are carefully thought through and designed to avoid negative externalities. In addition, it means that mulitple interventions with mulitple actors could have the potential to induce systemic change.

6.2 **The state of EdTech infrastructure in Rwanda**

Infrastructure is a key component of a well-functioning EdTech ecosystem. There has been enormous progress on infrastructure in classrooms, but there is still a way to go on enabling digital infrastructure for EdTech. Despite great progress in the long-term (see Box 6 and Box 7), there is a need to invest in strengthening digital infrastructure.

Box 6. Recent improvements in digital infrastructure in Rwanda

Sources: Rwanda Ministry for Education (2021)[28], Roser et al. (2022)[29] and AA (2020)[30]
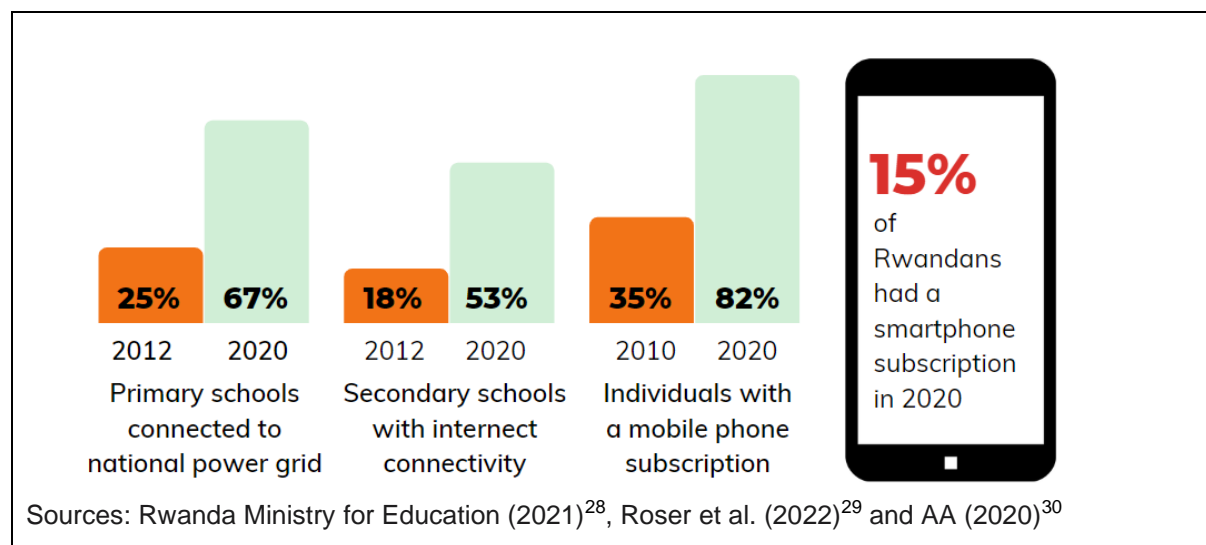
Box 7 demonstrates some backsliding in average provision of digital infrastructure between 2019 and 2021 due to an increase in the number of classrooms built which are not yet digitally

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[28] Rwanda Ministry of Education, 2021
[29] Roser, Ritchie, and Ortiz-Ospina, 2015
[30] AA, 2020

equipped. These numbers highlight the need to invest in strengthening of the digital infrastructure.

Electricity, internet and computer coverage for schools is partial, but is mostly improving according to the 2020/2021 Education Statistical Yearbook.[31]

67% 81%	**19% 19%**	**4% 17%**	**75% 83%**	**9% 23%**	**10% 45%**
Have on-grid electricity	Connected to solar power	Use a power generator	Have computers	Have a computer laboratory	Have a "smart classroom"

● Primary schools   ● Secondary schools

- The number of students per computer in primary schools has increased from 10 (8% in secondary schools) in 2019 to 13 (9%) in 2021.
- 46% of primary schools (61% of secondary schools) use ICT for teaching and learning in 2021, down from 58% (67%) in 2019, which can be attributed to "the new schools constructed in 2020, which have not yet received computers and been connected to the internet".
- 66.9% of households own a mobile phone.[32]
- Disparities in access to ICT across urban and rural regions are highest for the internet and lowest for radio.[33]

Overall, Rwanda is therefore in a much more comfortable position than a decade ago in terms of infrastructure necessary to support EdTech, but more efforts and investments need to be made to allow EdTech in Rwanda to progress to the next stage. The same conclusions can be drawn when focusing on other components of the system.

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[31] Rwanda Ministry of Education, 2021
[32] Rwanda Ministry of Education, 2020b
[33] National Institute of Statistics of Rwanda, 2014

Box 8. EdTech workshop insights – The state of EdTech infrastructure

> **Insights from the November 2022 EdTech workshop: The state of EdTech infrastructure**
>
> Honorable Minister of State for ICT and TVET in MINEDUC Claudette Irere said that COVID-19 had:
>
> > "exposed gaps in digital access in education and in connectivity" and that
> >
> > "high-performing digital infrastructure is needed to achieve the ultimate goal of EdTech to improve teaching quality and learning outcomes."
>
> Encouragingly, respondents in our sample and participants at the November 2022 workshop shared the common perception that "the ecosystem is ready": infrastructure is building up to the point that enables deployment of EdTech solutions in schools at scale, and teachers and learners are more open to technology than previously.

6.3 The progress of EdTech in Rwanda

Digital infrastructure has greatly improved compared to a decade ago as noted above. However, EdTech products are not yet mainstream. Few institutions or firms were active in EdTech for content delivery in Rwanda before the outbreak of the COVID-19 pandemic in 2020, and most of them had been founded elsewhere. Almost half of the firms in our sample were founded in 2020 (8 out of 17 firms). According to respondents, all levels of education are seeking to expand e-learning from primary to tertiary level.

Respondents expressed that generally students and instructors are enthusiastic to engage with EdTech, and that universities and schools have become more open to the use of technology after COVID-19. However, whilst COVID-19 boosted interest in EdTech and may have had a lasting effect, there are signs of waning interest compared to the peak during and closely following school closures. EdTech firm respondents noted that while business had been booming during the peak of the pandemic, opportunities were fading, and educational institutions were slowly going back to the default in-person education mode. Incentive systems should thus be put in place to ensure that efforts to develop EdTech are sustained and that the country keeps building on its successes (see Box 9).

Respondents stated that all subjects are suited to technology-enable instruction, but hands-on, practical and vocational education is more suited to blended learning than a fully digital approach. Although most firms that we interviewed focus on STEM and language classes, respondents considered that all subjects can be digitalized in part or in full. However, for hands-on or practical subjects such as those taught in TVET, EdTech could supplement hands-on learning rather than replacing it, in a synchronous and blended way using a real instructor.

