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**Business model framework for education technology
entrepreneurs in South Africa**

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I, Adrian von Maltitz, declare that -

the dissertation, which I hereby submit for the degree at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I have obtained, for the research described in this work, the applicable research ethics approval. I have observed the ethical standards required in terms of the University of Pretoria's Code of ethics for researchers and the Policy guidelines for responsible research.

Abstract

“Education is the most powerful weapon which you can use to change the world.”

- Nelson Mandela

Education technology (EdTech) has been proven to make a positive impact on education outcomes in developed economies. There is a vastly untapped opportunity to introduce more EdTech into the South African basic education ecosystem to help with the education crisis in South Africa. In 2004 the South African Government issued a clear e-Education policy white paper, but not enough progress has been made to improve education. The EdTech entrepreneur is the entity in the education ecosystem with the highest level of agility to take on such an opportunity, if properly positioned and supported. The objective of this study was to develop a framework to identify key considerations for EdTech entrepreneurs to create sustainable ventures, and in so doing make a larger contribution to improving the quality of basic education in South Africa.

The research approach was exploratory. A conceptual model was developed from the literature review. Propositions were set based on the conceptual model. A multi-case study approach was chosen for primary data collection. Qualitative analysis compared empirically based results as identified themes with three predicted propositions.

The literature review suggests the following possible considerations when developing a business model for EdTech entrepreneurship, i.e. innovation to develop a unique value proposition, delivery to a broad customer base, open models to encourage collaboration with various stakeholders, impact measurement, diverse funding sources, as well as simple and focused revenue streams. Little to no literature exists with empirical findings on these considerations in the EdTech industry. Existing literature builds frameworks, components and specifications for consideration without any empirical testing. Part of the challenge is that companies keep the details of their business models secret, especially small companies with a niche value proposition. No literature could be found for EdTech entrepreneurship in South Africa, or any emerging economy.

Four themes emerged from the results: mature product, complex support network, multiple infrastructure considerations, and multiple sources of revenue. The findings confirmed teacher distrust as having the greatest impact on value creation, mobile networks as only one of the key impacts on value delivery, and



Business model framework for EdTech

both private and public sectors providing value capture opportunities. An archetypal business model framework for EdTech was developed, which concludes: EdTech entrepreneurs should develop mature products that teachers can endorse; build a support network, which would include an advisory board and low-cost infrastructure providers; and source multiple revenue streams from the private and public sectors. Incubation support does help, even if just to provide introductions to a wider support network. Better government policy and procurement implementation would also enhance the provision of simpler and predictable revenue streams to EdTech providers.

Keywords: basic education, K-12, education technology, edtech, e-learning, entrepreneurship, business model framework, sustainable ventures, South Africa.

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List of Acronyms/Abbreviations

BMC	Business Model Canvas
BMI	Business Model Innovation
DBE	Department of Basic Education
ECD	Early Childhood Development
EdTech	Education Technology
e-Education	Electronic Education
e-Learning	Electronic Learning
ICT	Information and Communication Technology
K-12	Kindergarten to grade 12 (alternative term for basic education)
NGO	Non-governmental Organisation
PEST	Political, Economic, Social and Technological
SEACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SMMEs	Small, Medium and Micro Enterprises
SWOT	Strengths, Weaknesses, Opportunities and Threats
USA	United States of America
VNA	Value Network Analysis
WEF	World Economic Forum

1. Introduction

In this chapter the background to the research study is set by investigating education policy in South Africa related to the research topic, which is followed by a brief background on education technology globally, and then more specifically education technology in South Africa. The section that follows provides a background on technology entrepreneurship. All of these sections then come together by considering the overlay of “education technology”, “technology entrepreneurship” and “South Africa”, in a section titled “education technology entrepreneurship in South Africa”. The rest of the chapter covers the research problem, objectives, questions and rationale; concluding with the overall document structure and summary.

1.1. Background to the research study

“The power of education extends beyond the development of skills we need for economic success. It can contribute to nation-building and reconciliation.”

- Nelson Mandela

Education quality is a vital input into economic growth (Hanushek and Woessmann, 2010), and along with this economic growth, it can positively transform societies. South Africa is an emerging economy with a low quality of basic education (Spaull, 2013; WEF, 2017; DBE, 2019), where an improvement in the quality of education along with rapid investment in entrepreneurship potentially has a major positive transformational impact (Naudé, 2017). While an improvement in tertiary or higher education is very important, and is linked to creating a higher level of skills to drive economic growth, the foundation is laid with basic education. This study focused on basic (primary and secondary) education, as it forms the building blocks for further higher education and skills development. Findings from this study could provide inputs to similar emerging economies.

The term “Fourth Industrial Revolution” was introduced to describe the latest era of rapid technological change in the world (Schwab, 2015), bringing with it a wide range of opportunities, as well as threats. The threats from this rapid technology change to societies with a low level of education include job loss, e.g. through automation of existing low-skilled routine jobs, and a negative impact on their global economic competitiveness (Naudé, 2017). There are however a multitude of opportunities that arise from the technology evolution, including new business models of bringing goods and services to consumers. One of these opportunities is harnessing technology to support education, i.e. education technology or more commonly referred to as electronic learning (although not all education technology is electronic).

In order to minimise the threats and take advantage of the opportunities, economies such as South Africa need to rapidly invest in entrepreneurship and quality education (Naudé, 2017).

In the basic education environment there are a few key actors, including government, education institutions (schools, teachers), learners and sponsors (parents, private and philanthropic companies and/or individuals, public sector). A less visible actor in this environment is the Information and Communication Technology (ICT) supplier, which includes the technology entrepreneur. This network of actors works together in various ways to provide education to South Africa. The operation of this network is also influenced by government policy, which is explored in the next section.

1.2. Education policy in South Africa

According to the “Education Statistics in South Africa 2016”, published by the Department of Basic Education (DBE) in June 2018, there were 29 749 established public and registered independent education institutions in 2016 (DBE, 2018). Of the 13 307 830 learners and students enrolled in all sectors of the basic education system in 2016, 12 342 283 (92.7%) were in ordinary public schools, 590 282 (4.4%) were in ordinary independent schools, 255 862 (1.9%) were in early childhood development (ECD) centres and 119 403 (0.9%) were in special schools. The schools are categorised into five quintiles, with Quintile 1 being the poorest 20% of schools, and Quintile 5 being the least poor.

The South African DBE released a white paper on electronic education (e-Education), also entitled “Transforming Learning and Teaching through Information and Communication Technologies (ICTs)” (DBE, 2004). This white paper recognised the imperative for e-Education to address the changing global nature of work, consider the realities of the information age, and the need for equal distribution of education opportunities; leading to economic growth and social development.

The white paper identified various capacity constraints that limit ICT delivery, as well as related support challenges. It called for the public and private sectors to work together to achieve the e-Education goals, while addressing a wide range of challenges. In this paper these challenges are termed a digital divide and include major gaps in:

- Connectivity and infrastructure
- Local content development
- Collective knowledge generation
- Workforce capacity creation (both for delivery and support)
- Culture transformation (overcoming inhibitions and insecurities around ICT)

Chapter 1: Introduction

- Collaboration across various sectors
- Investment into Small, Medium and Micro Enterprises (SMMEs)
- Innovation and competitiveness

The paper further lists existing projects working to address the above, as well as government structures and policy definition to utilise ICT to address the education crisis in South Africa. Specific ICT focus areas identified in this paper include education, health and SMMEs, considering cost, sustainability and efficient use.

In the DBE “A 25 Year Review of progress in the basic education sector” report, the DBE identified partnerships with the private sector as funding sources, with a significant focus on the gap of connectivity and infrastructure (DBE, 2019). While connectivity and infrastructure (including electronic tablets) are an important enabler, the other gaps identified in the e-Education white paper need to be closed to make the necessary e-Education impact. Larger established ICT providers, such as telecommunications companies, are better positioned to support the large-scale infrastructure projects, while smaller entrepreneurial SMMEs are well positioned to help tackle the other gaps.

However, 15 years after this white paper was published, the quality of education in South Africa has still not sufficiently improved. There are many possible reasons for this failure, including policy implementation failure at the policy intermediary level, as well as the sheer size of the problem to be addressed. Vandeyar (2015) recommends possible improvements to policy implementation, including policy alignment between different government directorates, as well as improving teaching of policy rather than just communicating policy.

1.3. Education technology globally

In the South African government’s white paper the term e-Education is also referred to as education ICT. Other terms that are used interchangeably in industry, as well as academia, for e-Education, include electronic learning (e-Learning), education digitisation and Education technology (EdTech). The most widely used terms are e-Learning and EdTech, and will therefore both be used in this report.

EdTech was defined by Januszewski and Molenda (2013:49) as “The study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources”.

e-Learning was defined by Sangrà *et al.* (2011:35) as “A form of teaching and learning - which may represent a part or the whole of the education model in which it

is used - that makes use of electronic media and devices to facilitate access, promote evolution and improve the quality of education and training”.

The global EdTech market had a market capitalisation of US\$156bn in 2018 (HolonIQ, 2018) and has grown to more than US\$220bn in 2020 (HolonIQ, 2020). To date, the United States of America (USA) has set the trend and pace of the EdTech market. Asia is now experiencing the world's fastest investment growth into the sector. See Figure 1 for a distribution of global education stocks for 110 companies powered by 420 000 teachers and professionals (China and USA headquartered companies make up almost 70% of the total market cap).

Of the US\$6bn venture capital investment into this sector in 2018, the bulk was in Asia and USA Headquartered companies, with investment into South Africa completely negligible at this scale (HolonIQ, 2018).

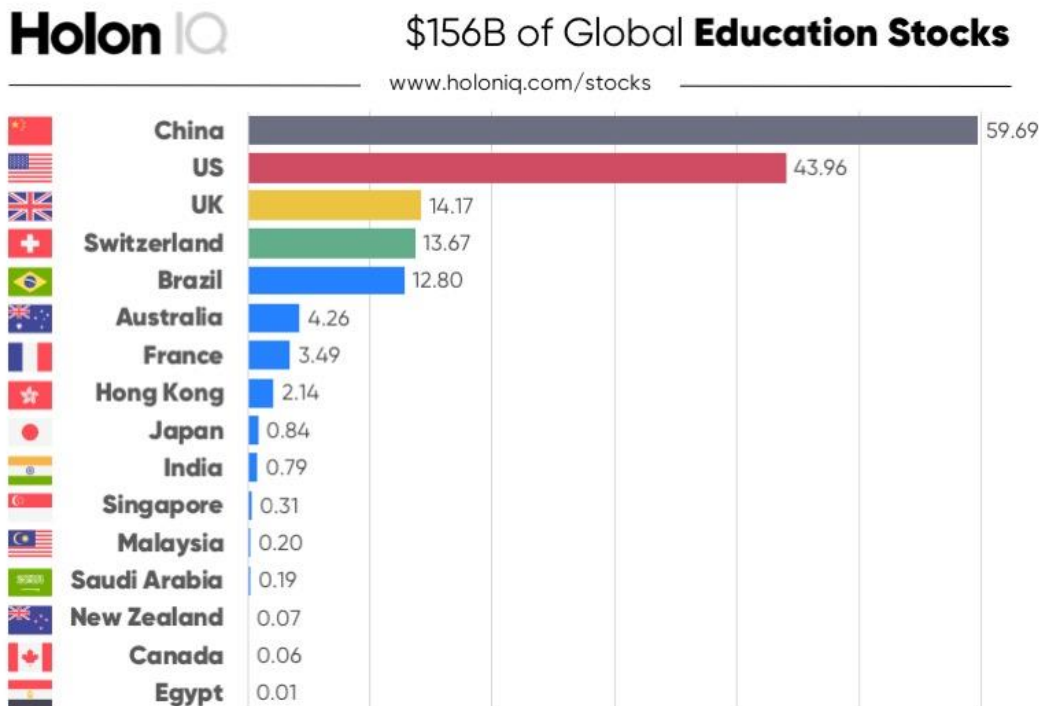


Figure 1: Global education stocks as on 9 Jul 2018 (HolonIQ, 2018)

In terms of basic education (or K-12) the increase in investment into this sector has grown substantially over the last decade (HolonIQ, 2020), as per Figure 2. While K-12 public schools pose a major challenge in terms of government bureaucracy, the opportunity lies in being able to contract centrally for a large market.

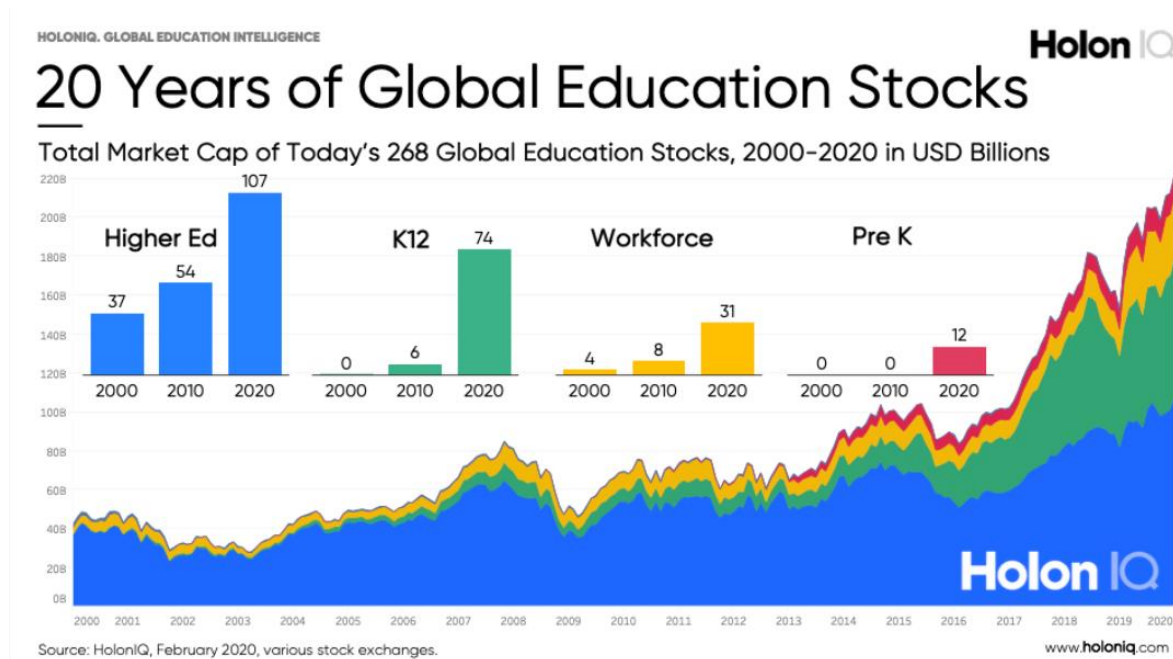


Figure 2: Global education stocks showing growth in K-12 (HolonIQ, 2020)

Tamim *et al.* (2011) indicated that EdTech has a positive impact on education (effect size of 0.35 considering 1 055 primary studies over 40 years). Especially encouraging is the research case study in Nigeria (Pandey and Tiwari, 2014) that indicated a positive outcome for an EdTech initiative despite of all the challenges it faced as a developing African country.

Recent trends in EdTech have moved to opportunities with mobile technologies. Mobiles are much more accessible to learners than computers. West (2013) made a case for mobile technology use in USA schools and indicated that teachers as well as students see the benefits of using mobile technology. Sandberg *et al.* (2011) indicated how a group of fifth graders studying English improved their results by having access to mobile technologies to support their learning.

Teachers can play a vital role in technology or ICT adoption. Based on a research sample of 1 540 primary schools in Turkey (Social, 2009), it was found that teachers in this sample, with varying levels of basic technology understanding and experience, had a positive attitude towards computers and the internet. Similarly a study of schools in a suburban area of Bangkok, Thailand (Kanthawongs and Kanthawongs, 2013) found that students, parents and teachers had positive perceptions toward the use of computers, the internet and social networking sites. Whereas a study in schools in Rwanda (Rubagiza *et al.*, 2011) did not indicate such positive results, with education policy, lack of ICT resources, a rigid ICT curriculum and lack of teacher training all listed as obstacles to ICT adoption.



The global EdTech challenges include a lack of hardware (ICT resources) and lack of ICT support staff, based on a study on a sample of schools from 26 countries (Pelgrum, 2001). Similar challenges exist and should be considered in South African EdTech (DBE, 2004).

1.4. Education technology in South African schools (Basic education)

Basic education is defined as kindergarten (pre grade R, grade R), as well as grade 1 to 12, and is more commonly referred to as K-12 (Kindergarten to grade 12) in most countries. Multiple opportunities exist for basic education institutions in South Africa to embrace e-Education as a mechanism to help improve the quality of education (DBE, 2004).

Similar to the global context where teachers play a vital role in ICT adoption, South African teachers are in a similar situation as Rwanda, i.e. South Africa also has a lack of ICT resources and teacher training (Vadachalam and Chimbo, 2017). A study by Vandeyar (2013) did, however, show some promise based on the sample of teachers in that research where implementation of ICT was not driven by the e-Education policy mandates, but rather by teachers' professional identity and desire to improve teaching and learning.

Another consideration is the inequality in South Africa. This poses a specific consideration for EdTech implementation and adoption in different schools within the country. A study on student attitudes (Bovee *et al*, 2007) towards computers clearly indicated no gender differences in attitude, but clear attitude differences between upper/middle class and township schools.

In a study where South African scholars perceived a programming assistance tool software program to be useful in the explanation of certain of the programming concepts, there was no conclusive evidence that IT scholars who used the tool had a significantly better understanding of programming concepts and motivation towards programming than scholars who did not use the tool (Koorse *et al*, 2015). This shows that careful consideration should be given to the implementation of EdTech to have a positive impact.

Considering the connectivity and infrastructure challenges in South Africa, Walls *et al*. (2015) argued for three key alternative strategies to sustainable e-Education in South Africa, i.e. offline platforms are more important than online platforms, mobile technologies are more important than non-mobile technologies and side-loading cultures are more important than downloading cultures. These strategies consider the connectivity availability, as well as cost constraints for learners, and should be

considered when identifying EdTech products for the broader basic education market in South Africa.

A study by Mihai (2017) indicated an interactive whiteboard technology implementation success in Mpumalanga, whereas another study indicated a failure with this same technology (Slay, Siebo and Hodgkinson-Williams, 2008) and suggested that an evolution of ICT related pedagogy is necessary instead of forcing technology on teachers. This comment is still valid for future ICT and EdTech implementations, but what is noticeable is that the successful implementation was nine years after the failed attempt. This could point to an improvement over time.

1.5. Technology entrepreneurship

Gartner (1990) explored the definition of Entrepreneurship, with the bulk of his findings centred on the characteristics of entrepreneurship, i.e. a situation is entrepreneurial if there is an entrepreneur involved, there is innovation, growth, and uniqueness; with the rest of the findings centred on the outcomes of entrepreneurship, i.e. a situation is entrepreneurial only if value was created or if someone gained. This definition by Gartner does not explicitly refer to the size of the organisation, but entrepreneurship is typically associated with new ventures or smaller companies, in contrast to the terms intrapreneurship or corporate entrepreneurship referring to similar activities in larger organisations.

While entrepreneurship is broadly referred to as setting up a new venture, increasingly entrepreneurship is defined as acting on an opportunity (Eckhardt and Shane, 2003) using innovation as its instrument (Drucker, 1993:30). These innovation opportunities can have multiple sources, including process need and changes in market structure (Drucker, 1993:35). Professor Howard Stevenson at the Harvard Business School defines entrepreneurship as the pursuit of opportunity beyond resources controlled (Eisenmann, 2013).

Historically this entrepreneurial pursuit of an opportunity needed to be linked to either financial gain or a complex challenge, but recently the need for the opportunity to have positive social and environmental impact has grown. Both employees and customers are increasingly interested in not only the price of a product, but the overall impact on the global environment and contribution to overall community wellbeing.

This opens up the debate about the definition of venture success, where the definition of sustainability has grown past only economic sustainability, but also environmental and social sustainability. Ultimately economic sustainability is

increasingly impacted by the other factors, and shareholders are interested in economical sustainability, which equates to medium to long term profit maximisation.

Beckman *et al.* (2012) further support the notion that the study of entrepreneurship has increasingly shifted its focus on the creation and discovery of novel opportunities. They go further by distinguishing technology entrepreneurship from mainstream entrepreneurship research by its focus on how these opportunities are fostered through innovations in science and engineering. There has been a major increase of technology entrepreneurship across the world, with technology companies not only becoming the largest in the world based on market capitalisation, but also dramatically changing all our lives.

Lotz (2006) studies technology entrepreneurship as a key driver for innovation and economic growth in South Africa. His findings are mainly focused on the entrepreneur and how the unique South African environment has played a role in how individuals have become entrepreneurs and formed their enterprises (e.g. that individuals are more likely to be entrepreneurial if one of their parents were, which is not unique to South Africa).

The fact that entrepreneurship does indeed drive economic growth in Africa is supported by Adusei (2016). The research in 12 African countries indicated that entrepreneurship in developing economies including Africa, even if replicative, is instrumental to economic growth.

1.6. Education technology entrepreneurship in South Africa

EdTech supply into South Africa is a combination of global companies and local South African entrepreneurs. The global companies have the benefit of large investments into their products that they can market into additional emerging economy geographies such as South Africa. They will face similar challenges to local entrepreneurs, but the South African small business entrepreneurs potentially have the benefits of agility, better understanding of the local education and stakeholder landscape, and access to government contracts (when meeting small business and black economic empowerment criteria). Even with the large opportunity to improve education and the growing global investments into companies focused on the K-12 customer segment, the overall population of EdTech entrepreneurs focused on basic education in South Africa is relatively small, i.e. after extensive online searches across LinkedIn, conference proceeding notes, trade shows agendas, news feeds, and incubator websites, less than twenty SMMEs could be identified with a basic education customer segment.

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It is, however, very encouraging seeing the success that at least one of the South African EdTech companies has achieved. In May 2017 Nasdaq-listed technology education company 2U announced it is acquiring Cape Town-based start-up GetSmarter for US\$103m (about R1.4bn). GetSmarter, founded by brothers Sam and Rob Paddock, develops online short courses in partnership with higher education institutions, including Cambridge University, Harvard University, the Massachusetts Institute of Technology and the Universities of Cape Town, Witwatersrand and Stellenbosch (Business School).

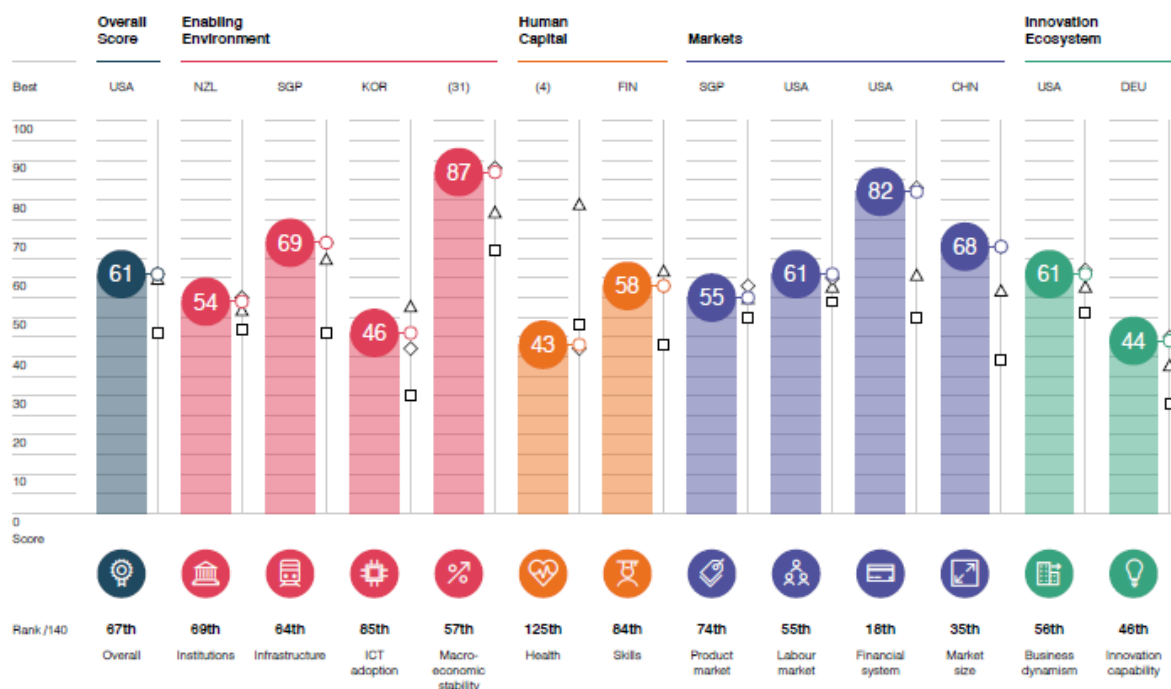
The GetSmarter success does, however, come from serving the higher education market. While the foundation for overall improved education levels in South Africa is laid at the basic education level, it is not clear if sustainable revenue models can be built on this market segment alone. The Paddock brothers opened a new online high school in 2020 (basic education segment) on the back of their GetSmarter success, intending to market this service in South Africa, as well as internationally.

While there are multiple entrepreneurship incubators and accelerators in South Africa, very few of them are focused on technology entrepreneurship, and only one of these incubators is focused on EdTech entrepreneurship. Injini was founded in 2017 as the first EdTech focused incubator in Africa. This compares to at least 13 accelerators in the USA focused on EdTech entrepreneurs.

1.7. Research problem

The World Economic Forum global competitiveness report 2018 shows South Africa ranked 67th of 140 economies (WEF, 2018). This report does not contain the “quality of education system” metric as it did in previous years.

Figure 3 provides a performance overview of how South Africa is doing in this global competitiveness review, with the second orange bar showing skills, which covers education metrics, as ranked 84th/140. The World Economic Forum global competitiveness report for the previous year 2017-2018 shows South Africa ranked 61st of 137 economies, with the quality of education system ranked 114th /137 and quality of maths and science education ranked 128th /137 (WEF, 2017). An improvement in the quality of education is a key input required for a competitive economy.

Performance Overview Key ◇ Previous edition △ Upper middle income group average □ Sub-Saharan Africa average 2018

Selected contextual indicators

Population millions	56.5	GDP (PPP) % world GDP	0.60
GDP per capita us\$	6,179.9	Unemployment rate %	27.3
10-year average annual GDP growth %	1.7	5-year average FDI inward flow % GDP	1.1

Figure 3: South Africa performance overview (World Economic Forum, 2018)

Spaull (2013) clearly outlined the education crisis in South Africa. Key challenges to improving the quality of education in South Africa include a lack of qualified teachers (Spaull 2013: 5, 54). From the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SEACMEQ - previously SACMEQ) 2007 tests Spaull found "...it is shocking to note that the top 5 percent of Grade Six pupils in South Africa (565 pupils) scored higher marks on the same mathematics test than the bottom 20 per cent of Grade Six mathematics teachers in the sample (80 teachers)".

The Department of Education believe that according to the SEACMEQ results, a large improvement at the Grade Six level was noted between 2007 and 2013 in both mathematics and reading. In their "A 25 Year Review of progress in the basic education sector" report, the DBE did, however, acknowledge that despite these important improvements, the absolute levels of learning achieved are still substantially below desirable levels (DBE, 2019).

Meoletsu & Mlachila (2019) found that money is clearly not the main issue since South Africa's education budget is comparable to OECD countries as a percent of GDP and exceeds that of most peer sub-Saharan African countries in per capita terms. They identify the main explanatory factors for the education crisis as complex and multifaceted, associated with insufficient subject knowledge of some teachers, history, race, language, geographic location, and socio-economic status.

Solving the education crisis in South Africa requires much more than just an EdTech intervention. While this is acknowledged, it does not detract from the opportunity for EdTech to contribute positively to this direly needed improvement.

Even though the South African DBE released a white paper in 2004 on e-Education (Transforming Learning and Teaching through ICTs), not enough progress has been made to improve education. The problem extends to the fact that the demand for education continues to outgrow the creation of teacher capacity. EdTech provides a potential option to create the additional capacity in South Africa to address this major education challenge.

EdTech can be applied in multiple ways to create this additional capacity, including potentially assisting with teacher education, assisting teachers so that it makes their jobs easier, to offering alternatives or supplementary education to what can be offered through the direct teacher channel. This education crisis presents a major opportunity for EdTech entrepreneurs. As was shown in section 1.2 (Figure 1) negligible investment is made into EdTech companies in South Africa in context of the global scale. Funding (grant, debt and equity) to support start-up and growth in the local African context is very limited compared to the global scale (HolonIQ, 2018).

Even with 17% of the South African total government budget expenditure (R230bn for 2017-2018 fiscal, 4.9% of GDP) allocated to basic education (Unicef, 2017), the education outcomes are still very low compared to the rest of the world. One of the major challenges for the DBE has been the need to address South Africa's history of institutionalised inequality on the basis of race, which has left a persistent legacy of inequality. The budget has to allow for key pro-poor programmes including the introduction of no-fee schools since 2007 to the point where about two-thirds (Schools categorised in quintiles 1 to 3) of children do not pay fees, and the provision of daily meals to over 9 million children through the National School Nutrition Programme. The combination of the government basic education budget and private school parent payments, offer revenue opportunities for EdTech entrepreneurs if they can be unlocked.

This leads to the key problem for this research, i.e. EdTech companies in South Africa are not economically sustainable, i.e. they are not able to maximise profit over the medium to long term. This can be deduced from the low investment level into these companies in Africa (HolonIQ, 2018), the small number of SMME EdTech companies that could be found online, and industry reports about companies not surviving. While no specific report on South African companies could be found, VentureBurn reported on Nigeria based PrepUp as an example of an African company that only lasted 3 years because of its business model not being economically sustainable (Mpala, 2019). Challenges mentioned by the founder Chidera include payments (payment collection via a telecommunications company offered an alternative to credit card payments, but eroded 50% of revenue as it went to the telecommunications service provider), the seasonality of his business and distribution channel issues (i.e. the product needed to work offline and be distributed easily from one device to the next without paying for wireless data services), and not being able to get venture capital funding as a result of the high risk, complex and bureaucratic customer segment.

1.8. Research objective

In order to address the research problem of EdTech companies in South Africa not being economically sustainable, a research project with the following objective was proposed:

“Develop a framework that identifies key considerations for sustainable EdTech entrepreneurship in an emerging economy”

In constructing this framework, the sub components of this objective to consider were:

- EdTech, i.e. specific industry segment, in this case education technology focus on basic education, or K-12
- Sustainable entrepreneurship, i.e. where “entrepreneurship” encompasses the process of establishing a new venture, which includes opportunity identification, business models, innovation and interaction with a network of stakeholders; and where “sustainable” ultimately refers to medium to long term profit maximisation as described in more detail in section 1.5
- Emerging economy (South Africa), considering that K-12 in South Africa has a major public sector (government) involvement

To address this objective the EdTech industry, business models (including their components and specifications), and value networks (graphical illustration of social and technical resources within/between organisations and how they are utilised) were explored.

A literature review was done to guide the construct of a conceptual model and the research design allowed for the development of an updated model, which was refined and ultimately led to the framework that was constructed during the case study data collection and analysis process.

1.9. Research questions

Based on the research objective, the following key questions were posed for this study:

- What are the main challenges in an EdTech business model for South African entrepreneurs?
- What are the key dynamics in the South African basic education EdTech value network?
- How can South African EdTech entrepreneurs be better supported in the EdTech value network?

1.10. Rationale of the research

In 2004 the South African Government issued a clear e-Education policy white paper, which included a clear need to invest in SMMEs. EdTech has been proven to make a positive impact on education outcomes in other economies, and there is a vastly untapped opportunity to introduce more EdTech into South African basic education institutions.

The EdTech entrepreneur is the entity in the ecosystem with the highest level of agility to take on such an opportunity, if properly positioned and supported. There are a very small number of EdTech entrepreneurs focused on basic education in South Africa, which seems to indicate that they are not well enough supported or economically sustainable.

This sets the scene for an explorative study focused on developing a framework to identify key considerations for EdTech entrepreneurs to create sustainable ventures, and in so doing make a larger contribution to improving the quality of basic education in South Africa.

1.11. Document structure

This study comprises of eight chapters. Chapter 1 provides the background to the research study and the related research problem based on the education crisis in South Africa, along with the potential role of the EdTech entrepreneur in the

Chapter 1: Introduction

education ecosystem. The chapter also sets the research objective of developing a framework to identify considerations for the EdTech entrepreneurs to be sustainable, and lists related research questions on how these EdTech entrepreneurs can be better supported to be economically sustainable.

Chapter 2 covers the detailed literature review into business models, how they apply to EdTech and the related value networks, and concludes by articulating gaps in the literature. By analysing existing models in the literature review, Chapter 3 develops a conceptual model for this study, and suggests related propositions.

Chapter 4 provides the research design and methodological approach adopted for this exploratory study. Led by the research questions and the literature review a multi-case study approach was chosen for primary data collection, and qualitative analysis compared empirically based results as identified themes with the predicted propositions.

Chapter 5 presents the results for the cases studies; the analysis offers key themes and provides inputs to review the conceptual model, and concludes with some specific government considerations.

Chapter 6 discusses the results by correlating the identified themes against the propositions that were set in Chapter 3, and concludes by developing the framework that can be used to identify key considerations for EdTech entrepreneurs to create sustainable ventures.

Chapter 7 covers the research study conclusions and provides answers to the research questions. Chapter 8, as the last chapter, presents recommendations, limitations to the study, and concludes with areas for further research.

1.12. Summary

This chapter provided the background to the research study, and sets the research objective to develop a framework to identify key considerations for EdTech entrepreneurs to create sustainable ventures, and in so doing make a larger contribution to improving the quality of basic education in South Africa.

The next chapter covers a detailed literature review, which is used to develop the conceptual model for this study.

2. Literature review

2.1. Introduction

The research objective was to develop a framework that identifies key considerations for sustainable EdTech entrepreneurship in an emerging economy. The first step in developing this framework, was to review the literature. The key aspects from the research objective include “EdTech or e-Learning” and “sustainable entrepreneurship”, and were used to structure the literature review. The insights into “emerging economy” (in this case South Africa) come from the empirical findings of this research. In the literature review “sustainable entrepreneurship” was explored through the concepts of business models and the related value networks.

The literature on “e-Learning” is very extensive (more so than “EdTech”), but focuses mostly on the impact on learners and how e-Learning can be improved. The global e-Learning and EdTech sectors have been thoroughly analysed by amongst others IBIS Capital, CB Insights, EdSurge and HolonIQ and various models built to describe investments into the sector, as well as the product landscape. These models do, however, not cover sustainable entrepreneurship, or more specifically business models and their related value networks in the EdTech sector. The broader literature review produced only a few articles that focus on the “e-Learning” suppliers, or entrepreneurs, and their role in the EdTech ecosystem.

There is a broad range of literature on “business models”, and is covered in detail in this chapter. Various business model frameworks and their evolutions were considered, with the business model canvas (BMC) selected as a key input to the conceptual model developed in this research, because of its contemporary nature, comprehensive coverage of all business model aspects, and “simple to understand” structure.

The cross section of literature for “EdTech” (or “e-Learning”) and “business models” aims to ultimately align the literature findings to the research objective, and is covered in the last part of this chapter. Business model innovation (BMI) is supported by evaluating the overall network of stakeholder interactions in the form of a value network. BMI and value network models provide further input into the development of the conceptual model.

2.2. Education technology and electronic learning

In Chapter 1 the investments into EdTech companies, based on HolonIQ data, was referenced as 268 listed education stocks in 33 countries, representing over \$220 billion of market capitalisation, \$85 billion of revenue and over half a million

professionals and teachers (HolonIQ, 2020). South Africa is not explicitly referenced in this EdTech investment data, as the investment into the sector in South Africa is negligible in the global context. HolonIQ also presents a product landscape which will be referenced in section 2.4.2 (Figure 8) of this chapter.

The systematic literature survey approach chosen, was to select a set of keywords, and to primarily use the Scopus database to narrow the search. The Scopus database was used as it indexes content from more than 24,600 active titles and 5,000 publishers, of which the bulk are peer-reviewed journals in top-level subject fields.

There were 69 277 results for the search term “basic education” and 7 047 for “K-12 education”. This result set was clearly too large to review each of these articles for relevance.

Including “EdTech” as a keyword resulted in 86 results, i.e. with the following search string “(k-12 OR basic AND education) AND (edtech)”. These articles were all scanned, and it was found that all articles focused purely on how EdTech (or e-Learning) can be improved and the effect it has on education. Some of these results were used to create the background for the research in Chapter 1, i.e. providing context to effectiveness and challenges of EdTech in education. None of these results spoke about the e-Learning supplier (or sustainable technology entrepreneurship).

Opening up the search to other terms for EdTech (and even limiting the result set to articles with these words in the title, still produced too large a result set of 5,191, i.e. with the following search string “(k-12 OR basic AND education) AND (e-learning OR edtech OR ict)”. Most of the 5 191 articles were scanned, but they did not produce any other insights into the EdTech supplier or the broader EdTech stakeholder value network.

The literature survey on “basic education” and “EdTech” was clearly not providing any insights that aligned to the research objective. This led to the second part of the objective, i.e. on “sustainable entrepreneurship”, being explored in the next section by a literature review on business models.

2.3. Business models

Although business models have been integral to trading and economic behaviour since pre-classical times, the business model concept became prevalent with the advent of the internet in the mid-1990s, and it has been gathering momentum since



then as can be seen by the number for journal articles on the topic since 1995 (Zott *et al*, 2011).

An extensive literature review study by Zott *et al*. (2011) on business models, found that there were many disparities on the definition of business models. Their study also found emerging common themes among scholars of business models, including that they emphasize a system-level, holistic approach to explaining how firms "do business"; and that business models seek to explain how value is created, not just how it is captured.

These themes of creating models based on a holistic view and considering value creation as a key component, have formed part of the models that evolved since 2010. The rest of this section explored some of the main business model constructs and identified specific considerations related to this study.

With the ever expanding research on business models, defining the business model concept, taxonomy of business models, decomposing business models and identifying their components, ontology and design tools; Alexa (2014) argued the research on business models still has a gap between the academic and the entrepreneur's perspective, there being an ever-growing need for practical and operational instruments. The paper by Alexa provides a review on evaluation methods and their utility for entrepreneurs in developing and evaluating their business models. The evaluation methods vary in their approach, with those primarily utilising a qualitative method potentially being more challenging for entrepreneurs to use. The BMC evaluation method in this paper is based on a strengths, weaknesses, opportunities and threats (SWOT) rating for each of the building blocks.

Tomy and Pardede (2017) took this evaluation of venture success to the next level by building a technique to evaluate opportunities and predict venture success based on uncertainty analyses, and used a machine learning algorithm to continue to refine their model. Political, economic, social and technological (PEST) uncertainties are evaluated. 'Capital' and 'revenue streams' factors within the economic uncertainty group are the focus of evaluation in this research.

Business model innovation studies argue that business models can facilitate the process of exploring technology (product, service, value proposition) innovation in relation to economic viability. Doganova and Eyquem-Renault (2009) view the business model as a scale model of a new venture, which aims at demonstrating its feasibility and worth to the partners whose enrolment is needed.

The same idea or technology taken to market through two different business models will yield two different economic outcomes (Chesbrough, 2010), making it important



to not only consider innovation of technology, but also innovation of business models. Chesbrough (2010) explored the barriers to business model innovation, confirming that one of the largest barriers identified in previous research is the conflict between already established business models for the existing technology and those required to support the disruptive technology. This conflict is typically the result of capital allocation to proven profitable uses, and very little allocation towards experimentation required to explore and implement alternatives. The conflict can only be challenged with the correct organisational structures and mandate.

The extreme case is where a technology shift kills the existing business model. Tongur and Engwall (2014) argue that technology and service innovation needs to be supported by business model innovation. This is further supported by the findings of Dasilva *et al.* (2013) that suggest that disruptive technology per se is not the reason for the collapse of large corporations, but rather the failure to adapt or create new business models to incorporate novel technology. Yang *et al.* (2017) developed a framework that identifies value uncaptured and how this can help firms identify value opportunities that trigger the innovation of sustainable business models.

A business model innovation typology study by Taran *et al.* (2015) provides multiple innovation types where innovation success is measured as a combination of innovativeness (radicality, reach, and complexity), proactiveness and openness. The patterns identified indicate that complexity does not explain the difference between failure and success, whereas radicality and reach do. Radicality and reach should be explored in EdTech business models, i.e. we should explore how unique the product or value proposition is and how broad the customer base is. Proactiveness and openness both positively contribute to venture success based on this study.

Geissdoerfer *et al.* (2017) developed the Cambridge Business Model Innovation Process, which maps activities during the innovation lifecycle to support the innovation process. It includes an ideation process to explore and decide on the best value proposition offering, and testing some of these through a virtual prototyping concept, ultimately mapping this on to a BMC.

A further consideration is the innovation of content marketing to support business model innovation. Mansour and Barandas (2017) built a conceptual framework that identifies considerations for this synergy, including targeted content marketing initiatives to engage specific customer segments to not only generate revenue, but for these customers to participate and co-create in the innovation process.

In the entrepreneurial context having a flexible, but also well-designed business model is key to success of the venture. Trimi and Berbegal-Mirabent (2012) explored the rapid iteration cycle of product and service to test various business model

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hypotheses as methods for entrepreneurs to start a venture with greater assurance of success.

The concept of “open” business models in technology entrepreneurship can be a key artefact to drive collaborative innovation (Doganova and Eyquem-Renault, 2009). This “openness” can lead to inputs from customers as co-creation, to inputs from partners and even competitors as co-opetition (simultaneous pursuit of competition and collaboration). There does, however, not seem to be consensus on an open business model contributing to venture success, and that the same challenges that exist for business model innovation apply to organisations wanting to move from their existing and traditional business models to open business models (Khumalo and Van der Lingen, 2017).

Environmental sustainability is directly impacted by EdTech products and services, as a result of the reduction in use of paper-based books, which depend on wood pulp consumption. Collaboration between software companies and publishers can lead to sustainable e-Learning business models (Calvo and Villarreal, 2018). Davies and Chambers (2018) explored business model innovation that with sufficient alignment between environmental, social and economic value, can lead to sustainable, holistic and complementary business models.

Sanderse (2014) explore business models for non-governmental organisations (NGOs) which have ‘not for profit’ and social impact imperatives, with a key addition to the business model being the evaluation of “impact”. As education and EdTech has far reaching social impacts, the addition of this component for EdTech business models should be considered.

In summary, this section has identified the following key themes and research areas in business models that should be considered for business models related to EdTech:

- Main theme: Business model innovation, because of the rapid change of technology and highly competitive market (Chesbrough, 2010; Trimi and Berbegal-Mirabent, 2012; Dasilva *et al.*, 2013; Tongur and Engwall, 2014; Yang *et al.*, 2017; Geissdoerfer *et al.*, 2017; Mansour and Barandas, 2017)
- “Open” business models, to facilitate better stakeholder collaboration, including collaboration with competitors leading to a large set of literature on co-opetition (Doganova and Eyquem-Renault, 2009; Taran *et al.*, 2015)
- Environmental and social sustainability aspects included in business models (Chambers, 2018; Calvo and Villarreal, 2018)
- Building models for “not for profit” and non-governmental organisations (Sanderse, 2014)

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- Canvas (one page) models for rapid creation and adjustment of business models, especially in the technology entrepreneurship space

The business model canvas is of specific interest, and is explored in more detail in the next section.

2.4. Business model canvas

In recent years companies have increasingly needed to cope with rapid change to be successful. Lengthy business plans are hard to update, which led to the development of shorter version business models. The next step in this evolution has been the BMC, in essence mapping the business model onto one page.

A business model describes the rationale of how an organisation creates, delivers, and captures value. The BMC of Osterwalder and Pigneur (2010) is a comprehensive, but simplistic model that covers nine key building blocks (see Figure 4) and their inter-relation on how this value can be created. These nine components are Key Partners, Key Activities, Key Resources, Cost Structure, Value Proposition, Customer Relationships, Customer Segments, Channels and Revenue Streams. The BMC aims to create a method to rapidly discuss and evaluate various business models by mapping these on to one page/canvas.

Ladd (2018) questioned if this canvas actually drives venture success. His findings suggest that it does, with focus on the Customer Segment component having the greatest positive impact (Ladd, 2018). The paper also suggests that different components of the canvas could have more impact during the lifecycle of the venture, i.e. some components being more important for start-ups, and others more important for mature ventures.

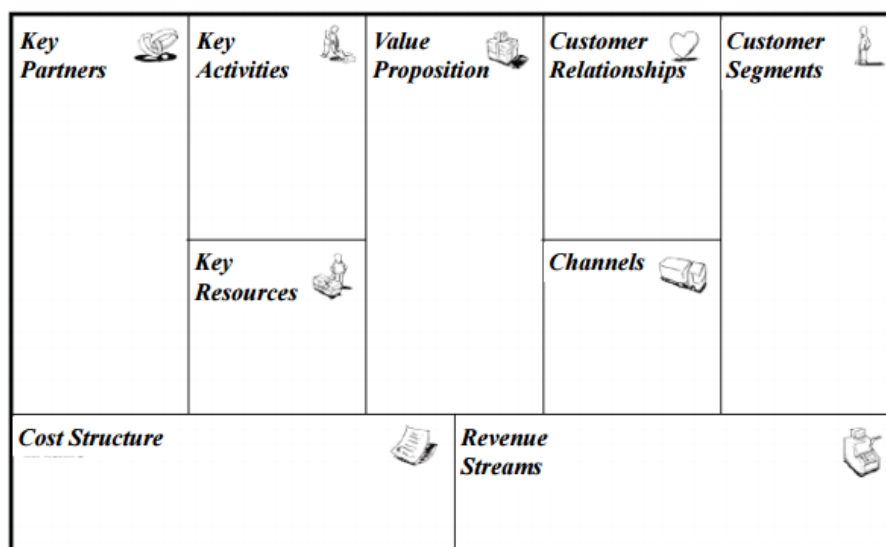
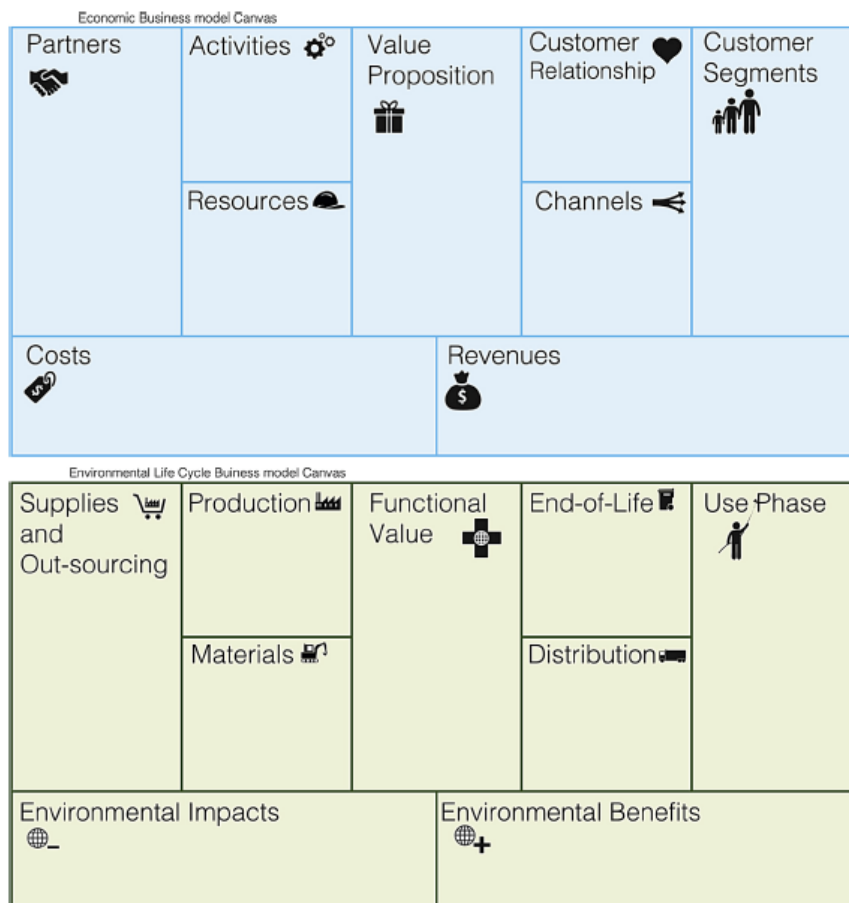


Figure 4: Business model canvas (Osterwalder and Pigneur, 2010)

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Coes (2014) assessed the strengths and limitations of the BMC, and found that strengths include the visual representation, usefulness and simplicity of designing and communicating business models. Limitations identified include exclusion of external forces to a business model, such as competition, market factors and other external forces, the narrowness of the Value Proposition, and excluding other purposes of organisations such as non-profit and governmental organisations.

Joyce and Paquin (2016) developed a triple layered BMC, containing layers for economic, environmental and social aspects. As the social impact is very relevant to EdTech, the BMC at the bottom of Figure 5 should be considered, specifically how social value could generate social benefits. The top layer BMC is in essence the same as the Osterwalder BMC in Figure 4. And the middle layer, related to environment, is less relevant to EdTech.