For example, the EdTech model used by RwandaEquip has been shown in the Kenyan context to improve learning outcomes by almost an additional year of learning after two

years of school.[34] RwandaEquip provides highly detailed lesson guides to teachers using tablets, along with the use of other technology-based tools. Anecdotal evidence from the rollout of the program shows that EdTech used for lesson planning can save teachers significant time which they can dedicate to their students.[35] This is an interesting case in which EdTech does not replace people with technology but can release teachers to bring more of the "human element" to the classroom.

Box 9. EdTech successes in Rwanda

Respondents identified a number of EdTech successes in Rwanda including the following. We list here several examples from our interview sample that illustrate the potential of Rwanda to be at the forefront of EdTech. This selection does not imply that other initiatives are not successful.

- **Academic Bridge:** Successfully deployed in 200 schools in Rwanda which pay a subscription fee for Academic Bridge's information management system; won multiple awards including ITU eEducation Thematic Award at the ITU World awards 2016, which rewards innovation with social impact.

- **Eneza Education**: "97% of the learners that came to our platform had improved learning performance"; reached 24% of learners who are below or within the poverty bracket in Rwanda.

- **O'Genius Panda**: Won multiple international awards including Digital Africa 1000 Challenge 2020; was featured by United Nations Sustainable Development Network among the Top 50 Most Innovative Global Youth-led Solutions advancing SDGs in the UN 2019 Youth report.

- **Rwanda Coding Academy**: Successfully trained the first cohort of students with the skills required to start a career in the field of software engineering.

- **RwandaEquip**: Public-private partnership that successfully replicated a methodology that has proved to work in Kenya where participants in the program gain almost an additional year of learning after two years of school.

- **Tertiary institutions (e.g. Kepler, Carnegie Mellon University, African Leadership University)**: Rapid and successful shift to digital learning during COVID.

- **VVOB, Coding Academy and REB:** Their programme to teach school students to code using Scratch, which was piloted for 2 years in 54 schools, allowed 247 after-school coding clubs to be established, reaching 3724 learners of which 50% are girls; they were recently nominated for an award in Belgium.

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[34] Gray-Lobe et al., 2022
[35] Ibukunoluwa, 2022

EdTech can also be used for managing the education system, for example through Teacher Management Information System (TMIS), Education Management Information System (EMIS), Comprehensive Assessment Management Information System (CA-MIS), and others. EdTech firms say that some private schools show interest in adopting technology-based school management tools, and evidence shows that teachers endorse such initiatives in Rwanda.[36] When implemented at the national level, EdTech will have the potential to provide better data for decision-making and facilitate more efficient service provision.

Box 10. EdTech workshop insights – Capitalizing on COVID-19's acceleration of EdTech

Insights from the November 2022 EdTech workshop: Capitalizing on COVID-19's acceleration of EdTech uptake

COVID-19 was described by respondents as a "blessing in disguise" for EdTech as it accelerated interest and investment in the sector.

Lillian Mutesi from the World Bank said that the pandemic:

> "was an eye-opener in terms of supporting e-learning but [this] was not fully implemented to a satisfactory manner".

In addition, the Permanent Secretary of the Ministry of Education said that there is a need:

"to shift away from [using technology] for survival […] and ensure that technology becomes an integral part of the educational life".

6.4 EdTech and inclusion in digital education

EdTech stakeholders in Rwanda are generally optimistic for the potential of the sector to improve learning outcomes in an inclusive way. According to respondents, EdTech solutions provide more freedom than traditional ways of learning to tailor content to users. For example, EdTech offers a way to disseminate content at scale, saving costs on printing and textbooks for schools, and reaching more users at no marginal cost. It offers a way to build a support system for teachers to equip them with the teacher training, lesson plans, knowledge products and tools they need, in every part of the country.

EdTech content that is designed to be inclusive can help engage students with disabilities. According to UNICEF, "disability is one of the most serious barriers to education across the globe".[37] For example, the World Bank is working with Rwanda Basic Education Board to tailor e-learning content to children with disabilities and children in need of remedial learning. Another example is UNICEF's work with eKitabu on accessible digital textbooks and with Imbuto Foundation and Dot Rwanda on remedial learning. These examples suggest that digital content could be a candidate solution to address some of the constraints faced by learners at risk of repetition and dropping out.

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[36] UNICEF, 2022
[37] UNICEF, 2020

Personalized content designed to teach at the right level can ensure that diverse learners can all progress. USSD codes combined with an online platform can achieve impact in low-tech settings and is a cheap way to reach multiple users at different income levels. As an example, Eneza Education saw an improvement in performance by 23% among the users of their products[38], most of whom have income levels below national poverty lines.

However, the general sense of optimism that respondents shared for the future of EdTech in Rwanda should be nuanced by the reality of the situation. The beginning of this chapter noted the great progress that has been made in expanding digital infrastructure and internet access in Rwanda. However, at least in the earlier stages of its development, lack of infrastructure and other enabling factors mean that the EdTech sector in Rwanda will be far from universal in its reach. Some real digital divides play out across several dimensions, with gender, income status, and rurality already having an impact on student performance.[39] A shift to digital modes of education in the Rwandan context creates a real risk that EdTech solutions could increase and reinforce these existing inequities, leaving behind those who already face additional barriers to success in their education. These inequities will need special attention in the journey to scaling the EdTech industry in Rwanda. We provide more insights on this aspect later in the report.

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[38] Eneza Education
[39] Cheriyan et al., 2021

7.   Supply-side challenges

> *This section describes challenges experienced by EdTech firms in providing EdTech in Rwanda: infrastructure, funding, skills and training (supply-side challenges). Policy and regulatory challenges that affect the supply side of EdTech were discussed in section 5.*
>
> *In terms of infrastructure, funding and financing, the current level of development of digital infrastructure still requires large investments to accommodate initiatives such as smart classrooms. EdTech firms rely heavily on external funding and do not yet operate on sustainable financial models due to the emerging nature of the industry. They struggle to compete on the Rwandan market with foreign companies or those funded by government and development partners. Respondents also highlighted the challenges they face to find skills relevant for their work locally. At the 2022 EdTech workshop, participants suggested designing a certification process to create a conducive market for EdTech companies in Rwanda, and increasing collaboration between EdTech companies to tailor the availability of training to skills needs as the EdTech market grows in Rwanda.*

7.1 Infrastructure

Section 6 of this report outlines the need for investment in infrastructure to build an enabling environment for EdTech in Rwanda. This includes a need to improve electricity access and internet connectivity in all educational institutions, build the network of mobile phone and smartphone users, and improve digital literacy and training related to EdTech. In Rwanda, digital infrastructure and devices have thus far received funding from MINICT, MINEDUC and development partners; however, a shortage of devices available to teachers, lecturers or trainers, remains. The Rwandan government is committed to these goals: its Giga Project aims to extend digital infrastructure and devices across the national education system through an investment of USD 330 Million to achieve its objectives by 2030, including USD 70 Million to be invested by 2024.[40]

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[40] Giga, 2022

7.2 Funding and financing

EdTech companies see funding and financing as hard to raise, regardless of a firm's stage of development. In our sample of 17 firms, only one respondent firm initially said that this was easy. This firm respondent cited a combination of luck and skill with getting introductions and making contacts with NGOs, development partners and investors. However the respondent stated that "the termsheets we get offered from Rwanda and abroad are terrible", and conceded that raising funds in the range of 10,000 to 100,000 USD is in fact "very, very hard".

Figure 9. Word cloud of respondents' answer on the ease of finding EdTech funding EdTech

In the private sector, there is a scarcity of purely revenue-driven financial models and a high prevalence of grant funding from development partners. Some business-focused funding opportunities exist through accelerator or incubator programmes (for example, FabLab; 250 Startups), but the amounts distributed remain small. Firm respondents said that EdTech is hard to monetize but not impossible. Although private investors are generally excited about Rwanda as a market, due to the ease of doing business and the push for innovation, respondents perceive that there is a lack of willingness to wait long enough to get a return on their investment. Moreover, a lack of purchasing power or willingness to pay for EdTech products among households and institutions makes a pure private-sector model driven by individual subscriptions hard. Business to business models are more common.

However, some interview respondents argued strongly that since an important opportunity for EdTech is to improve the scale and efficiency of the delivery of education services, it is best thought of as a public good in the Rwandan context. This implies that spending public funding on EdTech is legitimate, and therefore that grant funding and public funding for EdTech is fair game. However, the existence of grant funding and public funding for EdTech is entirely compatible with a thriving private sector in which firms compete with each other for tenders put out by the government and development partners.

A government interview respondent perceived that EdTech companies in Rwanda are more expensive than foreign companies. The respondent's interpretation of this was that these firms do not have a wide base of clients and must cover all costs from few contracts, due to the early stage of development of the EdTech sector.

In addition, some EdTech firm respondents perceived government and development partner-funded products to compete unfairly with those created by local EdTech firms. They suggested instead that the same funding goes to paying local EdTech firms to undertake work, rather than having the work done in-house by NGOs.

One development partner respondent stated that there is a need for more evidence of what works in Rwanda and the region, to make a credible investment case for more EdTech funding.

7.3 **Skills and training**

EdTech firm respondents said that whilst multimedia skills are available or trainable in country, other skills are scarce. The skills identified by respondents as especially scarce are:

- Instructional designers
- People who work with impact metrics
- End-to-end web developers
- Business development or strategy
- Capability to develop dashboards and analyze EdTech data
- Capability to develop accessible content for learners with disabilities
- Capability to gamify content

Some skills are available but not affordable to firms. EdTech firm respondents suggested this may be due to competition from NGOs – often international and with more resources – which are able to pay higher prices and thus crowd out small businesses**.** At the same time some respondents said that NGOs do not know where to find local companies with the right capabilities to implement projects as they simply do not have information on which companies are capable of delivering which types of products and projects. One respondent expressed optimism that as EdTech demand rises, skill development will follow, suggesting that skills will follow the financial opportunities inherent in the sector. In this context, public infrastructure labs like klab[41] already exist with high end devices to help in production and coding of digital content, among other services.

However, EdTech firms said that the training on offer in Rwanda tends only partially to meet the real skill needs of the sector. Whilst some training is happening in EdTech firms like internal trainings, Google classes, Coursera courses and coding courses, and KOICA and Enabel-funded training on EdTech for the TVET, EdTech firms typically perceived the external trainings on offer to them within the country to not be tailored to their real skill shortages. For example the existing accelerators and incubators are perceived to duplicate each other's generic business training offer and not to add much additional value from an EdTech perspective. Therefore there may be an opportunity to provide more useful training in scarce specialist skills such as the ones listed above.

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[41] kLab (knowledge Lab) is a unique open technology hub in Kigali where students, fresh graduates, entrepreneurs and innovators come to work on their ideas/projects to turn them into viable business models - https://klab.rw/

Box 11. EdTech workshop insights – Supply-side challenges

Input from the November 2022 EdTech workshop: Supply-side challenges

<u>Funding and financing</u>

The Minister of State for ICT in the Ministry of Education expressed the view that EdTech should be harnessed in service of the public good and that EdTech firms should not seek to scale up only in a few schools that can pay, but should seek to build products that can be used across the entire education sector.

An EdTech entrepreneur was applauded for calling for the cultivation of a fair market in which the best product wins the bid, and the local firms are allowed access to opportunities and to compete on a level playing field. In response to the perception that government and development partner-funded products compete unfairly with those created by local EdTech firms, a MINEDUC official at the workshop stated that in the early stages of the COVID-19 pandemic, the government had to scale up their e-learning platform very quickly so they did not have the time to involve the private sector. Whilst the MINEDUC official acknowledged that this particular initiative was perceived to compete with the private sector, they affirmed that the government recognizes the need to foster the private sector.

Workshop participants agreed on the need for EdTech standards, and a clear path to certification for EdTech products, both of which would help to make a credible investment case for more EdTech funding (see workshop communique in Annex 4).

<u>Skills and training</u>

Participants suggested that talent transfer programs could be put in place to help transfer knowledge between large companies or management consulting firms and Rwandan EdTech startups.

8. Demand-side challenges

This section describes challenges faced by potential users of EdTech in Rwanda (demand-side challenges). Respondents perceived facing four challenges, while the positive impacts of COVID-19 on the adoption of technology for education were fading out. First, low purchasing power and willingness to pay make it unrealistic to expect end-users to pay for EdTech products unless their benefits are made more salient. Second, in this context, there is a call for more evidence on the usefulness of EdTech solutions, and to engage end-users in the development of EdTech products. Third, unequal access to technology threatens universal distribution, which could reinforce disparities among the population. Finally, respondents reported that openness to technology and the generally low level of digital literacy still impaired the uptake of EdTech. In this context, more advocating should be done to impact the mindset around the use of technology in the classroom. Again, more evidence on its success would help to achieve this goal.