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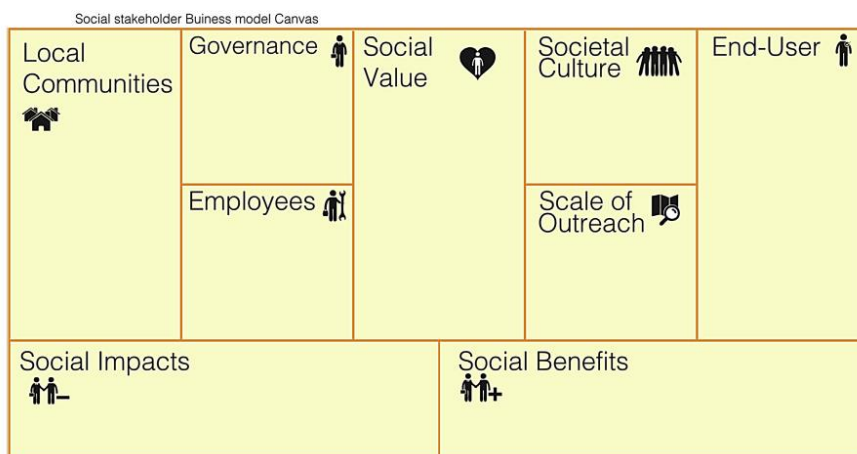


Figure 5: The triple layered business model canvas (Joyce and Paquin, 2016)

Maurya (2010) adapted a version of the BMC based on lean principles (where speed and customer engagement throughout the product lifecycle are important), and some of the building blocks were replaced by other components that Maurya felt more appropriate in lean environments as per Figure 6. The replaced components are Problem instead of Key Partners, Solution instead of Key Activities, Key Metrics instead of Key Resources and Unfair Advantage instead of Customer Relationships.

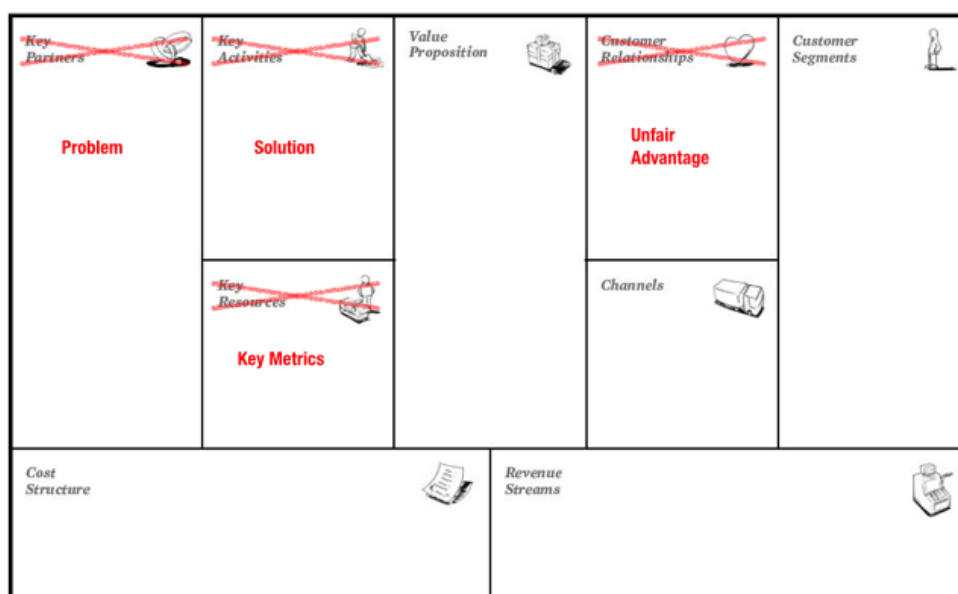


Figure 6: Lean canvas (Maurya, 2010)

None of the canvases in Figures 4, 5 or 6 include a “Fund Raising” component. The closest to describing this aspect is a guideline to design the business model in context of the external environment, specifically considering capital markets (which include fund raising considerations) as macro-economic forces that can influence the business model (Osterwalder and Pigneur, 2010: 208).

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Vecsenyi and Petheő (2018) introduced a Business Concept Map in 2011 as an alternative to the canvases by Osterwalder & Pigneur, as well as Maurya, as per Figure 7. Compared with the two other models, this model covers the following additional aspects: growth potential and market size projections; competitive analysis and market positioning; mission statement or reason for existence; legal conditions of existence; as well as initial investments, funding and financing. The “funding” component is of specific interest to this study.

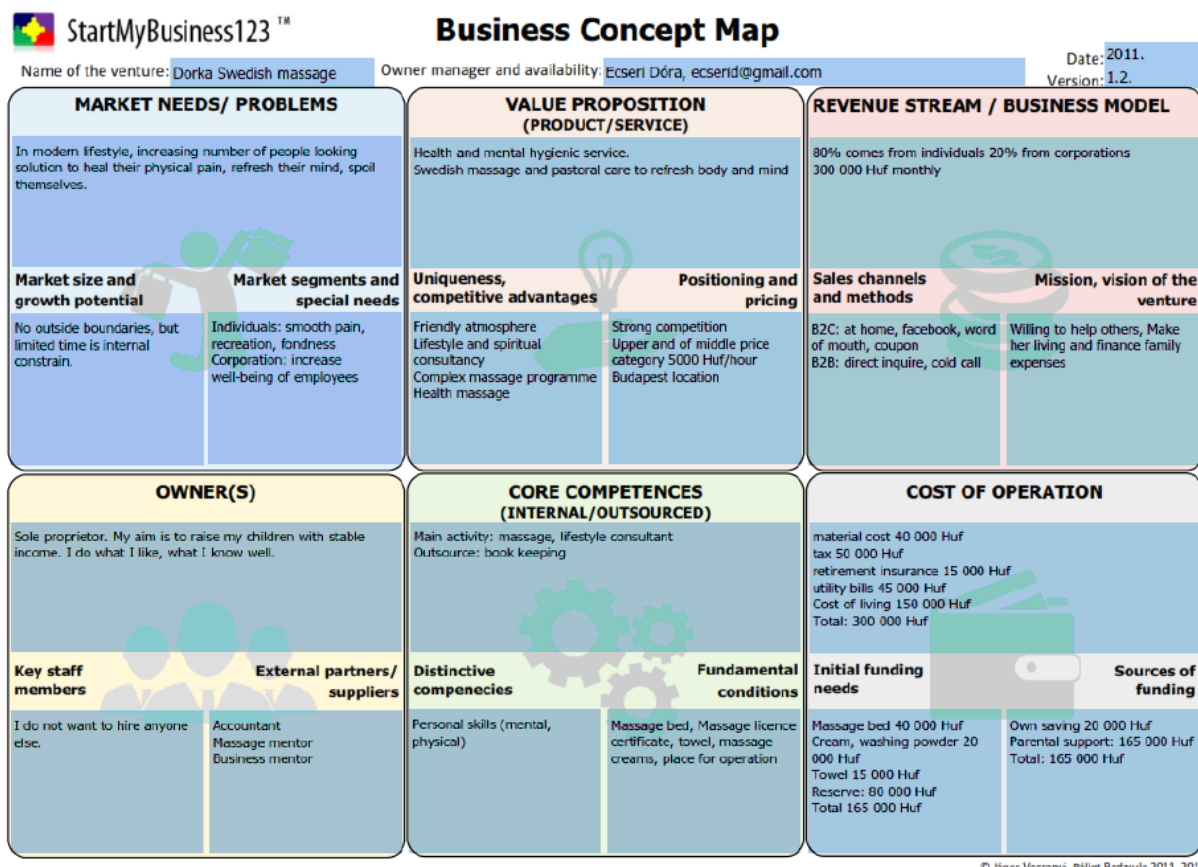


Figure 7: Business Concept Map with example venture details (Vecsenyi, 2018)

In the next subsections, groups of related BMC components are discussed in more detail, and where possible considerations specific to EdTech are mentioned.

2.4.1. Customer segments and key resources

The EdTech landscape has multiple customer segments. This research was focused on basic education, or schools.

In terms of “key resources”, a wide range of literature exists to describe the characteristics of an entrepreneur, and how important the leadership, as well as board of the organisation are in ensuring success of their ventures. Talaia *et al.*

(2016) specifically found that the education and skillset of the company's CEO has a direct impact on the ability of the company to raise funds, which is a key input into venture growth.

The technology entrepreneur in an emerging economy can be described by a model (Lotz, 2006), which consists of the entrepreneur, new venture, mature enterprise, the environment and their interaction. The research by Lotz is relevant to technology entrepreneurs in South Africa, and includes findings on the training and societal influences on the technology entrepreneur. These findings include that having self-employed parents provides a strong inspiration for the entrepreneur; the majority of founders used their savings or own funds to finance their new technological venture, while a small percentage utilised venture capital funds, a large portion utilising commercial banks; the majority of practicing entrepreneurs in technology-based businesses not having received any formal training in entrepreneurship.

Song *et al.* (2010) argue that a new venture's success depends on the success of the first product. They find that to mitigate this potential of failure a new venture should include a strong, multi-functional team, with focus on acquiring the necessary technical skills and resources at the early stage for product development to ensure clear product differentiation, and they do not need to seek marketing skills and resources until they are ready to launch the product to the market. They further obtain evidence that entrepreneurs must correctly identify high-potential markets and get the launch timing right in order to increase venture performance.

2.4.2. Value proposition

The "value proposition" for the EdTech environment can be mapped onto existing models such as the Global learning landscape prepared by HolonIQ (Figure 8).

For South Africa products and services, the "value proposition" can be mapped into this landscape, but it might very well be that there is a unique customer need or offering in South Africa. This was explored in the case study analysis, for EdTech entrepreneurs in South Africa. This landscape can also be used to do a certain level of competitor analysis, i.e. identify which block (Figure 8) you operate in and then check which other companies operate in the same product space. Spaul (2013) mentions the need for teacher training, which could be supported by block 31 (Teacher Resources) in Figure 8, as this area not only includes ready-made resources, but also guidance through peer to peer teacher sharing platforms. The focus of this paper is on basic education, whereas this diagram covers EdTech solutions into various other customer segments as well. This landscape is shared online and has filters, e.g. when filtering for K-12, the landscape displayed on the website is filtered to blocks only relevant to the K-12 education segment.

globallearninglandscape.org

2019 Global Learning Landscape

An open source taxonomy for the future of education. Mapping the learning and talent innovation landscape.

Holon IQ

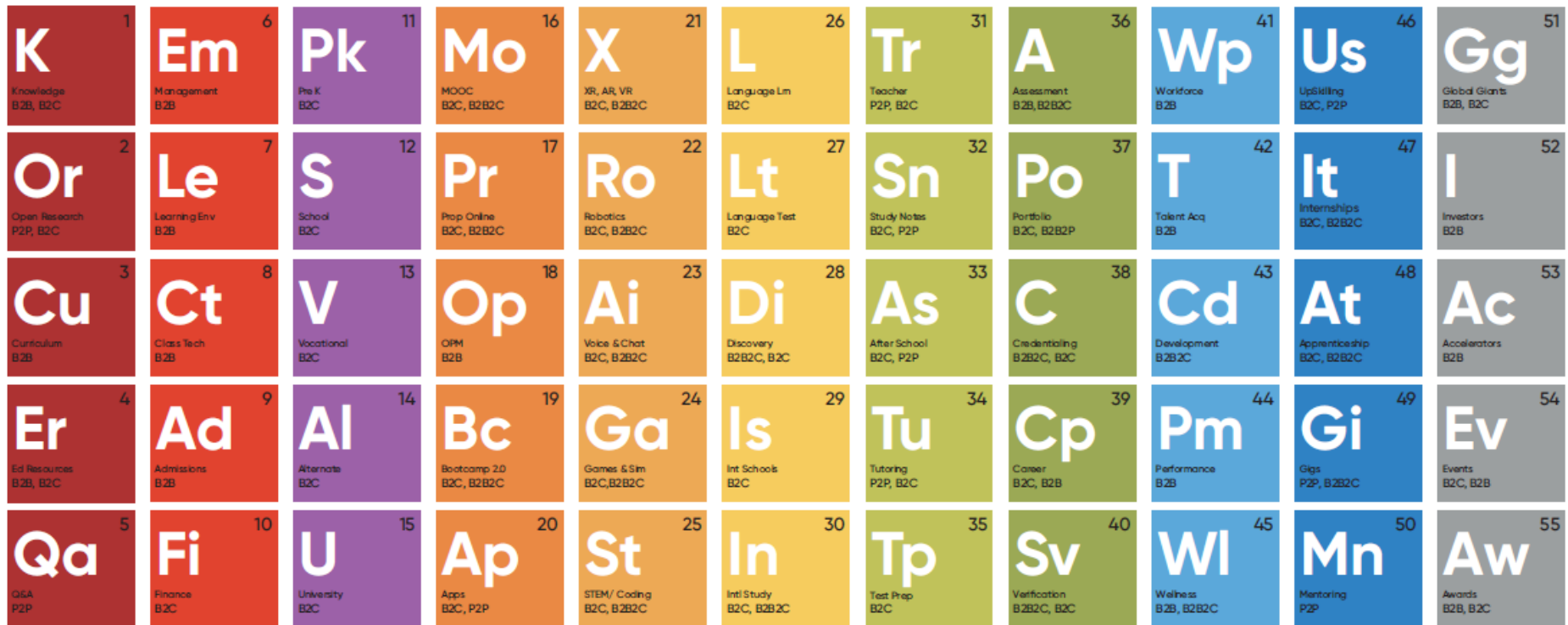


Figure 8: Global learning product landscape (HolonIQ, 2019)

Ford & Botha (2010) identified the Mxit platform (historically used predominantly by young people as a mobile messaging application, because of the low cost of transactions and community setup) as an enabler for EdTech solutions to South African learners. This platform does not exist anymore as a viable option to enable EdTech solutions, but it does highlight how other enablers, especially those with a social aspect, should be considered in the value proposition formulation and positioning.

Massive Open Online Courses (MOOCs) are a disruptive trend in education, and could play a role in basic education. Alario-Hoyos *et al.* (2014) developed a framework in the form of a one-page canvas to guide the development of a MOOC, by focusing on available resources (human, intellectual, equipment and platform) and a set of design decisions/considerations. Porter (2015) found that most MOOCs are currently based upon a “freemium” model (where content is provided freely and additional services are charged for); that there are already a range of different “flavours” of MOOC and that this range is likely to further develop over time with some clear winners emerging; and that completely free and open MOOCs are not likely to be the focus of growth in the future.

One of the real challenges to be considered when designing e-Learning products is to keep the learner engaged. Dominici and Palumbo (2013) identified a user-friendly platform, flexibility of time and hours, mandatory quizzes and exercises, and the presence of a download area as important elements driving user satisfaction of e-Learning courses, from a sample of university students. Less important factors were the presence of a personal tutor and the release of a certificate of attendance as a result of completing the course. Harrati *et al.* (2016) analysed usage-based metrics and found that the usage measure alone does not indicate user satisfaction, and product efficacy, in itself. Additional metrics should be considered, such as assignments, quizzes and forums. The study by Aparicio *et al.* (2017) revealed that individual learners' non-cognitive characteristics, such as grit, lead to e-Learning success. More specifically, grit positively influences satisfaction. Along with grit, other characteristics, such as information quality, system quality, service quality, use, and satisfaction contribute to e-Learning success.

Alptekin and Karsak (2011) developed a decision framework for evaluating and selecting e-Learning products. The framework maps customer needs to e-Learning product characteristics. This concept aligns to the BMC where the value proposition should be strongly influenced by customer needs.

2.4.3. Revenue streams

From the Osterwalder & Pigneur canvas each Revenue Stream may have different pricing mechanisms, such as fixed list prices, or pricing based on bargaining or auctioning, or market, volume, or yield dependent. Revenue Stream types include:

- Transaction revenues resulting from one-time customer payments
- Recurring revenues resulting from ongoing payments to either deliver a Value Proposition to customers or provide post-purchase customer support

Revenue streams can come from an asset sale, usage fees, subscription fees, lending/ renting/ leasing, licensing, brokerage fees or advertising.

In the ICT industry the recent trend is towards “everything as a service”. The analysis of 25 cloud-based platforms (Eurich *et al*, 2011) revealed that the current revenue streams of “platform as a service” solutions are unpretentious and follow simple patterns (see Figure 9). Most cloud-based platform providers only focus on direct revenue streams, which are typically based upon subscription fees or user-based transactions. Long term consideration should be given to innovation of these business models.

Recurring	Subscription Transaction-based Additional services (certification, training)	Advertisements Affiliate services
Non-recurring	Admission fee Downloads/upgrades	Revenue sharing
	Direct Revenue	Indirect Revenue

Figure 9: Potential revenue streams of cloud based platforms (Eurich *et al*, 2011)

Further to the topic of considering learner engagement in the Value Proposition and product development, game based learning should be considered, and linked to this the ever increasing freemium business model, especially prevalent in the mobile application gaming world. This freemium business model depends on the ability to record, analyse and interpret analytics and metrics to finesse the user experience and plan future iterations of a product to ensure a high level of user retention and monetization (Callaghan *et al*, 2014)

Oestreicher-Singer and Zalmanson (2012) investigated the freemium model and found that willingness to pay for premium services is strongly associated with the level of community participation of the user, rather than just getting access to additional content. Their results suggest that firms whose digital business models remain viable in a world of “freemium” will be those that take a strategic rather than techno-centric view of social media, and that integrate social media into the consumption and purchase experience, rather than using it merely as a substitute for offline soft marketing.

Chikoto and Neely (2014) looked into revenue models for not for profit organisations, and found that revenue concentration, rather than diversification, lead to positive growth. This does pose the question: Whether this applies even if revenue from a specific customer segment does not perform well? i.e. do you subsidise via another customer segment, or rather focus efforts on improvements via the existing customer segment and/or channel?

2.4.4. Fund raising

For the period that an organisation cannot cover its costs (running as well as growth) by its revenue streams, it is necessary to raise funds.

Funding can come from various sources, including founders, friends, family, philanthropists, investors (angels and venture capitalists), banks, government, and crowdfunding. These funding sources can be categorised into grants/donations, debt and equity.

Gundry and Welsch (2001) found that the utilisation of a wider range of financing sources is a key input to high growth ventures, supported by the ambition of the entrepreneur. Davila *et al.* (2003) specifically investigated venture capital input into company growth, and found a positive correlation between start-up company growth and venture capital invested in the company. Lerner *et al.* (2011) had similar findings for angel investment based on a global study over 21 countries. Teker *et al.* (2016) found the USA, Europe, Israel, Canada, China and India as the most developed markets for venture capital, with the USA having invested \$33.1 billion in 2013.

Recently crowdfunding has gained popularity, as entrepreneurs work towards creating socially and environmentally sustainable businesses. Chen *et al.* (2018) compared a sample of USA to Chinese companies and suggested that focus on venture brand and support via government policy is a key ingredient to support and grow crowdfunding.

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Pretes (2002) argued that startup grants and equity finance are useful and appropriate in addition to the more common loan-based approaches, especially for micro enterprises in low-income countries as per this study in East Africa. While it is clear that external funding sources can lead to venture growth, Vanacker *et al.* (2011) found that entrepreneurship financial bootstrapping associated to venture growth is either non-existent or there is positive growth. Business models and specifically the BMC have been successfully used to pitch for venture capital funding (Sort and Nielsen, 2018).

The Business Concept Map in Figure 7 introduced funding components to the model. Noga (2015) questioned the absence of these key components on the BMC as well, and suggested an adjustment to the canvas. His view is that the current canvas only focuses on the profit & loss statement. He extends the canvas with two additional components, i.e. investors (to fund your operating costs), and exits (as revenue streams determine the valuation of the company exits) as per Figure 10.

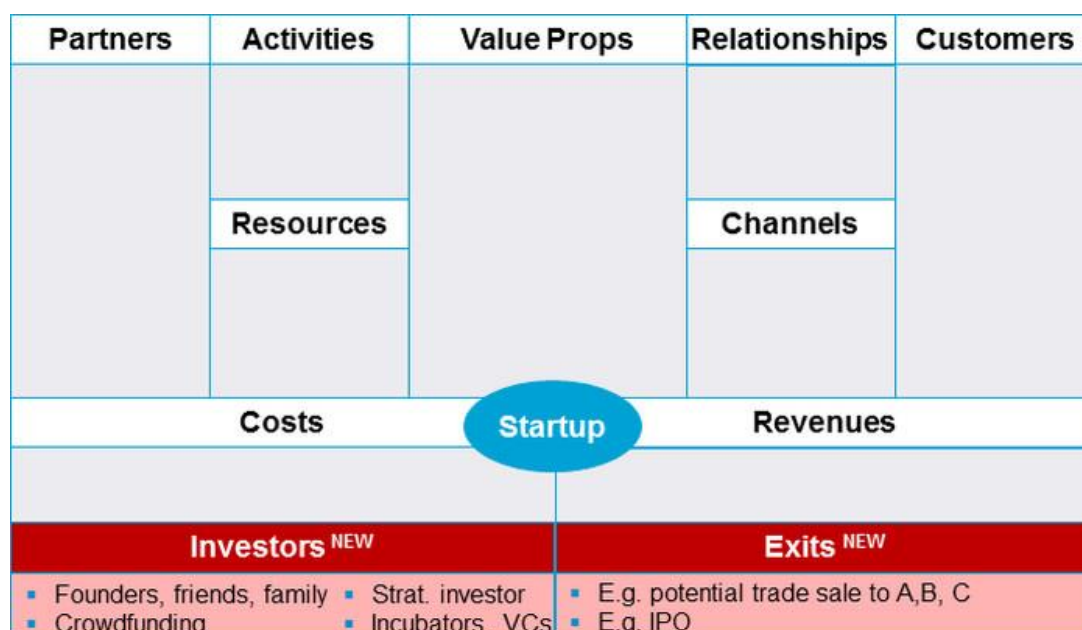


Figure 10: Business Model Canvas with Investor and Exit components (Noga, 2015)

2.4.5. Customer relationships, channels and partnerships

The linkage, or network, between some of the business model components are best described through the customer relationship, channels and partnership components. Partnerships can play a major role in collaborative delivery and innovation. This network of interaction between the different stakeholders can also be described in a value network. A value network is a web of relationships between two or more organisations, groups or individuals that generates tangible (e.g. economic) and

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intangible (e.g. credibility) value through complex dynamic exchanges (Allee *et al*, 2015).

Gunn (2010) examined e-Learning in a sample of tertiary education institutions in New Zealand, and identified institutional, as well as cultural barriers to sustainability of these initiatives. Even though e-Learning was set as a strategic intent, it was not supported by sufficient collaboration from all stakeholders.

Gnyawali and Byung-Jin (2009) argue that a co-opetition strategy helps SMMEs to develop their ability to effectively pursue technological innovations. Collaboration with competitors, as opposed to other firms, is unique and important because competitors have high degrees of market commonality and resource similarity. Co-opetition should be considered in industries that show the characteristics of a short product life cycle, technological convergence, or high research and development costs.

Gnyawali and Madhavan (2001) argue that structural properties of the network between companies influence competitive behaviour, and that firms would benefit from sophisticated tools to analyse the overall network structure, and their firm's position in it, to be able to restructure the network to their advantage. Their article suggested that not all kinds of connections are good, i.e. some ties enhance the competitive capability of the focal firm, whereas others constrain it.

A study of 212 nascent Chinese entrepreneurs supported the positive relationship between social network capability and opportunity discovery (Shu *et al*, 2018). Sullivan and Marvel (2011) suggested that other than acquiring technology knowledge through formal education and training, accessing this knowledge through a social network positively relates to the innovativeness of products/services developed by entrepreneurs. Libaers and Meyer (2011) found that clustering highly innovative small technology firms, especially serial innovators, could benefit them towards internationalisation efforts. All of these articles argue that partnerships play a key role in entrepreneurship.

While partnerships can play a key role in venture success, the importance of incubation, accelerators and mentor networks should not be discounted. A study by Seet *et al*. (2018) on an Australian start-up accelerator that is delivered using ideas such as Design Thinking, the BMC and Lean Start-up methodology, results indicated that mentors and experts were especially helpful in shaping learning and in developing entrepreneurial networks. Moreover, their results indicate that the processes of 'know-what', 'know-how' and 'know-who' are interrelated – by knowing 'who', participants learnt 'what' and 'how to' through social learning.

Lundqvist (2014) found that even though infrastructure, coaching and networks are important to the incubation of a venture, ventures that were supported in a surrogate method (e.g. by a university getting involved with entrepreneurial team formation) performed significantly better in terms of growth and revenue.

2.4.6. BMC summary

Each of the BMC components was explored in the previous five sub sections. Literature specific to each of these business model components provided further insight into considerations for the EdTech entrepreneur to formulate a BMC for their venture. Where possible context or examples of how this could apply to the EdTech sector were mentioned. It is also apparent from exploring each of these areas in detail that there is a clear relationship between the BMC components. In the next section EdTech BMC examples are explored, which leads into the last section in this chapter covering the value network, or relationship between BMC components.