8.1 Purchasing power and willingness to pay

On average, key potential users of EdTech - parents and university students - have low purchasing power and willingness to pay for EdTech. While the median household in Kigali earns 167 USD per month,[42] 39% of the population was below the poverty line according to the 2016/2017 household survey. This figure is higher in rural areas.

> *"Students at UR are mostly on government scholarships. They can't afford to pay for their own tuition. People are also unemployed"*
>
> *"If we can explain to parents the importance, they would pay"*
>
> - KII respondents from EdTech firms

Moreover, educational institutions are government funded, and often do not have the resources to pay for anything seen as "additional" to core expenditures – for example a contract with an EdTech firm to deliver a product. Resources are in fact provided to those schools directly by government institutions, thus crowding out the provision of resources by private stakeholders.

When it comes to companies or public institutions, respondents stated that some people in these institutions may not expect to pay for training (of any kind) and actually expect to receive per diem, a hotel and refreshments. They also expressed their hope that explaining the importance of e-learning to companies and parents might persuade them to spend more on it.

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[42] Bower and Murray, 2019

"in a company or public institution, [people] understand [that training means] getting paid, hotel, per diem. It's hard for me to make them understand they have to put in the effort"

- KII respondents from EdTech firms

8.2 The digital divide

As noted in section 6.4, EdTech solutions have the potential to improve learning outcomes in an inclusive way. For example, we mentioned ongoing initiatives in Rwanda to tailor e-learning content to children with disabilities and children in need of remedial learning. However, aiming for universal inclusivity must keep in mind the challenges in developing an enabling environment conducive to digital learning in Rwanda.

There is a digital divide in Rwanda across a number of dimensions: age, gender, household wealth, school type, location (rural/urban), and whether or not they have a disability all play into whether a student or teacher is able to access and effectively use digital tools, as well as their learning outcomes more broadly. For example, 86.4% of the urban population had access to electricity in 2020, compared to 38.2% of the rural population.[43] 13.1% of urban population owned a computer in 2017, compared to 0.9% of the rural population; these numbers are 12% and 0% when comparing the highest and lowest quintiles of the income distribution. 38.1% of urban population had internet access in 2017 compared 12.2% among the rural population; these numbers are 40.9% and 4.1% when comparing the highest and lowest quintiles of the income distribution.[44]

Research also shows that these dimensions of (dis)advantage are interrelated, and also affect student learning outcomes. For example, 2021 research found that boys outperform girls in Secondary 3 numeracy assessments in rural areas, but not in urban areas or schools of excellence, where students tend to come from wealthier backgrounds (see Figure 10).[45]

Figure 10. Differences in student assessment scores based on school type, location and household wealth
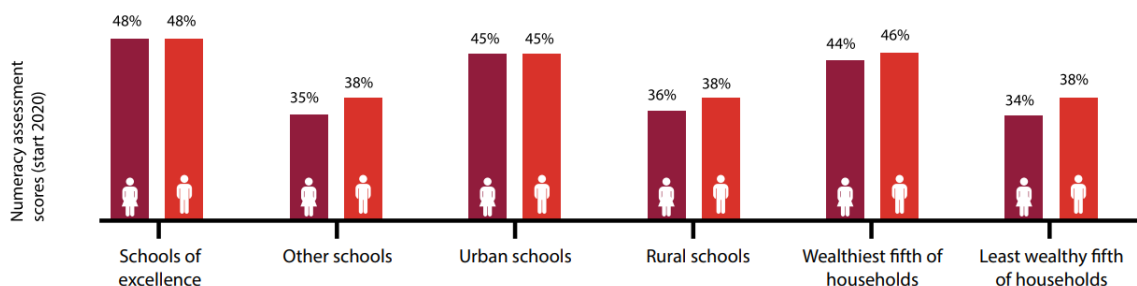
Source: Laterite and the REAL Centre (2022)

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[43] World Development Indicators, 2020
[44] National Institute of Statistics of Rwanda, 2018
[45] Cheriyan et al., 2021

When it comes to teachers, a phone survey of teachers of head teachers carried out during school closures in August 2020 found that while most head teachers had access to computers, only 35% of teachers were able to access computers at this time.[46] Further, 40% of male teachers could access computers compared to 27% of female teachers. It is worth nothing that these statistics have likely improved significantly since schools reopened, given the government's focus on improving teacher access to computers.

The digital divide is a demand-side issue because uptake of EdTech will be affected by the characteristics of each group: a rich urban tech-savvy young person who attends a private school is much more likely to be exposed to and interested in EdTech than a poor, rural, digitally illiterate older person. The digital divide also manifests as an electricity and internet gap between groups, a gap in access to devices, a purchasing power gap, and a gap in terms of attitudes and openness to EdTech and digital literacy.

Box 12. EdTech workshop insights – Addressing the digital divide

> **Input from the November 2022 EdTech workshop: Addressing the digital divide**
>
> In recognition of the digital divide, participants at the EdTech workshop called for players in the industry to tailor their content and platforms to be more accessible. It should be an explicit goal of both policy and of EdTech companies to be mindful of inclusion and access issues.
>
> The Rwandan government is working to address these issues, including through a significant focus on improving electricity and internet access as mentioned above, as well as rolling out smart classrooms in all districts (though this rollout faced some issues, also mentioned earlier in this report).
>
> For the specific case of people with disabilities, participants in the 2022 EdTech workshop reported that existing social programs in Rwanda have a strong focus on inclusion which translate into the production of material tailored for different kinds of disabilities. In technology, tools exist that are catered to people with disabilities. In this context, EdTech respondents are optimistic that EdTech can help bring inclusive outcomes, if a coordinated approach is taken to bridging the digital divide.

8.3 Openness to EdTech and digital literacy

Respondents agreed that openness to EdTech has increased among instructors and learners in educational institutions. However, respondents stated that in their experience some school leaders do not allow use of devices for their intended educational purposes by teachers or students, due to fear of accountability for lost or damaged devices. Moreover, in some schools students are often not allowed to use devices such as smartphones inside the classroom, and this could discourage the uptake of EdTech by students.

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[46] Carter et al., 2022

There is also a need to continue to develop the digital literacy of teachers, instructors and students. 69% of teachers haven't received digital literacy training, although government is working to engage them on this.[47] In addition, the International Computer Driving License (ICDL), has been adopted as the digital skills standard, and offers a certification program to enable the use of digital skills in a professional setting. Incentive mechanisms should however be carefully considered to encourage teachers to participate.

COVID-19 was widely seen by EdTech stakeholders as a blessing in disguise for the industry. At least eight EdTech firms began operations in Rwanda in 2020. Even before the outbreak of the pandemic, Rwandan policy leaned towards EdTech, but interview respondents universally agreed that COVID-19 was a catalyst for more engagement, increased demand and changed the perceptions of teachers and learners of the potential of EdTech, while also highlighting the digital divide and lack of preparedness. While some respondents remarked that the effect of COVID-19 on interest in EdTech was beginning to fade, the EdTech sector is undoubtedly now more developed than it was in 2019 both in the public and private sectors.

Box 13. EdTech workshop insights – Demand-side challenges

Input from the November 2022 EdTech workshop: Demand-side challenges

Participants highlighted the importance of allowing for entrepreneurs to interact with users directly during the product design phase to ensure that the product is a solution that meets the needs of users. Participants suggested practice solutions, such as building a platform where teachers can share details about their needs and developers can suggest how they intend to address those needs. As demand for EdTech increases, entrepreneurs need to understand users and know the path to follow to adapt and fit their needs. A teacher in Gatsibo District at the workshop endorsed the idea:

> *"I can advise entrepreneurs to work with schools. Consult the administrator and teachers so we know what they really need."*

Participants called for more data and evidence to inform decision-making. Stakeholders lack information on the content available to users, which gaps need to be filled in this context as well as in which ways digital content can best address those gaps. In addition, there is a need to measure teachers' performance before and after digital literacy trainings or before and after introducing EdTech tools in the school. Data and evidence would thus optimize the production and delivery of education solutions using EdTech and would allow tools to match the realities of the classrooms.

One participant expressed concern that pilots to test EdTech solutions in schools could overload schools if these pilots are not rolled out in a coordinated manner. Given that schools will act as testing centers for EdTech solutions, demands will be placed on teachers and students during the piloting of these solutions. It will thus be important to take a coordinated approach to selecting schools in which to test solutions to avoid overloading them. The Rwanda Basic Education Board should take this into consideration when approving schools in which EdTech solutions are piloted.

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[47] Giga, 2022

9. Conclusion

This report presented the findings of 34 EdTech stakeholder interviews and discussions that took place during the 2022 EdTech workshop in Kigali hosted by the Mastercard Foundation.

EdTech can be defined as involving the use of technology to deliver content that enhances teaching and learning, for everybody, and the use of technology to deliver and manage education services. There are some key elements needed for the sector to thrive. We saw that infrastructure has improved greatly in recent years, but that investments are still needed to strengthen the digital infrastructure in Rwanda. Despite those needs, stakeholders share a general optimism for the future and the potential of EdTech solutions in the country. In particular, they credited the COVID-19 pandemic with opening the mindset of users to the potential of EdTech, with many EdTech firms starting their businesses during 2020 as a result of the need for blended learning solutions caused by pandemic-related school closures. However, stakeholders noted that the acceleration of interest in EdTech products during the pandemic is fading over time.

The government is working on a new policy framework to support the development of the EdTech industry in Rwanda. The EdTech workshop was an early opportunity for EdTech stakeholders to give feedback to government stakeholders on the elements needed for the industry to thrive in Rwanda. Respondents reported both supply-side and demand-side challenges. On the supply side, respondents mentioned: onerous government approval processes and procurements; limited funding and financing opportunities; competition from established foreign firms; and the lack of specialist skills and training opportunities available locally and at reasonable costs. Such constraints could however be lifted by designing a certification process to create a conducive market for EdTech companies in Rwanda, and increasing collaboration between EdTech companies to tailor the availability of training to skills needs as the EdTech market grows in Rwanda. On the demand side, respondents mentioned: the low purchasing power and willingness to pay of users; the digital divide threatening the universal provision of EdTech solutions; and the openness of teachers, students, and the general public to using technology in the classroom. Respondents also called for more evidence about the success of EdTech solutions to engage all users.

EdTech workshop participants made several recommendations during the workshop to address these challenges. Regarding government approval processes and procurement, they recommended the adoption of a "Made in Rwanda" approach. In practice, this could translate into defining clear standards for certifying EdTech products, and encouraging the involvement of local EdTech companies in implementing education policies, for example through REB. In terms of the digital divide, participants noted the potential of EdTech to provide learning solutions tailored to different types of learners; however this is limited by access to digital infrastructure and tools, as well as digital literacy. Stakeholders acknowledged a need to be aware of this digital divide to avoid reinforcing inequities. They recommended that blended learning should be mainstream across the country, and that the development of products should adopt a human-centered design approach to answer the

needs of every Rwandan. From this perspective, stakeholders called for access to open data and more interaction with end-users to be able to better understand their needs. They also wished to raise awareness about the success of EdTech, notably through the production of more evidence. An exhaustive list of recommendations made and agreed upon by participants of the workshop can be found in Annex 4. We however list some of them on the next page.

Box 14. Recommendations from stakeholders attending the EdTech workshop

Input from the November 2022 EdTech workshop: Recommendations

Recommendations on the need to convene and discuss:

- There is a need to establish a framework through which EdTech companies can interact with government on the issues they face and through which they can be consulted and provide feedback on EdTech policy issues.

- The upcoming REB EdTech-themed workshop to understand, and shape, how REB envisions interacting with EdTech firms will be an important opportunity for EdTech stakeholders to attend.

- One participant suggested that relevant government officials run "office hours" for EdTech firms.

Recommendations on the need to collaborate:

- Given the relative small size and early stage of local EdTech companies so far compared to competing foreign companies, EdTech companies were encouraged to join forces when they bid for work, to boost their capacity and bargaining power, and to meet the requirements of the contractor.

- NGOs operating in Rwanda were encouraged to use local companies, so that if the NGO program finishes, the local firm still exists and the EdTech solution is more sustainable.

Recommendations on the need to share information:

- One participant recommended a directory of REB-validated EdTech solutions on the REB e-learning platform, from which schools can choose.

- Some participants recommended variants on the idea of a broad online platform for knowledge sharing about EdTech in Rwanda, from which EdTech products can be downloaded, and incorporating a "public infrastructure lab".

- A "national dashboard" to collect and analyze data to track the use of EdTech was recommended as well as guidelines on the type of data to feed into this dashboard.

- An annual EdTech exhibition was suggested, to which a range of stakeholders including schools are invited.

- Continuation, expansion and enrichment of the EdTech Monday series was suggested.

Recommendations on how public procurement processes can include local EdTech firms:

- Government can approach local firms directly to ask for their support.

- Firms can collaborate with other firms in order to meet procurement criteria as a group.

- Firms can write Expressions of Interest to engage the government.

- Government can hold pre-bid meetings with local forms or the ICT Chamber to agree on the requirements for Terms of Reference.