2.5. Education technology business model canvas examples

In the previous sections of this chapter various business models, and specifically the BMC were considered. Components and their potential application and consideration to EdTech were mentioned. Very little literature exists with specific reference to the application of the BMC to EdTech.

A study by Barzak (2017) referenced CB Insights venture capital maps and evaluated various EdTech business models in Russia compared to that of the USA using the BMC. Barzak argued that no one business model fits any specific industry or company, as the stakeholder and cost-revenue models are continually shifting. The study listed various revenue streams to consider including:

In the business-to-consumer segment (B2C):

- Issuing Certifications (e.g. Coursera)
- Issuing paid Statement of Participations
- Donations (e.g. Khan Academy)
- “Specialisations”, programs or course curricula (e.g. Udacity, Uniweb, Netology, Lynda)
- Purchase Courses for assignments with free audit

In the business-to-business segment (B2B):

- Course Production Services
- Course platform fees for hosting content
- Global marketing and branding
- Learning analytics tools
- Translation services
- Certification services

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- Recruiting Services for companies and other organisations.
- Further services for the professional development process of an organisation (customer relationship management, webinars, course moderation) etc.
- Training and consulting on how to design/develop online courses
- Using (anonymised) data for recruitment

Barzak argued that most elements in this business-to-business (B2B) model were related to the EdTech platform providing paid services to mainly higher educational institutions or corporates. The six companies evaluated by Barzak all seem to have successful business models, even if some companies had to adjust and even pivot a few times, but these models are based on customer segments that do not include basic education. See Figure 11 for an example of one of the EdTech companies as evaluated by Barzak.

<i>Key partners</i>	<i>Key Activities</i>	<i>Value proposition</i>	<i>Customer Relationship</i>	<i>Customer segments</i>
Tech Industry giants (Google, AT&T, GE, Tesla, Facebook, etc.) and Higher Education Institutions (Georgia Tech)	Coursework production	Students, adults & veterans: -A catalog of free courses/MOOCs on real-world skills tough by industry pros -Master tech skills (data sciences, machine learning, AI etc.), and land a dream job with Nanodegree or Nanodegree Plus programs (if not-100% tuitions refund offered) -Scholarship programs Businesses: -Corporate training -Hire talent (e.g. Blitz)	User's Udacity profile & discussion forums	B2C: Students Adults Tech Professionals B2B: Companies
	Software development		Uconnect for Nanodegrees – weekly face2face mentorship	
	Client & career service		Customer support & career resource center	
	Marketing		<i>Channels</i>	
	<i>Key Resources</i>		Website platform & blog Android/iOS apps Marketing: Udacity Intersect Conference Udacity Talks Social Media	
	Founder's experience and brand			
IT infrastructure & team expertise (software dev, datacenters, etc.)				
Leading instructors & coaches				
<i>Cost Structure</i>			<i>Revenue Streams</i>	
Fixed costs: IT platform and infrastructure development, administrative expenses, analytics Variable costs: outsourced paid graders (USD 50-100), scholarships			UConnect subscription: USD 99/month Nanodegree programs: avg. USD 200 per month (a program lasts 6-12 months) or per term depending on the program (e.g. USD 800/term)	

Figure 11: Business Model Canvas for Udacity (EdTech company) as per Barzak (2017)

2.6. Education technology, business models and value networks

Following from the previous sections, deep insights into business models were gathered from the literature. And from this the BMC investigated in more detail, concluding with findings on a potential EdTech BMC.

Another view on business models is the value-based perspective by Rezazadeh and Carvalho (2017), in which five types of business model innovation are proposed that are each focused on one element of the company's business model: (1) innovating the operation processes and factors involved (value creation); (2) innovating the offerings to customers (value proposition); (3) innovating the way to reach and interact with customers (value delivery); (4) innovating the financial architecture (value capture); and (5) innovating the partnership arrangements (value network).

The next step in the literature review was to investigate the overlap of the EdTech sector with business models, and their related value networks. A literature survey in Scopus produced 16 results where the title included (e-learning AND business AND model); and a Web of Science search produced 8 results for the same criteria limited to a timespan of 2010-2020. An alternative to the e-learning term was used, i.e. articles where the title included (edtech AND business AND model) giving four results in Scopus, and one result in Web of Science.

Across these result sets only four documents were relevant to this research topic. Because of this very small result set, the search was extended in Google Scholar resulting in three additional relevant results. All these results were investigated in terms of sources and citing of them to find any more relevant literature on this topic. The relevant documents are discussed in more detail in the rest of this section, and some of these have a direct impact on formulating the conceptual model in the next chapter.

Nagle and Golden (2007) and Di Valentin *et al.* (2014) built their models on the back of the Osterwalder & Pigneur BMC (2005 and 2010 versions).

Nagle and Golden (2007) present a model with e-Learning subcomponents to consider when analysing companies in this industry. These are:

1. Value Proposition – Product and/or Service
2. Target Customer – Organisational / End user / Market Segment (Vertical/ Horizontal)
3. Distribution Channel – Global Sales Force / Partner Network
4. Relationship – One-to-one or one-to-many
5. Value Configuration – Waterfall or Iterative

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6. Core Competency – Technology / Customer Relationship / Pedagogical Methods
7. Partner Network – Integration / Orientation (Knowledge/ Technology)
8. Cost Structure – Contract / Investment Capital dependant / Market Research dependent
9. Revenue Model – Contract price / Usage / Licensing / Unstructured

While all of these are very valid, and give a slightly different view to previous models, there is not really any significant difference, other than the reinforcement that one of the core competencies to consider as an e-Learning provider is pedagogical method and knowledge.

Di Valentin *et al.* (2014) built their model to cover all the business model components (or elements as they refer to them) with a set of specifications. The research is termed “Towards a Business Model Framework for E-learning Companies”, where they aim to get industry input into their model in future research. Contacting the authors has not been successful, and no further research could be found on obtaining industry input as empirical data to test their framework. Getting inputs from company founders and CEOs in the e-Learning industry presents a potential research hurdle. The empirical data collection of this research could contribute in further developing the models of Di Valentin *et al.* Their models and specifications are summarised in the five tables in Appendix B from their research. The five element categories are value offering, partnerships, market, strategy and financials. None of these provide substantial additional insights into business models, other than the value offering category, which does provide some specific e-learning value proposition options to consider, which could be used alongside Figure 8 (HolonIQ Learning Product Landscape) by EdTech companies to assist in product or value proposition positioning.

Sambhanthan and Potdar (2017) categorise the business model into three categories, i.e. managerial, economic and service orientation. For each of these categories they define further sub layers to help evaluate e-Learning business models.

1. Managerial - team management, activity management, revenue management
2. Economic – business fields, exchange goods, basic business model types, degree of integration, sources of revenue and forms of references
3. Service Orientation - application provider, content provider, hardware provider, service provider and full service provider

Davis (2019) found three main factors impacting the adoption of EdTech in public K-12 schools in New Jersey in the USA. Technology acceptance (including perceived usefulness), the knowledge ecosystem, and commercialisation were found to have a

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close to equal impact on EdTech adoption. A practical consideration from this research was the importance of using hands-on demonstrations to convey the value and use of EdTech to teachers and school decision-makers.

Badhani and Mut (2017) explore business model innovation, and built a framework that takes the need for an ever-evolving business model into consideration. This framework is built based on three components, i.e. the business model, dynamic capabilities of the company, and the overall value network. The framework is evaluated in a case study of an e-Learning company called Sensavis, over five stages that the company had to adjust their business model. The business model aspects are grouped into value creation (partners, activities, resources), value delivery (channels, customer relationships and segments), and value capture (cost structure, revenue streams). And these are tied into three key company dynamic capabilities (sensing, seizing and reconfiguring) and mapped into an overall value network as per Figure 12.

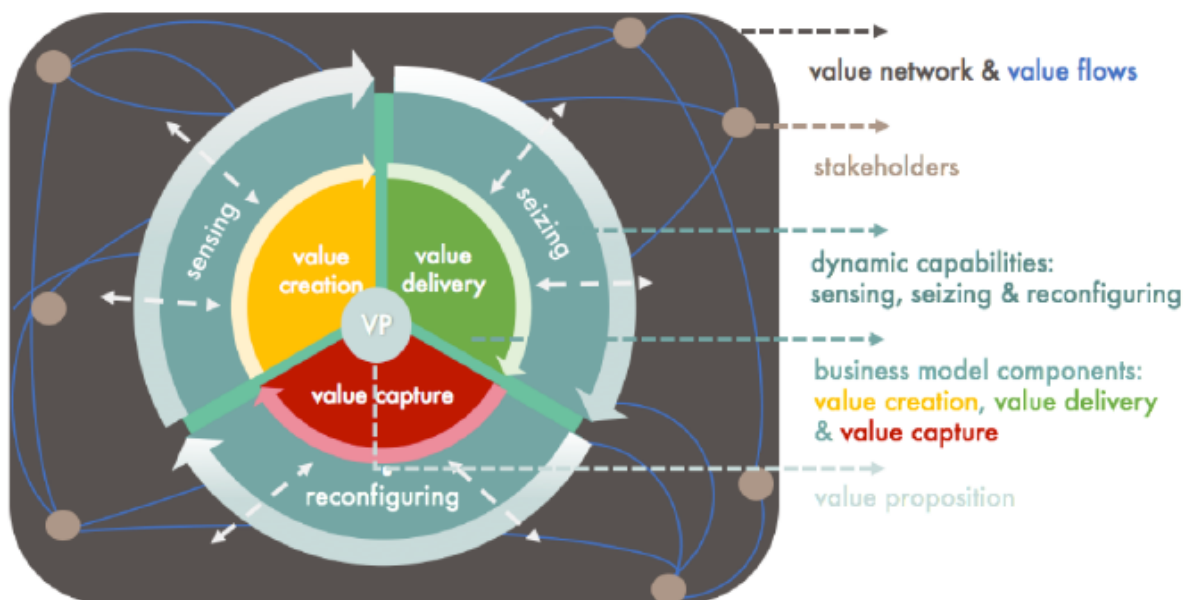


Figure 12: Business Model Innovation framework (Badhani and Mut, 2017)

A Value Network Analysis (VNA) method is used to analyse the e-Learning company and its interactions with the overall ecosystem of stakeholders. The four steps adapted from Peppard and Rylander (2006) used by Badhani and Mut (2017) are:

1. Define network participants and their objectives
2. Identify value dimensions of network participants
3. Define value flows
4. Analyse and shape

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The output of the VNA is a map, as per the example in Figure 13, which covers stage 5 of Sensavis within its value network. This includes global stakeholders as the company expanded.

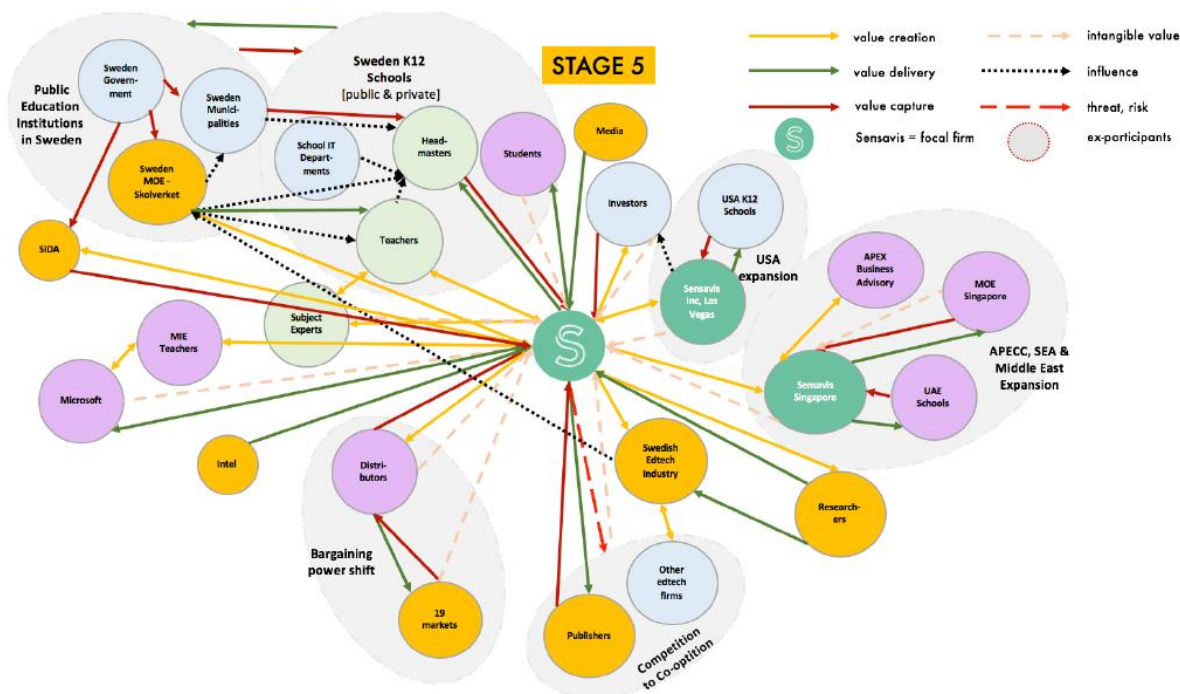


Figure 13: Sensavis Stage 5 value network (Badhani and Mut, 2017)

Mattsson and Andersson (2019) published an article built on the Master's thesis by Badhani and Mut (2017), where they expanded the research by adding data from the public sector. They specifically investigated the public-private partnerships in the context of public service innovation. Their findings support the need for continuous business model innovation by the private company actors as the industry evolves over time. The public actor agenda is also vastly different to the private actor, leading to various tensions between these actors.

The three insights about these public-private tensions include that they shift over time as new knowledge develops concerning the service innovation, that the tensions depend on which public organisational level the private supplier interacts (in some instances interaction is necessary at multiple levels), and lastly that digital transformation and public service innovation are intertwined on-going processes, that restructure and reorganise the public-private interactions.

2.7. Conclusion

The literature review identified various models, components, the component specifications and considerations to form the basis for the research objective, which is to develop a framework that identifies key considerations for sustainable EdTech entrepreneurship in an emerging economy.

The literature points to the following possible considerations when developing a business model for EdTech entrepreneurship, i.e. innovation to develop a unique value proposition (which is also driven by business model innovation), delivery to a broad customer base, open models to encourage collaboration with various stakeholders, impact measurement, diverse funding sources, as well as simple and focused revenue streams.

Little to no literature exists with empirical findings on these considerations in the EdTech industry. Di Valentin *et al.* (2014), as well as Barzak (2017) built frameworks, components and specifications for consideration without any empirical testing. Part of the challenge is that companies keep the details of their business models secret, especially small companies with a niche value proposition. The study by Badhani and Mut (2017) builds on the fact that business models cannot be static, and therefore need to be supported by continuous innovation. The investigation into business model innovation leads to a framework that can identify a broad set of considerations within the EdTech sector, i.e. for the EdTech venture as well as all the other stakeholders in the overall value network.

No literature could be found for EdTech entrepreneurship in South Africa, or for any emerging economy.

The insights from the literature review are used to develop the conceptual model in the next chapter, guide the formation of the propositions, as well as inform the structure of the data collection exercise.

3. Conceptual model

3.1. Introduction

The opportunity to improve the quality of basic education in South Africa presents a complex challenge to entrepreneurs. This challenge provides an opportunity with the obvious potential of positive social impact, but not so obvious potential for entrepreneurs to create economically sustainable ventures. Not being able to create an economically sustainable venture could be a detractor for more entrepreneurs to join in tackling the education challenge in South Africa.

Chapter 1 (introduction and background to the research study) provided insight into the EdTech sector, and set the objective for the research. In Chapter 2 (literature review) insights into EdTech entrepreneurship were gained through company business models and the related value networks they are embedded in. This chapter reviews the frameworks and models identified in the previous chapters, and builds a proposed model for the empirical data gathering specific to South Africa as an emerging economy.

Key considerations from the previous chapters include business model innovation, mapping out relationships in the overall stakeholder network (which should include partners and customers), and the evolution of technology over time.

Some of the broad EdTech opportunities include teacher training (very relevant to South Africa), integrating technology as a learning tool in classroom instruction, and teaching students to become skilled and confident users of technology.

Three propositions are set in this chapter. They cover the following five key investigation areas, i.e. channels, partnerships, value proposition, funding and revenue. These propositions are evaluated in Chapter 6 against the empirical data gathered based on the conceptual model construct.

3.2. Existing models

The models and frameworks that could be identified in the literature review are summarised in this section, with a brief indication of their strengths and weaknesses.

The BMC of Osterwalder and Pigneur (2010) covers nine key building blocks. These nine components are Key Partners, Key Activities, Key Resources, Cost Structure, Value Proposition, Customer Relationships, Customer Segments, Channels and Revenue Streams. The strengths of this model are its wide use and

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simple structure, whereas a key weakness is the absence of mapping of relationships between the blocks and the external environment.

The lean model by Maurya (2010) replaced Key Partners with Problem, Key Activities with Solution, Key Resources with Key Metrics and Customer Relationships with Unfair Advantage in the BMC. While this model has similar strengths to the Osterwalder and Pigneur BMC, the replacement of partners and customer relationships exacerbates the weakness of not mapping all relationships in the stakeholder (or value) network.

Vecsenyi and Petheő (2018) introduced a Business Concept Map in 2011 and this model covers additional aspects: growth potential and market size projections; competitive analysis and market positioning; mission statement or reason for existence; legal conditions of existence; as well as initial investments, funding and financing. Noga (2015) extended the canvas with two additional components, i.e. investors (to fund your operating costs), and exits (as revenue streams determine the valuation of the company exits). Both of these models have the strength of being more comprehensive, i.e. specifically around adding funding and financing information directly into the model, but have the weakness that they could be overly complex.

Joyce and Paquin (2016) develop a triple layered BMC, containing layers for economic, environmental and social aspects. This model has the strength that it adds non-economic dimensions to consider (which is particularly relevant for the EdTech industry), while similar to the previous two models has the weakness that these additional layers make the overall model more complex.

Nagle and Golden (2007) built their model based on the Osterwalder and Pigneur BMC, and add the specific view that one of the core competencies to consider as an e-Learning provider is pedagogical method and knowledge. Di Valentin *et al.* (2014) built a complex model which covers detailed business model element categories specific to e-Learning companies for value offering, partnerships, market, strategy and financials.

Badhani and Mut (2017) built a business model innovation framework, which categorises the business model components into four categories and focuses on building a map of the overall value network. The strengths of this model are that it simplifies the core business model components even more, and focuses on the relationships of stakeholders in the value network. The weakness of this model is that it oversimplifies the business model components, which could detract from detailed insights into business model element challenges.

These models were all considered when constructing the conceptual model in this chapter.

3.3. Proposed conceptual model

The proposed model for this research aims to address the research questions. The questions are focused around the EdTech entrepreneur business model challenges, as well as the dynamics in the EdTech value network. The research questions are:

- What are the main challenges in an EdTech business model for South African entrepreneurs?
- What are the key dynamics in the South African basic education EdTech value network?
- How can South African EdTech entrepreneurs be better supported in the EdTech value network?

To answer these questions there needs to be sufficient representation of the business model and value network components, as well as value flows, in the proposed model.

The main gap in the existing literature relates to testing the models related to EdTech with empirical data (Di Valentin *et al*, 2014; Barzak, 2017), which includes the fact that these models have not been tested in an emerging economy such as South Africa. The model from Badhani and Mut (2017) relates the business model to the value network, by grouping components from the BMC into four value constructs, i.e. value proposition, value creation (partners, activities, resources), value delivery (channels, customer relationships and segments), and value capture (cost structure, revenue streams). The conceptual model in this study adds “funding” to the value capture construct, and investigates value proposition under the value capture construct, simplifying the model to three value constructs, as discussed in more detail below.

To build a map of the value network we need to identify all the actors and their linkages in this industry, considering resource, partner, and customer categories. The actors include government, education institutions (multiple layers including teachers), learners, sponsors (government and parents), EdTech entrepreneurs (and their partners such as publishing companies and mobile networks) as well as investors (angels, banks and venture capital companies).

The five key investigation areas of this study are channels, partnerships, value proposition, funding and revenue. These investigation areas were grouped into three value construct areas, i.e. channels included in “Value Delivery”, partnerships and

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value proposition included in “Value Creation”, and revenue and funding included in “Value Capture”.

The EdTech entrepreneur value flows were more explicitly categorised based on the business model aspects grouped into value creation (partners, activities, resources), value delivery (channels, customer relationships and segments), and value capture (cost structure, revenue streams, and funding).

The conceptual model in Figure 14 was proposed for this study. This model combines principles of the existing models, with specific focus on the value network, but also sufficient insight into the company business model. The three propositions are represented in this model by P1 to P3 and are covered in more detail in the next section. The EdTech Entrepreneur is at the centre of the model, as this is the focal entity in our research. The value proposition is covered by the value creation block, and therefore not shown separately on this model.

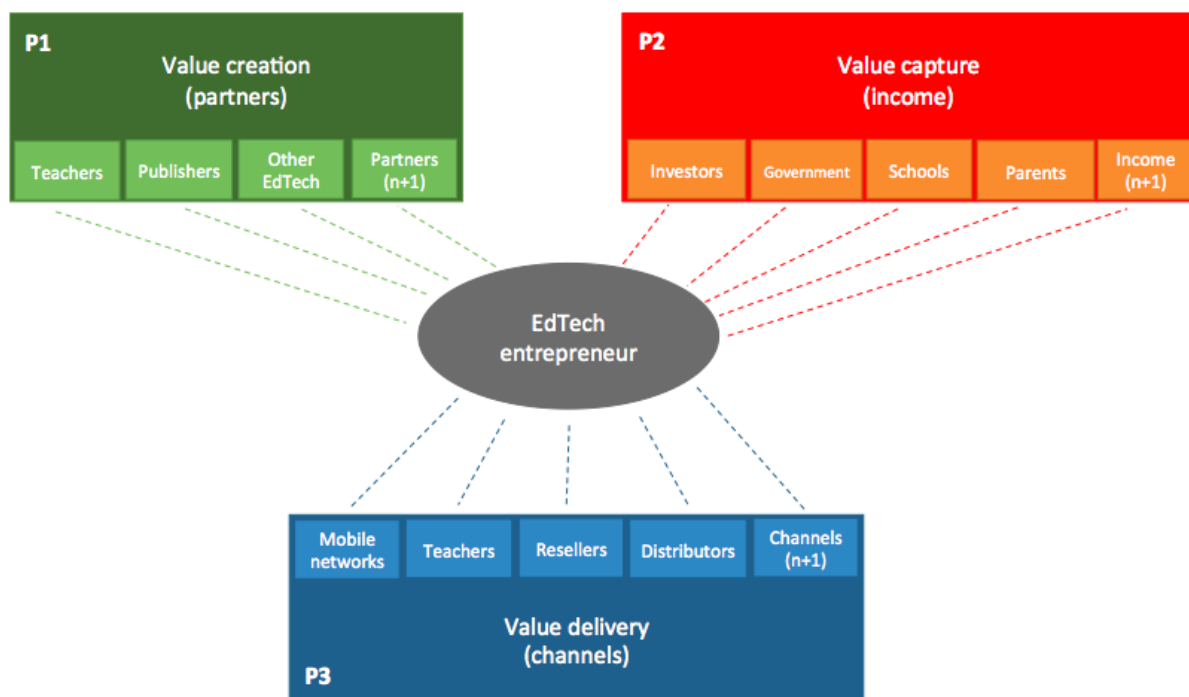


Figure 14: Proposed conceptual model for EdTech entrepreneurship

The dotted lines in this model represent the interactions or value flows between each of the stakeholders and the EdTech entrepreneur. The investigation into these interactions was constructed in such a way that insights into the dynamics in the value network would emerge, and also provide insights into the business model challenges for the EdTech ventures. The value network was explored by identifying the complete set of stakeholder relationships and then focusing on the main stakeholders in each of the value constructs. At the time of creating the conceptual

model, the main, or key stakeholders were understood to be mobile networks in “Value Delivery”, teachers in “Value Creation”, and government, as well as investors, in “Value Capture”.

3.4. Propositions

Based on the literature review and the conceptual model, three propositions were formulated to cover the three value constructs (not directly compared to the research questions), with a focus on the key stakeholders in each of these areas.

Proposition 1 [P1]: Teacher distrust has the greatest impact on value creation
(*Rival: Teacher distrust does not have an impact on value creation*)

The relationship between the EdTech entrepreneur and the educators/teachers in the value network was one of the key aspects to investigate, as educators can have a direct impact on the most relevant EdTech being applied in order to have a sustainable impact (Social, 2009; Kanthawongs and Kanthawongs, 2013; Vandeyar, 2013). Addressing teacher distrust in EdTech forms part of the culture transformation challenge listed by the government’s white paper (DBE, 2004).

Proposition 2 [P2]: Investor scepticism and government revenue streams have the greatest impact on value capture
(*Rival: Investor scepticism and government revenue streams do not have an impact on value capture*)

The EdTech landscape has multiple customer segments. This research is focused on basic education, or schools. In South Africa a large percentage of schools are fully funded by government, which leads to the argument that the suggested business model for EdTech should consider revenue from government or other revenue streams to subsidise the bulk of this customer segment with low revenue potential. A wider customer landscape should be investigated to feed into diverse revenue stream opportunities. Revenue streams from private vs. government funded schools, as well as secondary or alternative revenue streams from tertiary education institutions and private industry should be explored. When revenue streams are not very clear, then investors are typically quite sceptical about investing into related ventures, as there is not clear monetary return on investment.

Proposition 3 [P3]: Mobile network zero-rating has the greatest impact on value delivery

(Rival: Mobile network zero-rating does not have an impact on value delivery)

A telecommunications provider, especially a mobile network operator, can provide the underlying technology enablement for EdTech in an emerging economy that has a lack of infrastructure. EdTech is more accessible to learners over the mobile networks (Walls *et al.*, 2015), and even more so if data usage is not charged. Studies have shown benefits and improved results from having access to mobile technologies to support learning (West, 2013; Sandberg *et al.*, 2011). These networks offer alternative opportunities for payment collection (Mpala, 2019), especially if the transaction fee from the provider is low.

3.5. Conclusion

Existing models were identified in the literature review, and from these a conceptual model built for this study. This conceptual model was used to structure the empirical data collection, and in this process the model was evaluated as well.

Three propositions were presented based on the conceptual model that was developed from the background to the research, as well as the literature review. These propositions are focused on key stakeholders in each of the three value constructs in the EdTech value network. The themes identified in Chapter 5 from the empirical data collection provide insights into the validity of these propositions.

In the next chapter the research design and methodology is presented.

4. Research design and methodology

4.1. Introduction

Led by the research questions, a literature review, followed by a case study approach was chosen. The literature review was used to formulate the conceptual model, and to provide a basic set of secondary data. Specific propositions were developed from the conceptual model to focus the scope of the study, which is a typical approach to keep the study within feasible limits (Baxter and Jack, 2015). The case study methodology was used to test this conceptual model and to collect primary data.

The cases that were studied are EdTech entrepreneurial companies in South Africa. A multi-case study approach was chosen to improve the certainty of the results, and was started with a list of seven EdTech companies as potential case studies, with the possibility of extending the cases based on the snowball technique (Saunders *et al.*, 2019:323) and the initial results.

4.2. Rationale for the research approach

In Chapter 1 the rationale for the research identified the EdTech entrepreneur as a possible key entity in the basic education ecosystem, if properly positioned and supported. The research problem suggested that the EdTech ventures were not economically sustainable, so this led to a research objective to develop a framework that would identify key considerations for sustainable EdTech ventures. A qualitative research approach for 'exploring and understanding the meaning individuals or groups ascribe to a social or human problem' (Creswell, 2014:4) was selected to gather a rich set of data to gain detailed insights into the challenges for EdTech entrepreneurs.

The primary data collection was done via a case study approach. This is a valid data gathering technique because of the exploratory nature of the research questions (Yin, 2014). Although there are multiple stakeholders in the EdTech value network, data collection was targeted at the EdTech entrepreneurs, as they are central to the value network that was explored, and as a result would be able to provide data on all the value flows in the network.

The research teleological type is exploratory. The unit of analysis is the SMME EdTech company sustainability measured in context of the overall value network. The overall value network was evaluated, with each of the value flows giving insights into the dynamics of the relationships between the stakeholders.

4.3. Research design

The research method is qualitative. The instrument of choice for the primary data collection was a case study. The case study instrument should be used when research questions ask “how” (Yin, 2014), which applies to the research question: How can South African EdTech entrepreneurs be better supported in the EdTech value network?

Data collection was primarily driven by semi-structured interviews, as the Covid pandemic hampered the effective use of alternative qualitative instruments like participant observations and focus group interviews. A structured questionnaire was emailed upfront and used to guide the interview. The interviews were conducted by the researcher via videoconference, mainly because of the Covid-19 pandemic making it hard to meet in person, but also because respondents were from various parts of South Africa. This methodology provided the researcher the opportunity to further explore insights raised in the response. With a generic, distributed, self-administered questionnaire, qualitative responses can sometimes be incomplete or misunderstood and therefore misinterpreted, which can influence the data analysis and may skew results.

4.4. Research methodology

4.4.1. Population and sampling

Data collection and analysis was planned on seven cases. At least two of these with predicted similar results (literal replication), and others with predicted rival results.

A company search of “e-learning South Africa” on LinkedIn returned 214 results. Each of these results was scanned, but with almost none in the target population, i.e. the results included educational institutions, tutors, and resellers of international EdTech, etc. A subset of these results alongside a further extensive search on the internet resulted in less than 20 EdTech companies with a basic education customer segment. At least three were focused on devices such as smart whiteboards, which did not fit the criteria for this study.

The companies were selected based on them having been in existence for at least five years, and that were SMMEs (10 to 100 employees). The reason for selecting companies that were older than five years was that they had been able to sustain themselves somehow, and would also have valuable insights based on their experience over a longer period of time than new start-ups. It was not viable to consider a longitudinal study over multiple years because of the time constraints of this research. Based on the target criteria of serving a basic education segment,

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being around for at least five years and being SMMEs, only seven companies could be found, and these were earmarked as potential case studies.

4.4.2. Data gathering

The questionnaire for data collection was structured into sections that covered the company background, broad EdTech context, stakeholder relationships (channels, partnerships, customers, investors and government), and lastly a value network mapping.

The questions contained in the questionnaire are mostly open ended and required short narrative responses. The interview guideline questionnaire is included in Appendix A. The last question covering the value network flows, their direction, and categorisation, could not be sufficiently covered in the interviews, because of the complexity of the question and the limited time available during the interviews. Instead this last question was used along with question 4, on identifying the main stakeholders in the value network, to make sure no stakeholders were missing in the model, and to explore any interactions between stakeholders that had not been sufficiently covered in the previous questions. The answers provided data to be coded and the coded data was used as input to themes that were correlated to the research propositions.

4.4.3. Data analysis

A pattern-matching analytic generalisation technique was used on the primary data, by comparing empirically based results as identified themes with predicted propositions. This was done by capturing all the data in a qualitative analysis tool called Atlas.ti, coding the data and inferring themes from the coded data via a thematic analysis process. Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data (Braun and Clarke, 2006), a widely used qualitative analytic method, which is a useful and flexible method for qualitative research.

The findings of this exploratory research provided conclusions based on the correlation of the themes to the propositions, and provided input to the framework that was developed as part of this research. The findings also provided input to future research recommendations in terms of testing the framework and getting a broader set of data inputs, which could include quantitative and statistical analysis methods.

4.4.4. Ensuring quality and trustworthiness

The main criticisms of the case study method are generalisation of the results and validity. Trustworthiness in qualitative research includes dependability, credibility, transferability and authenticity (Saunders *et al.*, 2019:217). Recording and

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transcribing the interviews enhanced dependability and credibility. The case study method should generalise to theoretical propositions, not to the population as in statistical research. The four design tests for a case study should have the following tactics (Yin, 2014), i.e.

- Construct Validity – use multiple sources of evidence, establish a chain of evidence, and have key informants review the draft case study report
- Internal Validity – do pattern-matching (compare empirical to predicted results), do explanation building, address rival explanations, use logic models
- External Validity – use theory in single-case studies, and use replication logic in multiple-case studies
- Reliability – use case study protocol, and develop case study database

Construct validity is key and was improved by using triangulation, in this case comparing interview responses from multiple respondents where possible.

Internal validity is less of a concern with this exploratory study, as the aim of this study is not to explain causal relationships. Nonetheless, pattern-matching was used to confirm the validity of the empirical results.

Replication logic was used across multiple case studies to confirm external validity or transferability, and creating and updating a separate case study database, with all the results of the interviews, improved reliability. By strictly adhering to the answers and comments of the participants, authenticity was ensured.

4.4.5. Ethical considerations

The University of Pretoria ethics committee approved the research questions and approach before the primary data collection was started.

A permission letter was used to get access to interviews for the case studies, and consent forms signed with each respondent. The company names as well as respondent names were anonymised, as the type of data being gathered is very sensitive, especially to SMMEs. The anonymity was confirmed when these companies were formally approached for data collection. Further, if third party companies, such as mobile networks and funders, were mentioned during the interviews, these were anonymised when referenced in respondent quotes in this report. The format used was 'TelcoXYZ', or 'FunderXYZ'.

The interviews were recorded so that data could be coded and themes could be identified. The recordings, transcripts and data coded in the Atlas.ti tool have all been stored securely.

4.5. Study limitations

Little to no literature exists with empirical findings on possible considerations when developing a business model for EdTech entrepreneurship, which would form the basis for evaluating the sustainability of these EdTech ventures. No literature could be found for EdTech entrepreneurship in South Africa, or for any emerging economy.

This meant that a conceptual model was built with relatively “generic” business model concepts from literature, and would be improved by gathering empirical findings. Driven by the research questions, the exploratory nature of this research, a case study method was chosen. Even with more than one case, there are limitations to the case study method. The most challenging limitation of the case study approach is not being able to “generalise” to the population. The aim of this study was to generalise to theoretical propositions, which could then be tested more thoroughly in future research to potentially allow for generalisation to the population.

The target population in South Africa was very small. It provided sufficient cases for the multi-case study approach in this research, but extending the research to include more cases from other emerging economies would have strengthened the research validity even more.

4.6. Conclusion

The research design and methodology is aimed at exploratory research correlating data to the propositions.

An extensive literature review was used to develop the conceptual model and a case study method was used to test this model. The considerations for ensuring validity of research via the case study method were noted, and an interview guide developed to direct the qualitative data collection process. Ethical considerations for data acquisition, analysis and reporting were approved by the University of Pretoria and observed during the research.

5. Results

5.1. Data collection overview

Data collection and analysis was planned on seven cases. The cases selected were SMME, i.e. 10 to 100 employees, South African EdTech companies that are at least five years old. The aim was for at least two of these having predicted similar results (literal replication), and others with predicted rival results.

Initially there was a positive response from all seven companies, but only three participated in the interviews. The most notable reason for not participating was from one of the companies, which indicated time constraints to participate in the study and pivoting to corporate training.

One of the companies interviewed was considering a pivot from basic to tertiary education, as the one respondent commented: *“Instead of going broad, going deep, tertiary suddenly becomes a more attractive market. Along with that people pour more money into it, because they are getting more serious”*. Another three companies were identified during the data collection process, mainly through the snowball technique (Saunders *et al.*, 2019:323). Of these three additional companies, two participated in the interviews, bringing the total to five cases for which data was collected and analysed.

The main source of data was interviews, with supporting data sourced as publicly available data from the internet. Interviews were held with the CEO, owner, or founders of the companies and lasted a minimum of 60 minutes and a maximum of 120 minutes over one or more sessions. The publicly available supporting data was sourced from LinkedIn and company websites.

With the limited time available in the interviews, the last question around value network flows was adjusted to rather just focus on any missing stakeholders and a brief narrative discussion of the stakeholder interactions.

The data loaded in Atlas.ti was coded, and from there themes were identified. The next section covers a summary of the themes that were identified, with the sections that follow covering each of the themes in more detail. One of the objectives of the case study methodology was to test the conceptual model. This is covered in the section “Updates to the model”, which was mostly supported by data coded as “missing stakeholders”. No major conceptual changes were made to the model, but missing aspects were added to the existing blocks in the model.

The next chapter discusses the results, with a specific focus on how the results correlate to the propositions in the research design.

5.2. Data coding and related themes

Thirteen codes were used when analysing the data. The codes were:

- Mobile network foundational aspect
- Product efficacy / scepticism
- Learner endorsement
- Parent endorsement
- Teacher endorsement
- EdTech challenges
- Investor selection
- Alternative support
- Missing stakeholders
- Alternative budgets
- Government approach
- Government as main influence
- Founder technology vs education background/skillset

When analysing these codes along with the data, a few key themes emerged. These will be covered in sections 5.4 to 5.7 in detail, but in summary they are:

- Mature product
- Complex support network
- Multiple infrastructure considerations
- Multiple sources of revenue

The relationship of the coded data to the identified themes is summarised in Figure 15.

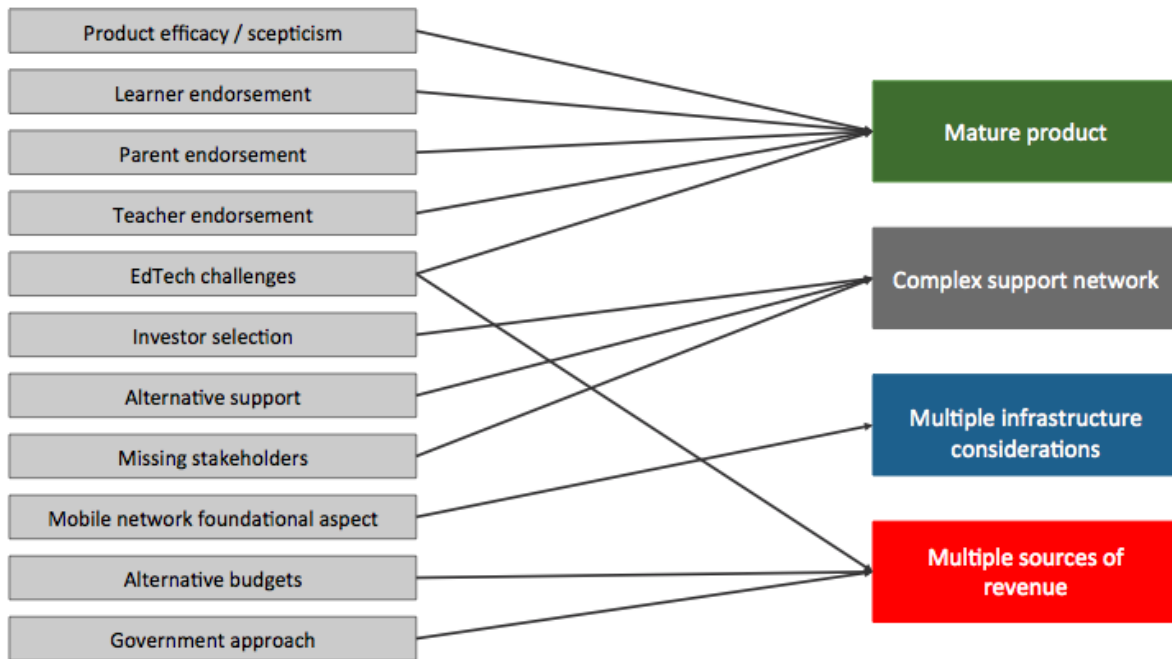


Figure 15: Thematic analysis outcome: Coded data relation to themes

The relationships between the themes will be touched on in the detail description of each of the themes in sections 5.4 to 5.7, and summarised at the end of this chapter.

Before each of the themes is discussed in detail, the next section shows how the results of the data collection provided updates to the conceptual model for this research.

5.3. Updates to the model

One of the objectives of the case study methodology was to test the conceptual model. The model did very well in exploring the key objectives of the research, as well as facilitating deep dives into the specific challenges that EdTech entrepreneurs face in creating economically sustainable ventures.

The model in Figure 14, i.e. without the propositions marked, was used during the interviews, as attached to the questionnaire in Appendix. A. It became very clear during the interviews that one stakeholder could play a role in more than one area of the value network, i.e. more than just the “Teachers” that were listed in “Value Creation” as well as “Value Delivery” in the original conceptual model. The data that was coded as “missing stakeholders” had the largest impact on updates to the model. With the coded categories of “alternative support” and “alternative budgets” also providing input to the update of the model.

One specific consideration from the literature review was the NGO business model (Sanderson, 2014), i.e. more specifically how the EdTech entrepreneur should consider the “not for profit” and social impact construct (Joyce & Paquin, 2016). When constructing the original conceptual model, the NGO was, however, not considered as a separate entity to be added on the model. Another reason the NGO was not added on the original model was that in a generic sense some NGOs can provide grant funding. Grant funding is not necessarily associated with a sustainable business model, so it was not initially seen as complementary to what this research aimed to investigate. NGOs typically have an international mandate and can be social impact funders, and/or policy advisors, and typically have a not for profit structure. Other entities with a very similar structure are not for profit foundations, which are normally categorised into private, community or company foundations. The foundations either fund social impact ventures or operate on these objectives themselves. There is however a clear difference between these two entities, with the most noticeable being that the NGO has a broader and policy focus. This was supported by one of the interview respondents, i.e. the need to add NGOs to the model, but also that they have a policy focus:

“One that maybe is worth putting on there which I didn't see, is actually NGOs. NGOs play such a big part in education, in the developing countries. They're quite a big funder of EdTech in certain areas where the need is high, but the addressable market is very small. And the NGOs do play quite a big role, especially the big organizations, UNICEF and things like that, in trying to advise and change government policy.

... If we look at some of the roles that the NGOs have ended up are more around policy interventions, that's mostly NGOs. You don't see social impact funds really engaging in policy discussions with government, that's not their mandate at all.”

This response not only suggested that NGOs should be added to the model as they play an important role in this value network, but also eluded to multiple possible roles for a NGO entity. A further role of the NGO was that it was mentioned as a vehicle for EdTech companies to reach sectors that their offering was not yet focused on, e.g. this view from one respondent:

“We also have partnerships with NGOs. There are organizations that would like to support a community with some sort of intervention and have funded us to do something, that's become something that's quite close to our hearts. So we've also started our own foundation, and our foundation works with other NGOs to better interface to execute and run education interventions.”

This view was supported by a respondent from another company:

“So how we do that at the moment is by time commitment, and by offering commitment so we work with NGOs to give access to our programs, our courses, [and] our resources to underserved learners communities, [and] partners schools.”

In both these responses there is a clear need to depict the NGO in the conceptual model. And for the last two responses the NGO would be in the “Value Delivery” area of the network. From the initial response it is however clear that the NGO also needs to be in the “Value Creation” area, through the policy advisory work, and as a social impact funder, the NGO would also have to be in the “Value Capture” area of the model. This was also well summarised by one of the respondents:

“NGOs, definitely. ... I'd say all three creation, capture and delivery, to be honest.”

This brings us to the entity that is very closely related, i.e. the foundation. Even though this entity mostly plays the role of social impact, or grant funder in this EdTech value network, it clearly does play a vital role in this network, so it made sense to add it to the model. Foundations were not added to the original model, based on a similar argument to that of NGOs, i.e. grant funding is not necessarily associated with a sustainable business model. From the “missing stakeholders” data coding, one of the respondents very clearly summarised it as:

“A really important partner or stakeholder is the foundations, or the nonprofit entities, the grant giving organizations, and they come in a few different flavours.”

Once again this entity could potentially be added to all three areas of the model, but as the main contribution to the EdTech entrepreneurs seems to have been funding, they were added to the “Value Capture” area of the model. To simplify the model, the approach of allocating an entity or stakeholder to a specific area on the model based on their largest impact, was applied to all other value network entities that play a role in more than one area in the network.

Following on from the NGOs and Foundations, we look at the additional stakeholders for “Value Delivery”. When exploring the role of mobile networks, a broader infrastructure question came up. This was mentioned in Chapter 1, i.e. ICT connectivity and infrastructure project progress (DBE, 2019) as a key component of EdTech delivery for the DBE. For completeness sake, it makes sense to add it to the model. It is listed as “Infrastructure” on the model, and includes everything from alternative connectivity to a mobile network, e.g. fibre connectivity, to computers in

Chapter 5: Results

the schools. The next area of interest was “Media outlets”, as per one of the respondents:

“Another stakeholder came to my attention, looking at the chart. Media outlets, radio, television, newspaper, magazines. They can have a very powerful effect on pushing the value of your EdTech products to people.”

And finally it made sense to add “Aggregators” to the “Value Delivery” area of the model, as a specific channel, i.e. not a distributor or reseller in the simplistic sense, but more specifically as combining offerings before distribution, as described by one of the respondents:

“An aggregator to me is a party that pulls together different offerings, packages them, distributes them to consumers. ... In these instances and at some times, if your value is sitting alone without another, you're not going to be operating in that channel, in that vertical.”

In the “Value Creation” area partnering with other EdTech entrepreneurs as indicated on the original model, especially when the offerings were complementary, was also supported, with one respondent referring to it as *“because the landscape is quite sparse in South Africa. It's almost like finding a friend on a desert island.”*

Other than NGOs that we added to the “Value Creation” area of the model, two other entities were also identified. The one was “Incubators” or “Accelerators”. These are strictly speaking two different entities, but for the purpose of this study they were grouped together to keep the model and the discussion simple. Even though this entity, i.e. incubators, was mentioned in the literature review (section 2.4.5 - Seet *et al.*, 2018), it was not added to the original model as it was not clear that it had such a major role to play in support of the EdTech companies. During the interviews it however became quite clear that this entity was quite important, and in many cases had a functional overlap with “Investors”, and even “Foundations”. The specific aspect which stood out, other than all the typical support that an incubator or accelerator provides, was well summarised by one of the respondents as *“I think the highlight of it was access to networks”*. And even more interesting, *“... They specifically focus on entrepreneurship development and so I met their founder, ... and from there [they are] now a partner in our business”*. So the incubator entity provided access to and created value networks.

And lastly another interesting entity was identified and added to the “Value Creation” area of the model. This was added as a broad term “Academia”, but there was a specific example given by one of the respondents, which is worth quoting here:

“One of the professors is learning science professor. ... we've started to talk about partnerships because she sees the value in working with us, and we definitely see the value in working with her from a learning science and learning engineering perspective.”

It was clear from the discussion in the interview that the introduction and initial payment for access was made by another entity, in this case a foundation, but that both the university professor and the EdTech company found mutual value from a longer term working relationship.

In terms of the “Value Capture” area of the model, after a discussion in more than one interview, it was clear that the actual learners, or students should also be listed on the model, as per one of the respondents:

“Students won't pay for anything. So then, the parents actually become your customer, but your users are the students.”

The students were listed in the model in the “Value Capture” area, alongside the parents, to indicate the close linkage between the two entities. So at this point we had “Students” and “Foundations” added to the “Value Capture” area. One final entity to add was the “Corporates”, short for corporate companies. As mentioned earlier in this section, some companies have foundations as well. So there is an overlap with that entity. It was however clear that corporate companies without their foundation arm, also still played a role. One of the respondents summarised very well why corporates should be on the model:

“In South Africa we've got the missing middle class. So, when I was looking in defining my customers and my end users one thing was very notable that the typical South African is not going to be able to afford a subscription service to get access to our platform. So, when I looked at who's going to pay for that access, corporate South Africa is where the money sits.”

This specific quote will be explored in much more detail under one of the other themes, but it is clear that at least one respondent was generating income from this entity. Related to this was an even more interesting situation where a corporate company was providing incubator support in the value creation area, infrastructure in the value delivery area and income, initially as a grant via the corporate foundation, in the value capture area. Another quote worth mentioning here relates to a corporate company, which extends beyond just fiscal value:

“They create value through us, different campaigns, ...and, because they're a strong, powerful professional brand, being married to that is very powerful

for our brand. And so there's a lot of value creation there, outside of the fiscal sense.”

In summary nine new entities were identified for the model. They were added in black font colour text, see Figure 16.