Recommendations to address supply-side challenges:

- Stakeholders can try out alternative financing mechanisms (e.g. "buy now, pay later"; recycling of used devices to lower the costs; partnership with telecom companies).

- Create a market place for approved and certified EdTech products through a certification process led by government.

- Mainstream a hybrid model of learning to create appetite for EdTech solutions.

- Put in place talent transfer programs and tailored training programs to build the skills base for developing EdTech products.

Recommendations to address demand-side challenges:

- Find ways for users to interact with EdTech developers, such as via a bespoke testing platform for teachers.

- Develop an evidence base on user needs, and how digital content can best fill these gaps, so that solutions match the realities of classrooms.

- REB should take a coordinated approach to testing EdTech solutions in schools so that schools that act as testing centers are not overwhelmed.

Many of these recommendations were captured by Mastercard Foundation and ICT Chamber in the workshop Communique, with input from workshop participants (see Annex 4).

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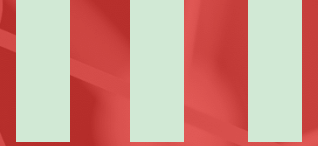
ANNEXES

Annex 1: Key informant interview respondents

List of EdTech Firms interviewed for this study

Name	Position	Firm
Mariam M. Muganga	CEO	Academic Bridge
Christopher Marler	Founding Director	Africa Digital Media Academy
Ever Kanake	Managing Director (Formerly with Ajili)	Imanzi Business Institute
Confident Niyizibyose	CEO	Augmented Future
Gabriel Eckman and Yussouf Ntwali	Founders, CIO and CEO respectively	BAG Innovation
Charlie Goldsmith	Founder	CGA Technologies
Dieudonne Irafasha	CEO and founder	Diolichat
Olivier Karasira	Founder and project manager	Ejo App
Isaac Kinyanjui	Chief Learning Officer	Eneza Education
Origene Igiraneza	CEO and founder	O'Genius Priority
Mark Abel Mugenwa	CEO	Rokkup
JMV Karegeya	CEO and founder	SchoolNest
Allen Kendunga	CEO and founder	Talent Match
Jan Willem Eggink and Nehemie Nkurunziza	CFO and E-Course Developer	Three Mountains
Jean Desire Habiyambere	Cofounder and CEO	Training Hub
Cliff Richard Ingabo	CEO and founder	Twis Ltd
Fiston Mudacumura	Founder	HAAPA

Government officials interviewed for this study

Name	Position	Institution
Bella Rwigamba	Chief Digital Officer	MINEDUC
Dr Christine Niyizamwiyitira	Head of Department of ICT in Education	REB
Esther Kunda	DG, Innovation and Emerging Technologies	MINICT

Educational institutions interviewed for this study

Name	Position	Institution
Eugene Karangwa	Chief Information Officer	University of Rwanda
Daton Eric NGILINSHUTI	Division Manager in charge of Digital Content and Connectivity	Rwanda Polytechnic
Mutijima Asher Emmanuel	ICT and Multimedia Trades Specialist	Rwanda TVET Board

NGOs, development partners interviewed for this study

Name	Position	Institution
Julian Parry	Team Leader, English Literacy, Building Learning Foundations	British Council/BLF
Sarah Challoner	project implementation lead for ECD	VSO - Twigire Mumikino
Philbert Hakizimana and Damian Gregory	Damian G, VSO's project lead on BLF. Philbert H – programme manager for BLF.	VSO - BLF
Jocelyne Kirezi and Loran Pieck	Jocelyne, Research Adviser, Loran - Strategic Education Advisor Online Learning	VVOB
Lillian Mutesi	Education Specialist	World Bank
Yedidya Aimee Senzayi	Chief of Party	EDC/BRITE
Evans Atis	Education Specialist	UNICEF
Salome Ong'ele	Team Leader, BLF	EDT/BLF
Kamanda Kamiri	Country Director	Educate!
Norihide Furukawa	Education Specialist	JICA
Clement Uwajeneza	CEO	Rwanda Equip

Annex 2: Key informant interview guides

For EdTech companies

Introduction (0-5 mins)

We are from Laterite, a data, research and analytics company with a 12 year presence in Kigali, and we have been asked by the Mastercard Foundation to conduct a study to understand the context in Rwanda in relation to education technology.

[if relevance of the respondent is not obvious] Before we get any further, could I do a quick check for relevance. We got your company from a list of companies that have worked on education technology or 'EdTech' at some point which was provided to us by the ICT Chamber. However we don't know how relevant some of the companies on that list are. We are looking for respondents who have done some kind of work in education technology and ideally have views on how EdTech does work or should work in Rwanda. In light of this, do you think this will be a useful conversation?

a.   [if name not already known] Could I please ask your name?
b.   [if institution not already known] What is your company or institution?
c.   [if job title and role not already known] What is your job title and role?
d.   How long have you worked in this company institution?
e.   When did your company begin operating in Rwanda?
f.   Approximately many employees does your company or institution have in Rwanda?

1. Defining EdTech in Rwanda

Starting our main discussion, we'd like to know more about how you would define EdTech in Rwanda.
a.   What comes to mind when you hear the term "EdTech"? In other words, which types of things do you think are in the "EdTech" category?
b.   What successes do you perceive have been achieved in Rwanda so far in relation to using education technology?
c.   How would you describe the potential of EdTech for solving educational challenges in Rwanda?
d.   How would you describe the limitations of and challenges to the usefulness and scaleability of EdTech in Rwanda?

2. Your work in EdTech and supply-side challenges

Now, we'd like to ask some questions about your particular EdTech company or initiative, and after this we will ask about constraints or challenges your company or initiative might face in relation to EdTech in Rwanda.

Their company and its work in EdTech

a. If your company has its own EdTech platform(s) or was involved in building an EdTech platform that operates or aims to operate in Rwanda, please name and describe it. Probe: Is there more than one?
b. What subjects or topics does the platform cover or seek to cover in Rwanda?
c. Who are the target end-users of the platform (learners)?
d. How many end-users has the platform reached so far?
e. Where does the revenue come from for the platform - do end users pay, or does another entity pay?
f. Is the content your company or initiative delivers, related to the relevant curriculum in some way, whether primary, secondary or university-level?
g. Is your content delivered in an asynchronous way or is it delivered on a schedule? Probe if on schedule: What is the frequency of content delivery?
h. [if not already obvious] Is your content delivered solely online or is there an in-person component?
i. How is learning progress assessed on your platform?
j. Are there other EdTech challenges you are seeking to solve next or products you are interested in developing and - if you are comfortable doing so - can you describe them?