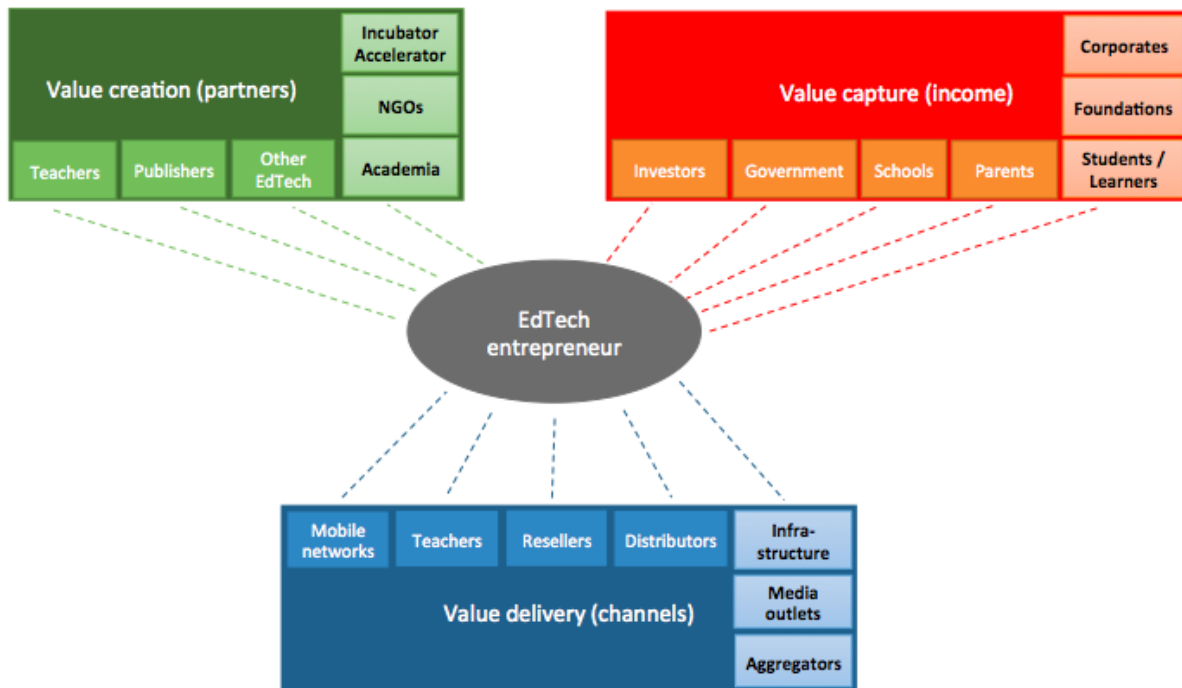


Figure 16: Updated model for EdTech entrepreneurship

This updated model helps to identify and reference the themes, and ultimately the initial research propositions as well, but in itself should also provide value to new EdTech entrepreneurship entrants to this network, as one of the respondents actually indicated that the absence of such a map as one of the biggest EdTech challenges in this environment:

“The big problem in education is that you're trying to produce this map of stakeholders. In other verticals it would just be less complicated. It is more complex, and more fragmented than most. And it's also highly regulated, but not very clearly regulated. And that makes it difficult, so I think it is a challenging environment.”

This challenge obviously extends from just the high-level stakeholder map as depicted in the model in Figure 16, to more specifically what the structures look like in each of the blocks, and even more specifically who these people are in the South African eco system.

The next section covers the first theme that was identified and analysed during data collection.

5.4. Theme 1: Mature product

This theme was developed from multiple interviews and data points. Data coded as “EdTech challenges” mainly had an impact on this theme. Data coded as “learner endorsement”, “parent endorsement” and especially “teacher endorsement” all had key inputs to this theme. And finally data coded as “product efficacy / scepticism” also informed this theme.

This theme is developed by some broad considerations at the start of the section, and concludes with specific impact examples at the end of this section which clearly show the linkage of this theme, i.e. having a mature product, to theme no.4, i.e. that there are multiple sources of revenue to consider. This theme also speaks very clearly to the “Value Creation” area in the model in Figure 16.

The first three quotes from multiple respondents set the scene and list some valuable consideration when developing a product or value proposition, and also on where the largest impact is. The first comment is to acknowledge that EdTech is not going to solve all the problems, but is important to get the product that will address the most pressing and specific problem. As per one of the respondents:

“Maybe people are looking for technology to be the silver bullet that will solve everything that most definitely won't. And our perspective has always been, the work that we're doing is going to solve a particular problem.”

So targeting the product to a particular problem makes sense. The next comment relates to collaboration, as per a respondent from a different company:

“A key problem that I identified was the fact that there was a lack of sharing and collaboration within the basic education system, and that was at various levels.”

In this particular case, the respondent actually went on to build an elaborate system to facilitate better collaboration between the stakeholders in the “Value Creation” area of the EdTech value network. And then lastly a comment which speaks to where we have the greatest impact in the education system, from another company respondent:

“The higher up you go [in school system] the less impact you have, which is another thing that a social enterprise needs to balance; and for instance, the greatest impact you can have in EdTech is at ECD level.”

This obviously hints towards this specific EdTech company also seeing themselves as a social enterprise. Most EdTech companies see themselves as this, and some even have the formal legal structures for a social enterprise, but that will be explored in one of the other themes. This comment also supports the positioning of this research as per the very first paragraph of Chapter 1, i.e. this research was aimed at the basic education system, rather than higher levels such as tertiary education, as this is where the greatest impact can be made.

Endorsement of a product plays a very important role. Student and parent views play a role, starting with this comment on how students (or learners) as the ultimate beneficiaries see the product, as per one of the interview respondents:

“When it comes to students, the ultimate beneficiaries of the whole value chain. They typically judge something by how easy it is, i.e. kids don't like to study and the easier you can make this thing that they really don't like to do, the more they're going to value it, and not only easy but also, the more they can become emotionally invested in it.”

This comment speaks to a product that is mature enough to be easy, and also has been built in such a way that the students become emotionally invested. Both of these features are not trivial to build into a product, and so clearly speak to the need for product maturity. This leads to the comment on how parents see the product, from another respondent:

“Parents want the best for their kids, so they're going to look at your product ... Is my child going to actually engage with this, are they going to get what they need out of it.”

This does speak to engagement from the student side, but even more importantly it asks if the student will get what they need from it. This is already the first hint of skepticism as uncovered in further paragraphs of this section, but again importantly speaks to a product that needs to be mature enough to address these concerns from the parents.

When investigating teacher endorsement, there was an overwhelming consensus from multiple respondents that this plays a noteworthy role. As per the first respondent on how teachers see the product:

“They can be quite critical and rightfully so, of anything new, coming into their environment. Not only critical because of the number of people trying to push their latest thing into the school but also because if the moment they accept something they're endorsing it, and that reflects on them as a school. So if they endorse something that's poor quality, that will reflect on them. So that's kind of how we interact with schools. Once schools trust your product, they typically embrace it quite rigorously.”

So a mature product, i.e. not “poor quality”, will not only be a key consideration for the teachers, but if endorsed, it will open doors for it to be widely embraced. The same respondent continues with:

“We found that word of mouth is our most powerful confirmation of efficacy. If your teacher recommends it, then they're not only putting their name to it, but that also will come with a description of the context. So in other words, we recommend this product and this is how we use it in class, or this is how our kids use it at home. And by having both that recommendation with the context paired with it, is a powerful endorsement.”

This last comment speaks to not only a mature product, but a mature process, so maybe more accurately described as a mature value proposition. Facilitating context discovery with the delivery of a mature product clearly has even wider impact. The alternative view on how things can go wrong when teachers are not onboard with your product, is supported by a respondent from another EdTech company:

“But [if] we don't engage with teachers, and they are not on board for this journey, it's going to fail. And likewise, we can have one teacher that is very keen on the technology, but they're not the one that actually signs off the cheques. So you really need to work with every single one of those [stakeholders].”

This comment makes a good point that the teacher endorsement is not the full picture. It clearly plays an important role, but you still need to consider the other stakeholders who are linked to the actual payment for the product. This same respondent has quite an interesting and innovative way of making sure the teachers get a chance to endorse the product:

“One of the things we did was releasing a freemium offering that we've got, and that meant that teachers could use the platform without having to get a more formal financial approval. So it meant that we got a lot of adoption and evangelism from teachers.”

Clearly having a product that is mature enough that it can be offered as a freemium option does help to get teachers to “test” the product ahead of financial commitments. Related to innovative ways to get teachers on board, another company went even further with an interesting approach, i.e. as per one of the respondents: *“We started looking at holistic development of support of teachers so things like financial education”*. Offering supplementary support services to the teachers helped create a sense of community, or as the respondent called it “family”, making it much more attractive for teachers to come on board. Once again, this type of supporting function could only be delivered on a mature product.

Teacher endorsement of the product is even further supported by a respondent from a third company:

“We've come to the conclusion that it has to be driven by the teachers, it's not going to get driven by the parents, it's not going to get driven by province or districts because they can't hold them accountable, and the learners, you can't rely on self-motivated learners, and it's too expensive to try to build a big enough reward scheme to try to use all sorts of elements of gamification to get enough learners to engage. So you have to engage with the teachers to try to get them to drive usage. And this is very difficult. ... An EdTech product has to provide a lot of value, huge amount of value and fit. Well, in a really simple way for teachers to really push it.”

This last comment not only stresses the importance of the teacher endorsing the product, but it also indicates the challenges that exist for schools, parents and learners to drive product use. But to get to a mature product is not easy as per one of the respondents:

“Our biggest challenge with our users, our primary benefactors, the teachers. That's the behavior change, it's like how do you go from doing something one way and then doing it another way, which is fundamentally different from the way you used to doing things. And so, that's on the surface but when you boil it down to what's the biggest challenge, time and money. We don't have enough money to buy us the time to test and cultivate the changes that we want to see.”

This includes not only having enough money to build the mature product, but also the money to drive the “change management” aspect of using this new product and/or process.

Exploring online education adoption and skepticism and how this impacts product, the following few comments from one of the respondent were very relevant and interesting:

“Our major challenge initially was educating our customers that online education is not lesser to in-person education, and even though we do a significant amount of online education, we are big advocates for flexible learning.”

Even within the context of providing flexible learning options, this company still struggled getting customers to adopt online education. This led to exploring skepticism in the product efficacy, with this reply from the respondent:

“Huge skeptic ... pre COVID [it] was even bigger. ... From there COVID hit. Everyone was forced online. It's worked for some, it hasn't worked for others, but what it has done, it's created this know how. And this knowledge that it is an option.”

So without doing much in terms of product, it looks like the pandemic has positively impacted EdTech product adoption. But with the pandemic came another challenge as per the following comment from the same respondent:

“Post COVID now. Our challenge has now completely changed, where before we were a player in this market. Not many other players, we know who our competitors are, we know our peers. Now it is like everyone is diving into the pool on a summer's day. It's now about how do we stand out, or how do we like reinvent ourselves to not drown in that pool with the rest of the people.”

So this comes back to product maturity. If it now looks like new players can easily enter this market, it will be less likely for them to have success with an immature product.

From a company that has been developing their product over many years the one respondent commented: *“We need to build a much more mature product to engage with schools”*.

The next example has a clear link to product maturity, and which will ultimately lead to a discussion on how this links to theme no.4. The one respondent commented on the product maturity being a key consideration to work with government:

“It's very difficult for a startup that's still trying to figure out exactly how everything works, that's a little rough around the edges, to go to work with

government because they're just going to throw scale at you, that you probably are not able to really scale. But if you've built things out, the value proposition is understood, and you're mature, and government comes and brings the scale, and you're efficient enough to give a very decent and competitive price and it actually saves them money, but you know works because they can bring you the scale that now allows you to enjoy the economies of scale, then it's a win-win everywhere."

This comment has a clear reference to product, process and value proposition maturity, but perhaps also just maturity of the company to work at scale. Another similar comment from another company, which also links to theme no.4:

"We're rolling out a much cheaper departmental package so that we can lower the price point substantially for government schools, and actually make it a departmental decision rather than a school governing body decision. So we lower the level at which the decision gets made and simplified and our platform is now mature enough to do that."

The respondent continues to add additional revenue opportunities from this more mature product, but this will be covered in theme no.4. It is however clear that offering different "packaged" versions of the product in itself, is only possible with a mature product.

This whole theme does already hint strongly to the question of how do you provide a mature product as a start-up. It goes even further in that one of the respondents that already have a mature product and company commented, *"So we can't go do a three year study to prove the efficacy of our online offering for example"*. This comment refers to a barrier to entry in government and the effort it takes for even a company that is not a start-up, and also more generally speaks to the need for a mature product. It is worth mentioning at this point that a product (or value proposition) can be aimed at schools, to supplement in person instruction by teachers, or as an alternative to mainstream schools. The alternative to mainstream schooling provides a vehicle for learners in low quality schooling environments to remotely access very good teachers.

In summary this theme, about a more mature product, does open doors to the theme no.4, on multiple sources of revenue. A complex support network also facilitates this, which is the theme we explore in the next section.

5.5. Theme 2: Complex support network

This theme emerged mostly from data coded as “alternative support”, which had a bit of overlap with data coded as “missing stakeholders”, but also had inputs from “investor selection”. Questioning at the start of the interviews, which was more to establish background, ended up providing very valuable insights into this theme across all the respondents.

When asked about existing support structures, the first respondent commented:

“We have partnered with the ‘SocietyXYZ’. And one of their members is one of the members on the board. And then in addition to that, we are also a part of the ‘FoundationXYZ’ programme. And as a result, we get mentorship from them.”

This response was encouraging as there was an advisory type function on the company board, and there was a vehicle for mentorship via a foundation. When exploring support from investors, the respondent commented:

“There have been two major prerequisites for us. The first one is that the investor is investing in the company, not in their IP only. ... The second one is that they in some or other way have some mentorship component, whether that be within the industry itself, which is a big bonus if they understand the industry then, obviously, that gives more value to the support that they can offer. But even outside of that just business support and mentorship. So, being able to support us taking us to the next level. For instance pure cash injections are not really that enticing. It's got to come with those other two factors. And we walked away from a few offers over the years because of that.”

Exploring if finding an investor was something that the company still planned for the future, the response to not having an investor was:

“I would say it's an obstacle to growth. Yes. It's an obstacle to international growth, I think it's an obstacle to fast national growth. So in other words, if we never got investment, I think we would eventually turn into quite a strong player at the national level, and maybe even have some feelers internationally, but I think it would take at least double the time to do it and four times the stress.”

It was clear that the respondent saw investment as a vehicle to scale more quickly, but only if the investor offered the necessary support structures like mentorship. Another respondent commented:

“I've been part of ‘CorporateXYZ’ incubation programme... More recently, I'm part of the ‘BankXYZ’ programme, social entrepreneurship incubator programme. Was part of the ‘CorporateXYZ2’ foundation accelerator programme. ... was part of ‘IncubatorXYZ’, that's another incubation programme. So yes, I have been supported in either incubation or acceleration.”

In this case multiple incubation programmes had clearly supported the respondent. Similarly the support from investors was questioned next, with the respondent commenting with more reasons on why their company had not taken more investors on-board:

“For me the whole mindset is [to] keep as much equity as you can for as long as you can. Again coming back to the South African ecosystem, ... the process of raising money through a VC fund or government vehicle, it's just been such a headache. ... We'd pitch to a committee and they would assign an investment portfolio manager. And I could tell that the guy had some qualification, but he had no experience in a startup, and he had not raised, or exited a startup and I thought to myself, ... I can either spend time building my business or I can waste my time through this process.”

The respondent elaborated on the high amount of effort that was required to engage VC funds, and ultimately how the broader and more extensive support was also missing from the VCs they had spoken to. Similar to the previous respondent, this respondent did, however, also see the potential positive contributions that the right fit investor could offer. The respondent went on to comment:

“I'm still actively looking for additional investment to keep operations going and make sure that we can think and act with clear heads and not a point of desperation. I've had a couple of chats with some VCs but it wasn't a good fit. I felt the way the guys engaged with us was very transactional and they didn't have the feel that we were looking for in terms of somebody that we want to bring into our organization. ... We're looking for somebody that's going ...beyond money. It's network. So if I'm going to bring on an investor, I need somebody that's going to be able to open up doors at the ministerial level, at the presidential level, somebody who has international networks as well because we want to scale. Somebody with maybe know how experience, that's been with a business that's scaled internationally. So those are the things that we are looking for. Otherwise complementary skills.”

Again there is a sub theme of how the investor could help with growth and faster scaling of the business, by having access to the right networks, but also having

sufficient experience. The same respondent goes on to mention existing investments via foundations, and why the one case worked so well for them:

“It takes one rotten apple, whether it's an employee, whether it's a partner, whether it's an investor. So, I can totally relate to guys going out and looking for the right investor. ... ‘CorporateXYZ’ foundation gave [us] a lot of money, but they are very hands off, ‘CorporateXYZ2’ foundation have given us significantly less money, but I promise you that has been the best experience of my entrepreneurial life because of the support and the culture. ... I would rather turn away from money than to take it and be stuck with somebody who's not a good fit for our culture and our purpose.”

Once again support stands out, with a very strong message on fit, i.e. on culture and supporting the EdTech purpose. The ideal situation seems to be getting the right fit investor that would be prepared to invest the necessary monetary amount, and also offer the necessary experience and networks to support the EdTech venture to rapidly scale.

A respondent from another company went on to discuss their experience with getting support, commenting that for the first few years they had no success:

“It wasn't for lack of trying. We really were actually trying to get support structures through venture capital kind of infrastructure, like all of those models. We got turned away by quite a few ... their kind of position was ‘this market is saturated’, which we disagreed [with] quite strongly.”

Eventually this respondent applied to a programme which started opening doors, as per the comments from the same respondent:

“[We applied] to this ‘BankXYZ’ programme for young entrepreneurs. ... ‘BankXYZ’ has a key focus on entrepreneurship and education. That's where they believe they need to invest their social impact fund. So at this stage what they were trying to do is create global exposure programmes for budding entrepreneurs in South Africa, ... they took us to Helsinki ...[to] learn from the Finnish state system and the education incubation and innovation that was happening there. So I got into that programme and that was the first support I would say that we got. ... From that ‘BankXYZ’ opened more doors. So we got introduced to an organization called ‘CompanyXYZ’, which was doing training for startups in South Africa; specifically now they're doing more to Africa. ... And then following that there was a programme that they put in place that I applied for and we got into called the funding readiness programme.”

This was an extensive incubator programme, which the respondent was very thankful for having been part of. And from this programme, further doors were opened which led to key partnerships for this company, as the respondent commented:

“So ‘BankXYZ’ got investors and funders together. ... We were very nervous of the VC funding model. And were hesitant. We are more looking for a partnership model, like someone who could come in alongside us and really help us on our journey. ... One of the interested parties was a company that actually is recognized by the economist as the largest official incubator in Africa, that was ‘CompanyXYZ’. They specifically focus on entrepreneurship development and so I met their founder, their owner. And we hit it off, and from there he is now a partner in our business, and with that we sit on their infrastructure, which is called the Partner Elite.”

All three respondents, from different companies, to this point had similar views on support structures. The next respondent initially indicated that they had very little to no support, by commenting:

“We’ve never been part of an incubator, we’ve never been part of an accelerator, we’ve never received any specific coaching and no, none of our organizations or investors have really provided any long term kind of support structures. For a little while, one of our investors, the ‘InvestorXYZ’, gave us access to some human capital development expertise that could help us and advise us on how to build up the team.”

But what was important, was that even though they had not been part of a formal incubation programme, they had support in their early days, as per the following comments from the same respondent:

“You could almost see the time within the ‘FoundationXYZ’ as something like being part of an incubator, but not with the express purpose of building a business, so it wasn’t around developing value propositions, building out a board, refining business plans, testing go to market strategies, i.e. the mandate was quite different at the time, but we were able to operate, we were able to work in the sector, learn things, have people on our books.”

The same respondent goes on to comment on not having had an advisory board support structure either:

“And to this day our board is comprised only of the minimum number of representatives we have to have on the board from the shareholders. ... we

don't have an advisory board, we never have had one. ... There are a couple of occasions where I think if we had an advisory board, we might have made some decisions differently."

When asked about investors and the support they can offer, the respondent commented:

"[Our existing investors] are actually impact investors. ...[They] are more focused on the type of work we're doing, the stage and maturity of the venture that we're in. ... There will be a time when we want to grow into other African markets. And then I think having the right ... choosing the additional investors, assuming we raise capital, would need to be done quite carefully and it would be the time to actually choose your investor so that they bring more than their money to the table, so to speak, they've got experience, they've got networks, they can actually help make that happen. ...With real impact investors [that] can take a long-term view, I think it's possible, but ... I don't think they're going to get very high returns in the sector. ... You need investors who've got a really long term view on it."

The last part of this response was also related to questioning around what would be required to make the EdTech venture sustainable, and if investors are involved their motivation would need to be more than making high returns. Which leads to feedback from the last respondent on this topic, commenting:

"We took on investors. And one of the big decisions for us as to which investors we took on was really around what are the support structures that they can provide. The most of it is around things that are more strategic rather than operational. A lot of it was around methodologies for further expansion into Africa. ... The relationship is as good as the alignment is when you start out and how you pick them. It's like building a team."

So in this case the respondent had investors, even for expansion into Africa, but when it came to other support structures, the respondent mentioned a few interesting challenges:

"There aren't that many support programmes that we're eligible for. Either they're very SMME focused, but that means a certain kind of business... which we don't tend to fit into. And then there are the incubators, and mentor/accelerator type things, which offer earlier stage startups [support], and maybe some of them would have been pretty good but they weren't really many, or that developed [when we started]. Locally we've got Injini and things like that,

a bit more EdTech focused. But that's a rather new development, and we're further along. I sit now, as a mentor on Injini and some of those other things."

In essence this company did not get incubator support, but still managed to get the required investors on-board. Another impressive outcome is that they now play a mentor role to other EdTech companies via the African EdTech incubator Injini.

So if most of these EdTech companies did not get funds, or possibly not sufficient funds, from investors, then the question is where did they get income. This is explored in more detail in theme no.4, but it was quite clear while exploring data related to this theme, that many EdTech companies were being funded by grants, from foundations, impact investors and other entities. The fact that incubators, accelerators, various investors, foundations, company boards, NGOs, academia, and corporates all provide support to these EdTech companies, albeit in somewhat different formats for each company, forms the basis for identifying the "complex support network" theme.

This theme is central to the whole value network. In the next section, i.e. theme no.3, multiple infrastructure considerations were identified for "Value Delivery", before moving on to theme no.4 focused on "Value Capture".

5.6. Theme 3: Multiple infrastructure considerations

This theme was developed out of data coded as "mobile network as foundational component". This was obviously driven by a specific proposition and question section in the interview. But what emerged was more complex than anticipated. The initial quotes support the expected outcome, with quotes towards the end of this section building out the theme that there are "multiple infrastructure considerations".

The one respondent indicates the importance of mobile telecommunications networks, but also suggest that relationship building with them is complex and goes on to suggest that EdTech companies can be seen as their competitors:

"I would say that in EdTech the mobile networks are a very big factor or components in that value chain. I think every single EdTech company is very aware of them. Because of the potential they have to deliver to the user bases. But mobile networks are highly commercially driven, and it makes it very difficult for one to establish a relationship with them. That's not that it can't be done and there are EdTech companies who get it right and it is powerful if you do. ... And also the mobile networks are trying to internalize their own education offerings, which I think more and more, EdTech companies are

becoming almost positioned as competitors to them. So that makes it even more difficult to partner with them without being absorbed by them.”

For this reason this specific respondent has not partnered with any of the mobile networks in South Africa yet. The comment about being seen as competition was supported by another respondent that commented: *“I tried to engage with the mobile operators and in fact ‘TelcoXYZ’ told me I’m their competition.”* Another respondent goes on to indicate how this barrier to the mobile networks was breached when the Covid pandemic hit:

“During COVID now there was such massive adoption of our tech, a lot of the Telcos came to the party and we’ve been zero-rated by a number of them. So it’s free to use our platform. So the Telcos generally are being very supportive and sincere.”

In this case the respondent refers to the mobile networks as Telcos in short, and the zero-rating means that users of the mobile network can access the EdTech content without paying for the data to get the content onto the user device. This obviously makes the EdTech offering much more accessible to people that cannot or do not want to pay for the data. This view was supported by another respondent that said:

“Whatever EdTech offering you’ve got over phones, mobile network infrastructure is more prevalent than any other kind of infrastructure at the moment, and the mobile networks play a really big role in delivery. And we’ve seen that [with] our zero-ratings from ‘TelcoXYZ and TelcoXYZ2’. We don’t have an independent study but we are utterly convinced that those have been instrumental in allowing us to get to the reach that we’ve got.”

The Telco’s mentioned by the respondent were two of the major mobile networks in South Africa. The respondent goes on to make an important point about the different quintiles in basic education in South Africa, i.e. *“I don’t think zero-rating matters at all at the high end of the spectrum in terms of scores quintile five or private. But in quintiles one to four, it’s a really big deal.”* Which does align with the comments from another respondent that has the high end of the basic education spectrum as the current core customer base, and wants to expand to the lower quintiles, commenting:

“It’s becoming a larger concern now. I mean, we don’t have it with our current core customers, but we were trying to grow. ...and for example, some of our schools that have been interested in the pilot that we’ve been running now, that’s a big consideration for their students. So it is something we having to quite strongly interrogate and look at.”

The respondent however goes on to explain a very interesting constraint with zero-rating, especially as it pertains to EdTech video content, commenting:

“And it’s an interesting one, because [of] the cost basis. ... The zero-rating is quite a tricky thing, both from getting approval but then also the actual IT infrastructure.”

It turns out that to get the zero-rating you have to serve the content from your “own” servers, meaning that you, as the EdTech company, incur all the content distribution costs. Serving video content from a “shared” platform such as Youtube or Vimeo prevents the EdTech company from incurring the content distribution costs, but content on these “shared” platforms cannot be zero-rated. So in effect the student does not pay because of the zero-rated data, but the cost is moved to the EdTech company. This dilemma can go as far as having to reconsider the product content format for lower quintiles, i.e. align with a more mature product in theme no1, or having to consider alternative infrastructure components to support the “Value Delivery”. This also depends on how much infrastructure is implemented by government and/or the schools, i.e. as one respondent commented some provinces or schools *“buy their own hardware and infrastructure for the school”*.

Another very interesting infrastructure consideration seems to be where the EdTech content is hosted. More than one company made reference to their content being hosted by Cloud providers, with one respondent commenting:

“From an infrastructure point of view we host our platform on ‘CloudPlatformXYZ’. I don’t think we would be able to have built our platform, and been able to build the infrastructure, ... it would not be feasible. ... But because of ‘CorporateXYZ’ and their infrastructure cloud solutions, we’ve been able to build the solution and it’s built now for scale.”

This approach is extended by another respondent commenting *“we do partner with other EdTech companies in a B2B sense”*, with the respondent going on to explain that they offer part of their Cloud based infrastructure to other companies. More than one respondent also indicated that they received discounted access to the cloud services because of their registration as social enterprises in the EdTech space.

To conclude in summary this theme identified multiple infrastructure considerations for EdTech companies, which included mobile networks, specific constraints for serving video over zero-rated mobile networks, broader infrastructure initiatives by government and schools, and content-hosting options in the cloud.

5.7. Theme 4: Multiple sources of revenue

This theme is critical to answering how “Value Capture” provides input to making these ventures sustainable, while still fulfilling their social impact purpose. Data coded as “alternative budgets” had the main input to this theme, with data coded as “EdTech challenges” and “Government approach” also providing some input. During the interviews a lot of focus was on exploring the role of government in “Value Capture”, as one of the propositions was focused on this, but it very quickly became evident, that a multitude of structures existed and were being used by these EdTech companies to survive, and even grow. And as per this summary from one of the respondents, most companies were only successful, with the required social impact, when considering multiple sources of revenue, as per these initial comments:

“Because you want to have impact, you cannot ignore the under resourced part of South Africa. So you have to try create a model that allows you to get through to those people, but at the same time, balancing the costs of doing so with some sources of revenue, whether that be grants or sponsorships of some sort. And then if you try go the direct to customer route, you're going to find a relatively small market there. So, I'd say that in a nutshell the biggest challenge going into EdTech in South Africa is that you have to diversify your revenue streams.”

We investigate the multiple sources of revenue in the rest of these section, starting with government funding or income. Further government considerations are covered in the next section of this chapter. As per the first respondent on government, the initial comment:

“We would rather not have financial backing from government at the initial stages of the partnership. ... I think what's far stronger is to go into government in a capacity of working with them, to establish the relationship, to get to understand the objectives of the partnership, and get to a point where everybody understands what is required. And to understand what the definition of the partnership looks like. And at that stage government funding I think becomes almost essential to go to scale.”

It was quite clear from the conversation with this respondent that the relationship with government was complex and not something that was established overnight, and that the relationship in the overall eco-system would need to be quite mature before accessing government funds. This view was shared by another respondent,

who commented: *“We’ve strategically decided not to focus on having government as a customer”,* as they felt this was too complex a relationship. A third respondent from another company also comments on the challenges of getting revenue from government: *“It’s not relationships, it’s ... we can’t step through the bureaucracy layer yet, because we don’t have enough critical mass”,* but goes on to comment: *“I am hopeful that at some point government will be a customer of ours. ... because I do think that is one of the fastest ways to close the [education] divide.”*

For one of the respondents in a company that already has a solid relationship with government, the following comment suggests that it is still not that simple to get income from this entity: *“We’ve been unable to navigate procurement with any of the provinces so far, but we would like to”,* and goes on to suggest a possible route to revenue: *“We think that we could tap into monitoring and evaluation budgets for the provinces and national to enable EdTech products to be used in schools.”* Another company that has been able to get revenue from government has done this by providing a mature product, or value proposition, as per one of the comments in theme no.1:

“... But if you’ve built things out, the value proposition is understood, and you’re mature, and government comes and brings the scale, and you’re efficient enough to give a very decent and competitive price and it actually saves them money, but you know works because they can bring you the scale that now allows you to enjoy the economies of scale, then it’s a win-win everywhere.”

From all the companies interviewed, only one had been successful so far with a model that has revenue flow from the government. The other obvious source of income is grants, and as per the start of this chapter it was not added to the conceptual model, as it was not seen as a sustainable model to run an EdTech company on only grant money. But clearly some of the companies that had been interviewed were surviving, if not growing, purely on grant, and in some cases competition funding.

One respondent commented, *“Where we have found funding is, yes grant money. It is a big thing in education. And we have sourced funds through that route over the years”.* A second respondent from another company commented, *“[we] focused largely on grant money, competition money, ...”.* Another respondent from a third company commented on two possible business models to create alternative revenue streams, i.e. one from government and the other from private schools, indicating that until these work they would rely on grant funding, *“Neither of those business models is yet working well enough that we could just double down on that. So we still have to do other projects with grant funders, and things like that, to keep going”.*

And then there is an option between grant and government funding via NGOs, i.e. as per one of the respondents, *“A lot of the NGOs, ... a lot of what they're doing is funding government projects. So there's definitely opportunity in there and that is challenging without a doubt”*. But there was no clear indication from the interviews that this specific avenue had been successful yet. It was clear that at least three of the five companies interviewed were still relying quite heavily on grant funding.

When looking into corporate companies as a source of funding or revenue, there is the possibility of an EdTech company pivoting completely to this customer segment, as per this comment from one of the respondents, *“There's a lot more money in corporate. I know quite a few people that have pivoted into corporate training”*. The same respondent went on to argue that once you get part of your revenue from corporates, *“It really distracts you ... [e.g.] after about one year, generating 90% of your revenue from corporate training with a lot less effort, you would end up shutting down the school's business”*. But at least two of the companies interviewed have created revenue streams from corporates, without losing sight of their basic education social impact purpose. The first respondent commented:

“As an EdTech [company] we leverage those pillars of corporate social investment and enterprise and supplier development as a means to fund our operations, until such point that we get to generate our own revenues and become viable and profitable by generating revenues commercially.”

This actually clarified that their income to date from corporates has been by operating a component of their business as a non-profit to gain access to corporate social investment, which is easier than a fully-fledged commercial arrangement. And this does tie back to government in funding in the sense that corporates get tax breaks when investing in this way in SMMEs, over and above being able to further their own social impact objectives. This specific respondent further explained some of the ideas for building out the commercial offering to corporates, which included advertisement revenue by targeted ads on the specific platform, but also building out a marketplace for content delivery.

The second company that was already generating revenue from corporates commented, *“To pay the bills we've actually served corporates, so we built learning management systems for corporates”*. This same respondent went on to elaborate on further plans for value exchange with a corporate partner, which could lead to income or “Value Capture”. What was very interesting about this specific relationship is that it not only had a bi-directional flow of brand value, but it also provided another interesting exchange, i.e. revenue for the EdTech company based on a combination of access to the EdTech content from the corporate user base, but also creating a

possible funnel or pipeline of EdTech users becoming users of the corporate company offerings, mostly driven by corporate brand and advertisement exposure on the EdTech platform.

As was indicated in theme no.2, complex support network, the role of the investor is much more than just financial input. And for this reason very few companies, only 1 of the 5 that were interviewed, had actually built formal investor relationships, other than social impact investors that provide grant funding.

One final other potential revenue stream that was mentioned is a social impact bond. This is not listed separately in the summary, as it is really just a specific option to access government funding, but it is worth mentioning it here because of the interesting details related to this option. The respondent explained the structure and working of a social impact bond:

“Government wants to achieve something. But they don't have the skills to do it. So they cannot run it, they can't procure it etc ..., and they have a budget for it, ..., they think that if they go through a tender process the money will get wasted, they can't manage that process. In step foundations. The foundations say, 'we will assist you, we will set up the social impact bond'. It is an entity where usually a cluster of foundations say 'we will pay into a nonprofit vehicle that will pay a bounty for this thing that the government wants to have happen'. ...This vehicle has set up independent monitoring, which then says okay now we verify [it is done]. So the third party providers were paid by this nonprofit vehicle, and they got the money for doing what [government] wanted. They can be companies, and get paid a certain amount for every [task]. It was independently verified. And then this nonprofit vehicle does its cost recovery from the government.

And then the thing is, if these third parties don't deliver, the government money is safe. It's the nonprofits and the foundations that invested into it that take the risk. So social impact bond is a vehicle that set up where some organizations will take the risk on behalf of the government. And if the thing, if the end product is delivered, they can claim what they put up back from government. The government will pay back to those foundations, they're not looking to make a profit. And it means that independent companies can operate as though there's a bounty with a known bar, but the government isn't administering it because the government doesn't have the capacity to administer it.”

The respondent went on to explain how this could work for education, where the government could have an impact goal of increasing marks by a certain percentage,

and the nonprofit vehicle setting a price for third parties like EdTech providers to provide that specific outcome to be able to get the payment. This type of structure already exists in South Africa for ECD, and it takes quite a while for the nonprofit vehicle to be setup as it normally involves multiple organisations working together to set up this vehicle with all the details to make it successful.

In summary, the main sources of revenue for the companies interviewed were:

1. Grant funding, considering a pivot to tertiary education or find government funding after a longer period of relationship building
2. Private users, schools, government (s), i.e. already serving users outside of South Africa
3. Grant funding, with plans for private schools and government funding
4. Grant and competition funding, corporate social impact funding, with plans to extend to commercial corporate funding
5. Private users, top quintile schools, corporate funding, with plans to extend corporate funding and possibly government funding to help with lower quintiles

The ingredients for success and EdTech sustainability might be in “multiple sources of revenue” as this theme suggests and as can be seen from the summary of revenue sources above. As one of the respondents commented, *“If you also want to get scale, you can't just turn around and say you are going to work with just private schools. There is simply not enough meat in that”*, clearly indicating that more than one customer segment, with revenue, is required to make the venture sustainable. Another of the respondents goes on to make two related comments:

“I think if you're playing in one market, you're very exposed. So if we only play in the secondary education market in South Africa, we're very exposed. So for us diversification means not only playing in South Africa, we need to look north, we need to look international, we need to spread our portfolio, but just so that we can weather the macro storms that occur, hopefully, but it also means diversifying your competencies [delivery] ...Now your unit economics are even more powerful, because now what you're creating with that big expense line is now serving multiple channels.”

Multiple sources of revenue not only provide the necessary income, but also minimise risk of complete income loss. And the last part of the quote above argues that if you can build a competency, product component, or value proposition, that you can serve to multiple customers, via multiple channels, then the overall economics equation starts making even more sense; i.e. for the same cost base, the EdTech company can get multiple streams of revenue.

In the next section further government considerations are explored, before summarising the results of this chapter.

5.8. Government considerations

There was quite a bit of discussion about the role of government in the interviews, i.e. more than the input towards the theme in the previous section. This data is valuable in terms of inputs towards the next chapters, so some of the main sub themes in terms of government considerations are covered in this section. Data coded as “Government as main influence” and “Government approach” provided input to this section.

The importance of government in this value network is well summarised by one respondent as:

“The main stakeholder is government, in every which way. Government is the biggest provider of education, government sets the policy, they set the curriculum. If you are working in EdTech, you've got to figure out how you work with government, and that's whether the government is your partner or a policymaker or a regulator, or client.”

As the investigations in the themes in this chapter have already indicated, the role that government plays for the various EdTech companies is different from one to the next, but ultimately government still has some overarching influence which impacts everyone, e.g. setting the curriculum. As the same respondent elaborates, *“It's just that element of the ecosystem is fundamentally controlled by government, and will move as fast as the government and that's it. Even when you look at publishers, and publishers create content, they create content according to the curriculum. And so, teachers teach according to the curriculum.”*

Another respondent goes on to comment, *“And before teachers want to do anything they've got to comply with what government has set out and then you know government sets it out, it gets filtered down to provinces, provinces then filter down to districts, and then you've got district directors and district workers who go into schools and ensure that from a reporting perspective or implementation perspective, things get done”*, which not only indicates the level of influence and control from government, but also speaks to some of the structures which play a key role as investigated in more details in the following sub sections.

5.8.1. Policy and strategy

In Chapter 1 policy was discussed, and even the fact that government released a white paper on e-Education (DBE, 2004). The views in terms of policy are captured here from some of the respondents. One respondent commented on how other areas of government have implemented technology driven strategies:

“We need more systems, and more automation. There are many other industries, like, if you take SARS and things like that, or department of motor vehicles, like not more national databases, more consolidated data. Education is the vertical that could benefit the most from an E-Gov type of strategy.”

The strategy, or policy, for e-Education does exist, but the question is if it has been successfully implemented. Another respondent shared this view on policy and its implementation:

“There's the Department of Basic Education, they're obviously key in terms of policy, which we don't have one for EdTech properly, ... It's made more complex by the fact that there's no clear policy. There's no clear recognition from the provinces or national about digital products, their usage, etc. So at the end of the day, teachers KPIs can in no way officially be met by using an EdTech product.”

These are quite strong statements, but this is not the only respondent with this view. Another respondent went on to elaborate on the hierarchical nature of the government DBE structures and how this could be part of the challenge of implementing the policy:

“If you don't do your homework as an entrepreneur, you miss this point, but when you look at basic education system. One of the biggest challenges is the fact that they've got this hierarchical structure: national, provincial, district, and school level.

National government sets out policies and programmes. But they don't hold the budgets at the national level. Budgets are allocated to a province. And within a province, each province has autonomy. And when you combine that with a budget. You see that each province then decides how they want to implement those programmes or policies that will sit at the national level. And that is where a lot of the kind of siloed driven fragmented efforts are happening.

So for example, when you look at that e-Learning paper of 2004 that was set out by national government. The reason why a lot of that has not been implemented by government is that each province can choose how they want to implement e-Learning.”

The respondent argued that because policy is set at national level, but budgets and implementation are managed from the provincial level, this creates policy implementation challenges, and definitely also impact the consistency of the implementation across provinces. Linked to policy and strategy, procurement is another key government consideration, that is explored in the next sub section.

5.8.2. Procurement

Linking to the previous section, one respondent commented:

“The biggest challenge is the EdTech policy and procurement, I mean it's two things, but, you know, well procurement would necessitate a vetting process. So the fact that there's no budget and procurement means it's very difficult to figure out your business model. ... So if they could clean up procurement, and even just give schools a small budget, I think that the sector would actually suddenly do a lot better. A lot more EdTech entities or startups would form, they would know what they're in pursuit of, they would know what the bar is.”

This section leads on from theme no.4 where government was listed as a potential source of revenue. Looking at it from a slightly different angle, a clear procurement strategy and mechanism, will not only open doors to the EdTech entrepreneur, but also benefit government, as one of the respondents mentioned in the data coded as “EdTech challenges”:

“One of the areas that is quite far removed from teaching and learning and maybe it's less appealing, that adds huge value is really in the area of procurement. Just by identifying the right content for instance, and being able to purchase it efficiently at cost effective prices.”

This respondent also mentioned that they have helped specific government entities to save up to 50% on their technology spend in technology procurement initiatives of this nature. A clear EdTech procurement strategy, and resultant implementation could provide value to government as well.

Linking back to theme no.4, EdTech companies do find it very hard to engage government. This was already extensively covered in that theme, but to summarise: the following comments, *“We've been unable to navigate procurement with any of the provinces so far, but we would like to”*, and *“It's not relationships, ... we can't step through the bureaucracy layer yet, because we don't have enough critical mass”*, from two respondents, highlight the challenge of not having an easy procurement strategy and mechanism from government. The first of these two respondents goes on to elaborate:

“Currently for EdTech, there's no vetting process for digital products properly in place in the country. And there's no procurement process for schools, there's no budget available for schools specifically for technology products, and then even if there were, there is no proper vetting process, no procurement process in place.”

These challenges with the procurement process have made it very hard for the EdTech companies to engage government as a source of revenue. The elaborate government tender process also provides an obstacle to access government funds. A broader set of alternative support is explored in the next sub section.

5.8.3. Support for EdTech providers

Other than the need for a clear policy implementation, and streamlined procurement channels, the path for EdTech providers to work with schools is not an easy one, especially for new EdTech providers that have not had the time to build the extensive and multiple relationships required with government. One of the respondents that has limited relationships into government commented:

“Government support for private education providers is lacking. There's no framework really to operate through. ... What I'm alluding to here is some kind of government based support structure that allows us to plug into their network more effectively, as opposed to having to try to clear our own path into government. If there was some kind of established entity within government that formalised the process of working with schools that would be quite powerful.”

One approach that seems to have worked, after a lot of effort, *“...one of the successes we've had in working with government is because we've had both a top down and bottom up approach”*, as per a respondent from another company. This effectively boiled down to building relationships with the people at the top end that make the purchasing decisions, but also with the teachers at the bottom end to test and contribute to the EdTech offering.

Even without financial input, just getting into the schools is hard, as another respondent points to a specific challenge, *“It's the government schools where it's a much harder sell because they can't change how they report into the district's”*. The respondent was effectively alluding to the hierarchical and reporting structure in the government schools, and how the school or governing body does not have the autonomy to make their own decisions, as was mentioned at the start of the section under the “policy and strategy” heading.

5.9. Summary of data analysis and themes

Figure 15 provides a diagram of how the four themes that were identified relate to the coded data. Additional sections of this chapter covered updates to the conceptual model based on the data analysis, as well as a section focused on government considerations.

This has led to the updated model in Figure 17, with the themes numbered and a slightly updated diagrammatic view. Findings from these themes are summarised for each of the themes.

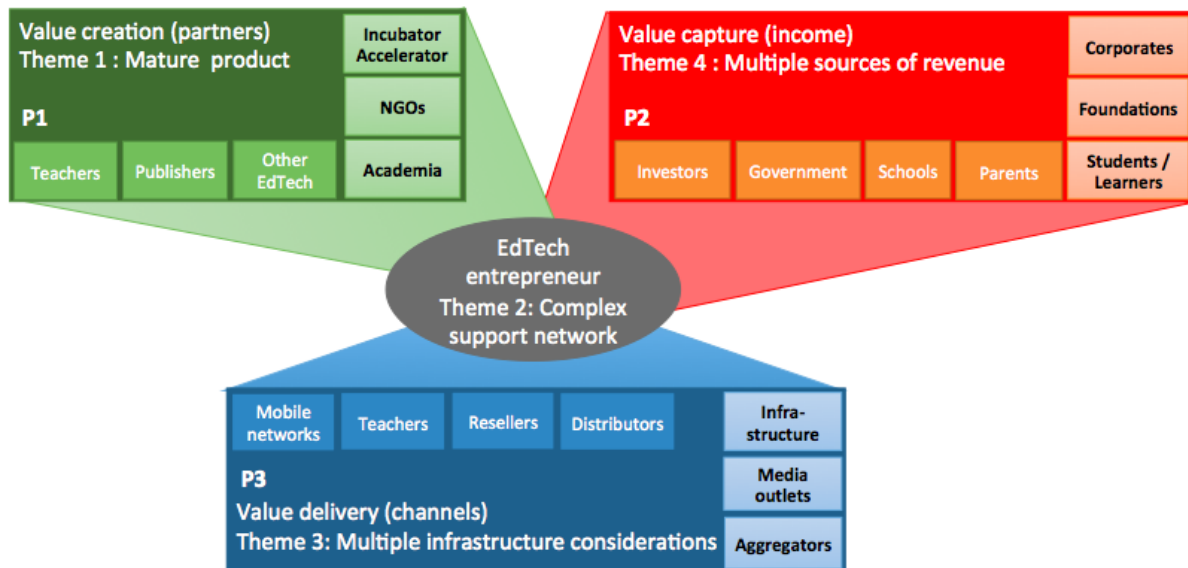


Figure 17: Updated model with numbered themes

Theme 1: This theme identified the importance of a mature product, that especially teachers can endorse, which would then, with support from the complex support network in theme no.2, provide access to multiple sources of revenue in theme no.4.

Theme 2: This theme identified multiple stakeholders in complex support networks, i.e. incubators, accelerators, various investors, foundations, company boards, NGOs, academia, and corporates all provide support to these EdTech companies, albeit in somewhat different formats for each company. Most EdTech companies, focused on basic education, were still mostly funded by grants from multiple stakeholders, and where investors were considered it was clear that support that extended beyond financial input was critical to the partnership, e.g. networks and experience to expand into the rest of Africa.

Theme 3: This theme identified multiple infrastructure considerations for EdTech companies, which included mobile networks, specific constraints for serving video over zero-rated mobile networks, broader infrastructure initiatives by government and schools, and content-hosting options in the cloud. These all feed into theme no.1.

Theme 4: This theme identified multiple sources of revenue, and is driven by a mature product and complex support network. Most companies had more than one source of income, and if not were actively planning for additional sources of income. This included income from grants, investors, private users, top quintile schools, corporates, and government; where grants could come from foundations, social impact funds, or NGOs; and these could be extended to income from other countries as well.

The problem of low quality education in South Africa provides an ideal opportunity, especially for an EdTech company that has built a mature product and has the right support network around them. As one of the respondents commented:

“In Africa, where you've got this growing youth population, the problem is such that the serving of people is going to quite quickly bend the government's arm to provision, and once that happens you're going to have to have good solutions. You can't roll this thing overnight, and then hopefully there's going to be some well placed EdTech companies that can then get a bit of that pie and really make a difference.”

The last section in this chapter covered government considerations, which are also important for EdTech providers to consider being ready for the opportunities. In summary these considerations include e-Education policy and procurement implementation challenges, which can be navigated, but only with solid relationships across various parts of government, and innovative product positioning to the procurement channels.

The next chapter discusses how these results correlate to the propositions that were set in Chapter 3, and develops the “framework that identifies key considerations for sustainable EdTech entrepreneurship in an emerging economy” as per the research objective.

6. Discussion

6.1. Introduction of theme to proposition correlation

The three propositions that were set in Chapter 3 of this study as they relate to the themes identified from the data collection and analyses in Chapter 5, are summarised in Table 1.

Table 1: Propositions related to themes

Proposition 1: Teacher distrust has the greatest impact on value creation	Theme 1: Mature product
Proposition 2: Investor scepticism and government revenue streams have the greatest impact on value capture	Theme 4: Multiple sources of revenue and Theme 2: Complex support structure
Proposition 3: Mobile network zero-rating has the greatest impact on value delivery	Theme 3: Multiple infrastructure considerations

Although theme 2 can be related to all three propositions, it has the strongest correlation to proposition 2, and is discussed in more detail in reference to that proposition in the rest of this chapter.

The next sections discuss each of the propositions and correlated themes, describing the findings.

6.2. Proposition 1 to Theme 1

Proposition no.1 was that teacher distrust has the greatest impact on value creation, with the rival proposition being that teacher distrust does not have an impact on value creation. Theme 1 identified the importance of a mature product, that especially teachers can endorse, which would then, with support from the complex support network in theme no.2, provide access to multiple sources of revenue in theme no.4.

The findings of theme 1 support both the main and rival proposition, with the qualifier being “mature” product, i.e. teachers do distrust the impact of the EdTech product, unless it is mature, at which point there is a much higher likelihood that they would trust it, and even endorse and support it. At least four of the five case studies had a mature product or value proposition, and the fifth case was busy expanding the scope of the value proposition. The findings in theme 1 argued the importance of the teacher endorsement as being even more important than the endorsement from parents. Theme 1 also identified multiple strategies that EdTech companies use to

get teacher endorsement, which includes offering a freemium version of the product for teachers to experiment with, ahead of a commercial commitment; and creating a community, or family, for teachers to collaborate.

In terms of evaluating which stakeholders have the greatest impact on the value creation block in the model in Figure 17, two stakeholders stand out from the results. The role of the teacher has no doubt as being one of the greatest impacts, but the role of the incubators and accelerators can be argued to play a significant role as well. These stakeholders can provide access to a critical part of the overall model, i.e. access to the rest of the value network.

6.3. Proposition 2 to Theme 2 & Theme 4

Proposition no.2 was that investor scepticism and government revenue streams have the greatest impact on value capture, with the rival proposition being that investor scepticism and government revenue streams do not have an impact on value capture. Theme 2 identified multiple stakeholders in a complex support network, which included investors. Most EdTech companies that were investigated in this research, which are focused on basic education, were still mostly funded by grants from multiple stakeholders. Where the EdTech companies considered investors, it was clear that support that extended beyond financial input was critical to the partnership, e.g. networks and experience to expand into the rest of Africa.

What was quite interesting about theme 2 is that EdTech company scepticism was even higher than investor scepticism. EdTech companies would need to provide the return on the investment, and unless it was clear how they would be able to do this, they were not going to source investment.

These findings do however support the proposition, i.e. investors are sceptical of a return on investment into the South African basic education EdTech sector. What can support the rival proposition is that investors do consider investment if there are multiple sources of revenue, which typically includes revenue from other countries. Only one of the five cases had successfully partnered with mainstream investors.