Supply side constraints:

k. Can your company find employees with the right skills in relation to its EdTech work in Rwanda? Probe: what skills do you have difficulty finding?
l. What type of funding or financing have you sought to get for your EdTech work so far?
m. Is funding or financing easy or difficult to find for EdTech in Rwanda?
n. Could you describe any challenges in relation to policy or regulation that you have faced or see that the EdTech sector faces?
o. Can your company readily find relevant training in relation to its EdTech work, and if not, what training would be of particular interest?
p. Can your company find relevant contacts and networks in relation to your EdTech work?

3. Demand-side considerations

a. Do you foresee challenges or opportunities in relation to overall market demand for EdTech, including in relation to end users' willingness to pay?
b. Which types of people or institutions tend to learn or benefit from EdTech products in Rwanda?
c. Are there any particular categories of people or geographic areas that you would describe as especially inaccessible to EdTech?
d. Are there particular types of educational subjects or challenges that you see as suitable to be tackled by EdTech?
e. Did COVID affect the demand for EdTech products in Rwanda and if so, how?

4. Additional questions [if time]

a. How can EdTech funders or hubs best support EdTech to thrive?

b. How can government policy best support EdTech to thrive?

c. [if time] Do you know about any other EdTech innovations/initiatives operating in Rwanda?

d. [if time] Is there anyone else that we should talk to?

Thank you so much for speaking with us today. Before we go, I wanted to ask you if you have any comments, suggestions or anything else you'd like to add?

For government, Development Partners, NGOs

Introduction

We are from Laterite, a data, research and analytics company with an office in Kigali, and we have been asked by the Mastercard Foundation to conduct a study to understand the context in Rwanda in relation to education technology.

a. [if name not already known] Could I please ask your name?

b. [if institution not already known] What is your company or institution?

c. [if job title and role not already known] What is your job title and role?

d. How long has your institution been working on EdTech?

e. In a couple of sentences, how does your institution work in education and technology?

1. Defining EdTech in Rwanda

Starting our main discussion, we'd like to know more about how you would define EdTech in Rwanda.

a. What comes to mind when you hear the term "EdTech"? In other words, which types of things do you think are in the "EdTech" category?

b. How would you describe the overall stage of development of EdTech in Rwanda?

c. What successes do you perceive have been achieved in Rwanda so far in relation to using education technology?

d. How would you describe the potential of EdTech for solving educational challenges in Rwanda?

e. How would you describe the limitations and challenges of the usefulness and scaleability of EdTech in Rwanda?

2. Your work in EdTech and supply-side constraints

Now, we'd like to ask some questions about the work of your institution in the EdTech space.

Their institution and its work in EdTech

a. When did your institution begin working on EdTech?

b. Could you describe the objective of this work?

c. Are you working with EdTech companies?

d. Does your institution fund EdTech companies or products?

e. [If relevant] can you describe the EdTech platform or platforms your institution has created or supported others to create?

f.   What subjects or topics does your institution aim to promote with its work on EdTech?

g.   Does your institution promote the use of EdTech to deliver content relevant to an official education curriculum, whether at primary, secondary or university-level?

h.   [if their institution directly created an EdTech platform] Is your content delivered in an asynchronous way or is it delivered on a schedule?

What is the frequency of content delivery?

i.   [if their institution directly created an EdTech platform] Is your content delivered solely online or is there an in-person component?

j.   [if their institution directly created an EdTech platform] How is learning progress assessed on your platform?

k.   [if their institution directly created an EdTech platform] What stage of maturity would you describe your EdTech initiative to be at?

l.   Are there other EdTech challenges you would like to work on next?

Supply side constraints:

m.   Do people or companies with the right skills exist to develop EdTech in Rwanda? Probe: what skills do you have difficulty finding?

n.   Does sufficient funding exist for EdTech in Rwanda?

o.   Do you see any challenges in relation to policy or regulation that the EdTech sector faces?

p.   Do you have difficulty accessing the right players in the EdTech space, whether government, education sector actors, EdTech companies, development partners, or others.

3. Demand-side effect and effectiveness

a.   Which education-related challenge in Rwanda is technology best suited to address?

b.   Which types of people or institutions tend to learn or benefit from EdTech products in Rwanda?

c.   Are there any particular categories of people or geographic areas that you would describe as especially inaccessible to EdTech?

d.   Are there particular types of educational subjects or challenges that you see as suitable to be tackled by EdTech?

e.   Did you perceive that COVID affected the attitude towards and demand for for EdTech products in Rwanda and if so, how?

4. Additional questions/recommendations

a.   How can EdTech funders or hubs best support EdTech to thrive?

b.   How can government policy best support EdTech to thrive?

c.   Are there any other EdTech innovations/initiatives that we should be aware of?

d.   Is there anyone else that we should talk to?

Annex 3: Profiles of EdTech companies and initiatives

EdTech Companies

BAG Innovations

End users: University students and young people under 25; the platform currently reaches 15,000 University of Rwanda students in addition to the 115,000 young people under 25 reached with USSD content

Current Market(s): Rwanda (HQ) since 2017

Number of employees: 13 employees

HAAPA Store.

End users: Parents and their children; there are currently 168 users registered on the platform. It is estimated that around 300 to 1000 people have visited the platform

Current Market(s): Rwanda since 2020

Number of employees: 3 part-time employees (developers and programmers)

Imanzi Business Institute

End users: Entrepreneurs, CEO and startups; the platform has not yet been launched but is planned to accommodate up to 5000 people

Current Market(s): Rwanda since 2020; activities started in 2021

Number of employees: 4 full-time employees and a database of 200 trainers

Training Hub

End users: University graduates, working professionals, companies' staff; 65 people have received/are receiving training; 5 trainings currently available

Current Market(s): Rwanda since May 2020

Number of employees: 4 full-time and 5 part-time employees

CGA Technologies

End users: 56 head teachers, 642 teachers and 41,836 students

Current Market(s): South Sudan, DRC, Rwanda (in 2012), Malawi, Ukraine, Ethiopia, Kenya, Sierra Leone, Somalia, Tanzania, Uganda and Zambia

Number of employees: 56 employees, but none in Rwanda

EJO App

End users: Teachers, schools and students, parents; 200 teachers involved during pilot; 80 teachers are currently using the app daily

Current Market(s): Rwanda since 2021

Number of employees: 4 employees locally in addition to 4 people providing support from India

Three Mountains Learning Advisors

End users: Learners; 1000 people have used audio courses on their website

Current Market(s): Rwanda since 2015; also East African Community

Number of employees: 10 employees

Talent Match Inc

End users: University of Rwanda, INES-Ruhengeri, IPRC-Karongi, TVET - Kivu Hills Academy; 600 fellows so far

Current Market(s): Rwanda since 2019

Number of employees: 8 employees

Augmented Future

End users: Primary school students; 3000 app users in addition to 1 million viewers for animations

Current Market(s): Rwanda since March 2020

Number of employees: 8 employees

Rokkup

End users: Entrepreneurs or companies willing to train their staff; currently training 14 people in addition to the 100 that have already been trained

Current Market(s): Rwanda since March 2020

Number of employees: 8 employees

Coolnet Solutions Ltd

End users:

Teachers and students; currently working with 9 schools

Current Market(s): Rwanda since January 2020

Number of employees: 4 employees

Twis

End users: 5-12 years old children; more than 5000 users so far

Current Market(s): Rwanda since 2020

Number of employees: 17 employees including authors and illustrators

O'Genius Priority

End users: S1-S6 students and teachers; over 9000 active users and 28000 targeted in 315 sectors of all 30 districts in Rwanda

Current Market(s): Rwanda since 2014

Number of employees: 13 employees

Eneza Education

End users: P4-S3 students; 600000 lessons taken; 612701 users

Current Market(s): Company created in 2011 in Kenya; started in Rwanda in 2020; products in Kenya, Rwanda, Côte d'Ivoire, Ghana and Sierra Leone; 11.5 million learners; 80 million lessons delivered through SMS; in Rwanda, 600000 lessons taken in 2 years and about 1.5 million questions

Number of employees: 38 employees of which 1 is based in Rwanda

Academic Bridge

End users: School administrators, teachers, learners and parents; currently works with 200 schools, 190000 students, 480000 parents and guardians, 9000 school staff in 4 countries

Current Market(s): Rwanda since 2015; in addition to Uganda, Kenya and Burundi

Number of employees: 19 employees

Diolichat

End users: Teachers, parents and students; in discussion with 3 schools to use the platform which implies 200 users

Current Market(s): Rwanda since 2021

Number of employees: 5 employees who work as software programmers

Africa Digital Media Academy

End users: Technical schools for students aged 16 to 18

Current Market(s): Rwanda since 2012; Youtube channel hosted by Rwanda Polytechnic has 1 million views, with greatest viewership being India, Philippines, US and Rwanda

Number of employees: 3 employees

Development partners, NGOs, government organizations

RwandaEquip

End users: Pre-primary and primary schools; 100 schools targeted for year 1; increased to 250 now

Start date: Since 2021

VSO - Twigire Mumikino Rwanda

End users: Teachers; currently targets 80 schools including 122

Start date: Since September 2021

VSO - Building Learning Foundations

End users: Teachers and headteachers

British Council - Building Learning Foundations

End users: Teachers

Start date: Since August 2017

Education Development Trust - Building Learning Foundations

End users: Teachers, headteachers and schools

Start date: Since 2017

VVOB

End users: Deputy headteachers, school-based mentors, headteachers, and sector and district education officers; 300 trainees annually; around 5000 teachers and school leaders targeted; Scratch targets STEM and ICT teachers (158 in pilot)

Start date: VVOB present in Rwanda since early 90s; EdTech project started in 2013

Rwanda Education Board

End users: Primary school teachers and students

Start date: Since 2011

The World Bank

End users: Schools, teachers and students

Start date: The World Bank has been working on EdTech in Rwanda for many years

Rwanda TVET Board

End users: TVET student in 453 schools

Start date: 2021

Educate!

End users: 40% of secondary schools in Rwanda; P6, S3 and S6 students taken on national exams

Start date: 2016

Education Development Centre - BRITE Project

End users: TVET students in the context of BRITE

Start date: 2009

Rwanda Polytechnic

End users: Students in IPRCs

Start date: 2017; COVID-19 accelerated the implementation of the strategy

UNICEF

End users: Schools, teachers and students

Start date: 2016; UNICEF works on governance, inclusive education, quality education and gender equality

JICA

End users: Teachers and students

Start date: 2021 with a project to strengthen primary school mathematics with the use of ICT

Annex 4: Communique from EdTech workshop of November 2022

The following communique was agreed at the Mastercard Foundation, Ministry of Education and ICT Chamber-hosted workshop on 17-18 November 2022.

The workshop participants recommend what follows:

1) ***EDTECH POLICY***
   The workshop participants recommended that the policy that is in development should address the following:
   - *Mainstreaming Hybrid system of learning in Rwanda*
   - *Adoption and implementation of OPEN DATA Policy within Education for both public and private institutions that qualify.*
   - *The need to utilize local EdTech companies in implementing education policies through REB*
   - *Make Education Data Center available to local private EdTech companies*
   - *Actively involve private sector in the validation of the EdTech Strategy*
   - *Actively involve private sector in the validation of the EdTech Policy and implementation plan.*
   - *Set clear standards for certifying of EdTech products*
   - *Review and, if necessary, adapt the National Teachers CPD Framework to incorporate blended mode of learning*
   - *Policy should harmonize infrastructure costs in both public and private institutions eg. Electricity, Internet, access to devices etc.*
   - *Policy should include safeguarding of children and vulnerable adults measures.*

2) ***PROCUREMENT OF EDTECH PRODUCTS***
   - *Adoption of an efficient, streamlined process for acquiring locally produced EdTech products by public schools*
   - *Aggregating demand and supply of EdTech solutions through an EdTech products marketplace*
   - *EdTech Companies should leverage partnerships to accelerate distribution of their products to expand consumption but also to reduce go to market costs.*
   - *EdTech companies should unbundle/unpack prices to understand better what goes into final cost of EdTech products, eg. Hosting, internet etc.*
   - *Actively participate in public tenders leveraging partnerships and joint ventures where possible.*

3) ***PRODUCT DEVELOPMENT AND QUALITY OF SERVICES***
   - *Make inclusion integral to EdTech product development with consideration of different users with different types of disabilities*
   - *Develop demand driven products and work with subject matter experts to ensure product quality and relevance.*

4) EDTECH COMPANIES SUPPORT

- o *Raise awareness of EdTech Solutions both internally with the EdTech ecosystem and to the general public.*
- o *Incubate and Accelerate EdTech Startups to meet the needed quality and relevance requirements*
- o *Facilitate communication, coordination, and collaboration for building relevant partnerships*
- o *Convene on a regular basis EdTech stakeholders to discuss progress of EdTech ecosystem in Rwanda*
- o *Facilitate linkages for regional collaborations of EdTech ecosystems where CITL is operating.*

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