The broader set of results from theme 2 speaks to many of the other “support” functions that exist in the EdTech value network. These other stakeholders offer alternatives to formal investment arrangements. These stakeholders include incubators, accelerators, foundations, company boards, NGOs, academia, and corporates; that can all provide support to EdTech companies.

The proposition argues that government revenue streams have an impact on value capture, which could be direct or indirect in terms of its impact on the economic sustainability of the EdTech companies. In section 5.8 the results, on investigating a “broader” set of government influence, indicated a clear agreement in all cases that government does have a major influence. As a minimum this influence is driven by curriculum control, but it extended beyond that, and especially in terms of product endorsement. So even if there was no revenue stream yet, which would have a more direct impact on economic sustainability of the EdTech ventures, the indirect government influence is strong enough on its own to have an impact on value capture.

Theme 4 identified multiple sources of revenue, and is driven by a mature product and complex support network. Most companies had more than one source of income, and if not were actively planning for additional sources of income. This included income from grants, investors, private users, top quintile schools, corporates, and government; where grants could come from foundations, social impact funds, or NGOs; and these could be extended to income from other countries as well. Only one of the five cases confirmed a revenue stream from government. So clearly government revenue streams do have an impact on value capture, and the results argued that part of the problem being that these revenue streams were complex.

In terms of evaluating which stakeholders have the greatest impact on the value capture block in the model in Figure 17, other than the investors and government, it does make sense to look at foundations and corporates. These two stakeholder areas arguably have a greater impact on value capture at the moment, i.e. at least three of the five cases depended on grants from these entities for value capture, and at least two cases were building revenue streams from corporates.

6.4. Proposition 3 to Theme 3

Proposition no.3 was that mobile network zero-rating has the greatest impact on value delivery, with the rival proposition being that mobile network zero-rating does not have an impact on value delivery. Theme 3 identified multiple infrastructure considerations for EdTech companies, which included mobile networks, specific constraints for serving video over zero-rated mobile networks, broader infrastructure initiatives by government and schools, and content-hosting options in the cloud.

The findings from theme 3 neither fully support the proposition, or its rival. Of the five cases investigated, only two rely strongly on content delivery over mobile networks. For these two cases one went as far as confirming “economic sustainability” being supported by the mobile networks providing zero-rating of their

content, as the respondent commented, *“we are utterly convinced that those have been instrumental in allowing us to get to the reach that we’ve got.”*

The other three cases mentioned challenges engaging with the mobile networks, which included being seen as a competitor, as the one respondent commented, *“I think more and more, EdTech companies are becoming almost positioned as competitors to them. So that makes it even more difficult to partner with them without being absorbed by them”*; but also having to navigate a complex infrastructure which puts constraints on serving video over zero-rated mobile networks. Even with these challenges, the EdTech companies were interested in expanding their offerings over mobile, i.e. if this was not already in place.

The rival proposition does not hold, as “does not have an impact” is not the case. And neither does the main proposition hold, as “greatest impact on value delivery” was only partially true for one of the cases. Mobile network do have “impact”, but perhaps not to the extent that it impacts “economic sustainability” of these ventures. For a company where the only income is via grants, and the EdTech content delivery is mostly via mobile networks, one could argue that the mobile networks, with zero-rating of content access, does impact “economic sustainability”. This is only true for one of the five cases that were investigated. Another case that also relies on mobile network delivery does have other sources of income, making it less reliant on the mobile network zero-rating.

The broader results from theme no.3 do however point to other infrastructure considerations, and related costs, which could impact the EdTech venture economic sustainability. And these infrastructure considerations, which should include mobile networks where applicable, could arguably have the greatest impact on value delivery. For these EdTech ventures, their typical main cost is people, as one respondent commented: *“we’re knowledge businesses, ...your overheads are enormous because you put in people”*, but infrastructure cost is not negligible, especially if all the parts of the infrastructure have not been discounted or zero-rated. If government and school initiatives provide the necessary infrastructure for content delivery, then that is one less thing the EdTech company has to worry about paying, and similarly being able to host the content on a Cloud solution that has discounted hosting costs should also contribute to the overall “economic sustainability” of the EdTech venture. At least two of the cases indicated that they had discounted Cloud hosting costs, because of their social impact as EdTech companies.

6.5. Framework development

Chapter 6: Discussion

The propositions were correlated to the most relevant themes in the previous sections of this chapter. The literature review suggested the following possible considerations when developing a business model for EdTech entrepreneurship, i.e:

- Innovation to develop a unique value proposition, based on “radicality” that contributes to venture success (Taran *et al.*, 2015), and on business model innovation (Chesbrough, 2010; Trimi and Berbegal-Mirabent, 2012; Dasilva *et al.*, 2013; Tongur and Engwall, 2014; Yang *et al.*, 2017; Geissdoerfer *et al.*, 2017; Mansour and Barandas, 2017)
- Open models to encourage collaboration with various stakeholders (Doganova and Eyquem-Renault, 2009; Taran *et al.*, 2015)
- Impact measurement (Sanderse, 2014; Joyce and Paquin, 2016)
- Diverse funding sources (Gundry and Welsch, 2001; Pretes, 2002)
- Delivery to a broad customer base (based on ‘reach’ that contributes to venture success as per Taran *et al.*, 2015)
- Simple and focused revenue streams (Eurich *et al.*, 2011; Chikoto and Neely, 2014)

The first three items “innovation to develop a unique value proposition, open models to encourage collaboration with various stakeholders, and impact measurement” correlate very well with theme 1 “to develop a mature product”. The collaboration is especially true for working with teachers, but also extends to collaboration with the “complex support network” in theme 2.

The last three suggested considerations from the literature review “diverse funding sources, delivery to a broad customer base, as well as simple and focused revenue streams” all correlate very well to theme 4 on “multiple sources of revenue”. More specifically on the funding, the empirical findings from most cases reported funding from multiple sources, even if it was similar type of funding, e.g. getting grants from multiple entities. The simple and focused revenue streams could be misinterpreted as getting revenue from only one source, but actually along with the broad customer base, does suggest that even if the revenue stream structure is simple, it makes sense to source revenue from multiple sources for the venture to be sustainable.

Bringing this back to the original conceptual model, which was updated based on the empirical findings, and after adding the numbered themes, gives us the model in Figure 17 as the base for the framework that has now been developed in Figure 18.

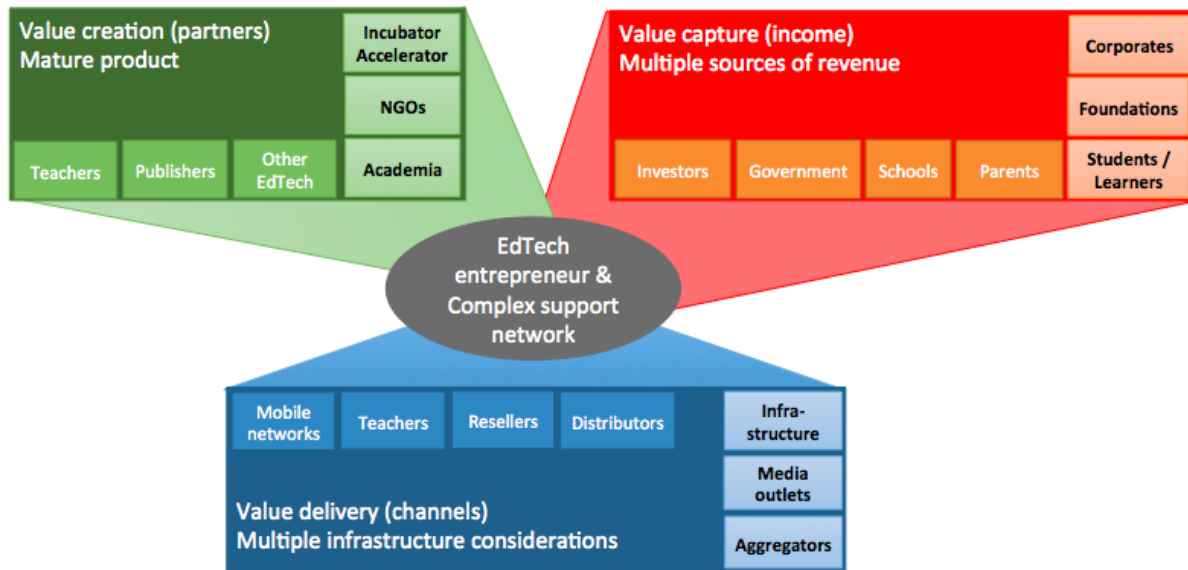


Figure 18: Business model framework for EdTech in South Africa

Considering this framework, it now provides a much more comprehensive view to evaluate the research questions. Although themes 1, 3 and 4 each align very well with one of the three major value constructs, theme 2 emerged as a dominant consideration that did not fit completely in the original model. This theme 2, a complex support network, is evident from all the additional stakeholders that were added, in black font colour, to the value constructs, especially relevant to the value creation and capture constructs.

This framework now also provides a blueprint for existing and new EdTech ventures in an emerging economy to evaluate their business models within the EdTech value network. A more comprehensive list of stakeholders is represented in each of the value constructs in this framework. Specific themes have been identified in terms of how these value constructs inter-operate in this framework. And some of the most important value flows in this framework were investigated with propositions and related findings.

The next chapter provides conclusions on the proposition to empirical finding correlation, based on the final framework that was constructed in this section.

7. Conclusions

In Chapter 5 themes were identified from the primary data collection and analysis. In Chapter 6 these themes were used to evaluate the propositions that were set in Chapter 3, as well as develop a framework for sustainable EdTech entrepreneurship.

The conclusions on evaluating the propositions are summarised in the following sub sections. The conclusions are sequenced based on the sequence of the propositions in the last chapter. A section to answer the research questions follows this.

7.1. Teachers have the greatest impact on value creation

Teachers distrust the positive impact of the EdTech entrepreneurs' value proposition, until a relationship has been established between all the stakeholders and a mature EdTech product has been offered, at which point teachers trust and support the positive impact of EdTech. When the product is positioned as a replacement for mainstream schooling, it helps when teachers can see the value, to support parent endorsement. In all product positioning cases collaborating with teachers to create the product is also important. It can be argued that teachers do have the greatest impact on value creation, but it is worth mentioning the incubators and accelerators that can be key in helping to establish the relationships between all the stakeholders.

7.2. Government and corporate revenue streams have the greatest impact on value capture

Investors are sceptical of a return on investment into the South African basic education EdTech sector, and will only invest positively into this sector if the EdTech venture can show multiple sources of revenue, which typically includes revenue from multiple countries.

A complex support network offers alternatives to formal investment arrangements, with the alternative support still having an influence on the economic sustainability of the EdTech ventures. The stakeholders in this complex support network include incubators, accelerators, foundations, company boards, NGOs, academia, and corporates.

Government has a major influence on the economic sustainability of the basic education focused EdTech entrepreneur in South Africa. This influence can be direct in terms of revenue, or indirect in terms of curriculum and product endorsement.

Most companies have more than one source of income, and if not, are actively planning for additional sources of income. These multiple sources include income from grants, investors, private users, top quintile schools, corporates, and government; where grants can come from foundations, social impact funds, or NGOs; and these sources of income can be extended to income from other countries as well. It can therefore be concluded that investors and government alone do not have the greatest impact on value capture, but rather that revenue can be sourced from multiple other entities, including corporates. Sourcing revenue from corporates does not mean that the EdTech venture needs to pivot completely to the corporates as a customer segment, but rather that an additional revenue stream from corporates can help support the venture to deliver to the basic education customer segment.

7.3. Multiple infrastructure providers have the greatest impact on value delivery

Mobile network operators have an influence on the basic education focused EdTech entrepreneur in South Africa, but in most cases the influence does not directly impact the economic sustainability of these EdTech entrepreneurs. A more accurate view, related to proposition 3, is that: Multiple infrastructure considerations have an influence on the economic sustainability of the basic education focused EdTech entrepreneur in South Africa. These multiple infrastructure considerations include government and school provided infrastructure, as well as mobile networks and hosting platforms. And this influence is even more pronounced when these infrastructure components are offered for free or at a majorly discounted cost.

7.4. Answers to research questions

This study has three main research questions. The answers are based on the conclusions in the previous sections.

Research Question 1: What are the main challenges in an EdTech business model for South African entrepreneurs?

There are multiple challenges, one of these being that you need a mature product or value proposition. This comes from years of investment, but for new entrants the option of partnering with someone that has already developed a mature product and just operating well within the value network could be an option. This is however linked to operating in a complex value network, which only works with support from multiple parties. Typically this support comes from building deep relationships over a long period of time. One of the key relationships is with the Department of Basic

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Education in the government of South Africa, even if only to align with the curriculum or get product endorsement.

Research Question 2: What are the key dynamics in the South African basic education EdTech value network?

These key dynamics are best described in terms of a complex support network. Some of the key considerations include working closely with teachers for value creation and product endorsement, working with multiple infrastructure providers to minimise costs for value delivery, and using multiple support structures to find the best partners for value capture.

Research Question 3: How can South African EdTech entrepreneurs be better supported in the EdTech value network?

It is clear that some kind of incubation support does help, even if just to provide introductions to a wider support network. Infrastructure providers should minimise the cost for EdTech value delivery. With the appropriate business model, i.e. mature product or value proposition, supported by the optimal network of stakeholders, revenue can be sourced from corporates. To source revenue from government is much more complex, but can be obtained. Better government policy and procurement implementation would also enhance the provision of simpler and predictable revenue streams to EdTech providers.

7.5. Summary

The objective of this research was to “Develop a framework that identifies key considerations for sustainable EdTech entrepreneurship in an emerging economy”. This objective was achieved by developing a model in Figure 14 based on a literature review, evaluating and updating this model in Figure 16 during the empirical data gathering, and developing a framework in Figure 18 based on the data analysis, which identifies key considerations for sustainable EdTech ventures. This framework can also be used by existing and new EdTech ventures to evaluate their business plans and models within the EdTech value network.

Building a sustainable EdTech venture in an emerging economy is a major challenge, as one of the EdTech companies responded during the interviews:

“Some of the challenges that we have with poverty or financial inclusion, are the same challenges we have for EdTech, they're not education problems really, they are societal problems and human problems. ... It's not about how



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do we transform an industry, it's how do we transform a society and those are really big things.”

We have a major societal challenge, and education can make a difference. With better support, more EdTech companies will become sustainable, and help to improve the quality of education in South Africa.

The next chapter provides recommendations, lists limitations to this research, and suggests possible future research on this topic.

8. Recommendations

Based on the conclusions in the previous chapter, this chapter provides external and internal recommendations, followed by a summary on the limitations of this study, and concludes with suggestions for future research.

8.1. External – Government, corporates & incubators

With government needing to improve the quality of education in South Africa, there is an opportunity for EdTech providers to help. The government has a policy on e-Education (DBE, 2004) and has recently reported on partnerships with the private sector as funding sources and providers of connectivity and infrastructure (DBE, 2019). The role of the EdTech SMME is not very clear from the policy, even though it is clear that this entity can play a key role to help address the challenges listed in the policy. The first external recommendation would be for government to consider extending and improving the partnerships between government and specifically EdTech companies in the private sector. This could be done through even more clear and updated policy guidelines, as well as consistent implementation at the provincial level, which includes clear policy to budget to procurement alignment.

Another key partnership is between EdTech providers and corporates, which can extend to a partnership between these two parties and government. The second external recommendation is that corporates should continue to support EdTech companies with social impact grants, but ultimately only as a stepping stone to a more sustainable arrangement which includes value for the corporate in exchange for revenue streams to the EdTech companies. Some of these models already exist, and should be explored as more partnership opportunities in South Africa.

An incubator support system has significant value, apart from building a business plan and getting mentorship on how best to pitch this to investors. The incubator support system can provide access to a broader set of stakeholders in the support or value network. Some of the key relationships that can be built on the back of this incubator support, include long term coaching and mentorship arrangements, access to infrastructure providers, and access to funding. It is promising to see support systems such as Injini in South Africa focused on EdTech in Africa. But as per the findings of this research, some companies might not fit the criteria for incubation, i.e. either because they have already been in existence for a while or have not been accepted into the programmes as they are “too early” in their process. The third external recommendation is for incubator and accelerator support functions to support EdTech ventures, even if they do not fit the exact entry profile into these support programmes.

8.2. Internal – Product, infrastructure, support, revenue

Providing a mature product as part of the value proposition opens up the rest of the opportunities in the value network. Getting to this point can be very tricky, but the first internal recommendation is that it seems to be best achieved by starting with what you have, or being means-driven (Read *et al.*, 2016) and partnering with teachers and other EdTech companies to enhance the value proposition with bootstrapping, competition or grant funding.

Once the mature product is ready, which includes alignment to the country curriculum and languages, multiple streams of revenue can be accessed via a complex support network. This support network includes infrastructure providers that can provide free or discounted access. The second internal recommendation is to build relationships with multiple infrastructure providers and to negotiate for free or low costs as the EdTech offering for basic education has a major social impact, which can create positive brand alignment for the infrastructure provider.

The third internal recommendation is that EdTech ventures should find the right support structures. This includes finding incubator and accelerator support, especially as these support structures help to create access to a vital and broader support network. These support structures should then extend to making sure the venture has an advisory board.

The fourth internal recommendation relates to actively finding multiple sources of revenue. This can involve grants from corporates evolving into partnerships or even revenue streams from these corporates. And ultimately by offering a mature product, supported by a digital skillset, partnerships with government can evolve into revenue streams as well.

8.3. Limitations

This research was limited mainly by the number of cases that could be covered. The cases represented a good sample of the target population, but there were still only five of them. The case study method by its very nature does not provide for generalisation to the population. The Covid-19 pandemic created additional challenges for this study, as businesses were trying to survive or ramp up rapidly to meet the demands of e-learning. This put additional pressure on the EdTech companies, which meant that it was even harder to get input from them.

8.4. Future research

This research was exploratory and developed a framework to support the sustainability of EdTech ventures, which ideally should be tested extensively with future research. The one option to test the framework is a further qualitative study including more cases, which would mean having to source cases from other emerging economy countries, as the cases in South Africa are limited. Sourcing case input from other emerging economies could also potentially provide inputs that might be unique to those specific economies compared to this study in South Africa.

The other option is a quantitative study to test the framework, but would also require a larger sample of inputs, which would only be possible by collecting data from multiple countries. A slightly different angle would be to consider gathering empirical data from other stakeholders in the value network, and not only the EdTech companies.

An interesting data code emerged from the data analysis in this research around “Technology vs Education background” for the EdTech entrepreneur. It would be interesting to know if the specific background of the founder or CEO impacts the ability for the entrepreneur to be successful in the EdTech value network. Related to this correlation investigation it would be interesting to research the ability of the EdTech entrepreneur to build relationships in an extensive value network and to what extent this would contribute to the EdTech venture being sustainable.

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Appendix A – Interview Questionnaire

Background

1. To confirm the maturity of your organisation, please indicate how many years your company has been in operation.
2. To confirm the size of your company, please indicate the number of your employees.
3. Are there any incubation, coaching, or other support structures for your company?

Broad context

4. Who are the main stakeholders in the South African EdTech market?
5. What are the main challenges in the South African EdTech industry?

Stakeholder relationships

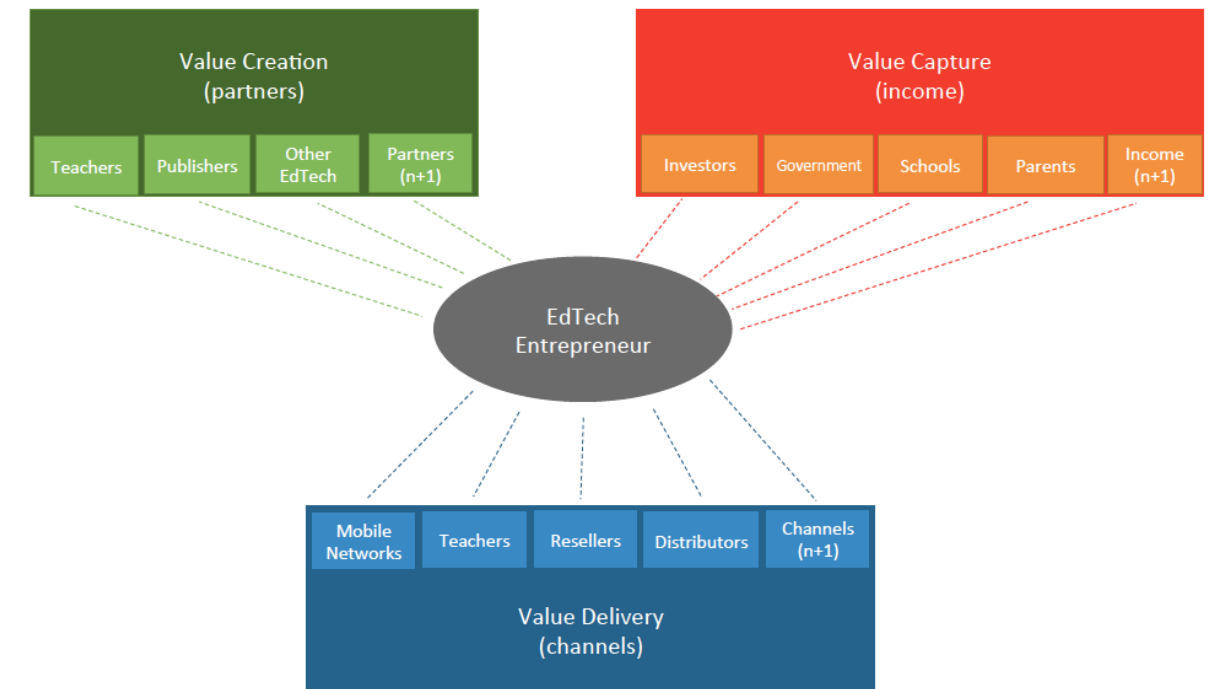
6. Please describe the relationships with your partners.
 - *Interviewer note: Explore mobile networks, distribution channels, resellers, competition, innovation, collaboration, before & after Covid.*
7. Please describe the relationships with your customers (schools, headmasters, teachers, IT departments, parents).
 - *Interviewer note: Explore any resistance to EdTech, and if so the reasons (teacher education, technology inhibition, mismatch on expected value proposition, budget constraints, distrust in product efficacy). Explore collaboration.*
8. Please describe the relationships with your investors.
 - *Interviewer note: Explore different investment sources, challenges, and willingness to invest in SA EdTech.*
9. Please describe the relationships with government (DBE, provinces, municipalities).
 - *Interviewer note: Explore revenue options from government, other support from government, challenges.*

Value Network

10. Complete the mapping of value flows in the diagram based on the following guidelines. Each of the value flows should be categorised into one of the following with the direction of the flow indicated with an arrow (in some cases flowing both ways):
 - (1) *Value Creation - includes the exchange of information*
 - (2) *Value Delivery - exchange of goods and services*
 - (3) *Value Capture - exchange of economic value*

(4) Intangible Value - exchange of intangible value, such as trust & credibility

The following diagram was shared along with the questionnaire above.



Appendix B – Di Valentin et al. 2014. business model

Di Valentin *et al.* (2014) built their model to cover all the business model components (or elements as they refer to them) with a set of specifications. The research is termed “Towards a Business Model Framework for E-learning Companies”. The details of the five elements with their specifications are in the five tables below.

Table 2: Business model elements of “Value Offering” (Di Valentin et al, 2014)

<i>Software & Service Offering</i>											
Production Model (SW)	CSCL	MOOCs	Tutoring Systems	Simulations	Platforms	Serious Games	LCMS	LMS	CMS	Author. Tools	
Technical Service Model	Technical Assistance			Platform Services			Hosting Services				
Software Manufacturing	Internal Service Delivery		Outsourcing	Licensing		Resale			Value Added Resale		
Standardization	Standardized			Medium Customized				Customized			
<i>Content & Service Offering</i>											
Production Model	CSCL		Drill & Practice		Simulations		Serious Games		Mobile Optimized		
Service Model	Tutorial Assistance		Content Quality Management		Content Brokerage		Content Placing		Didactical Consulting		
Content Creation	Service Offering		Outsourcing		Licensing		Resale		Value Creating Resale		
Standardization of Contents	Standardized			Medium				Customized			
Reuse of Contents	Low			Medium				High			
Mobile Adaptation of Contents	Low			Medium				High			
Actualization of Contents	Constantly		On Demand			Yearly			Other		
Distribution Model	Global		Partner Network			Online			Other		

Table 3: Business model elements of “Partnerships” (Di Valentin et al, 2014)

Partner Orientation	Software Partner	Technical Services Partner	Content Partner	Content Services Partner	Complementary Services Partner
Partner Structure	Few Partners and Strong Partner Structure			Many Partners and Loose Partner Structure	
Maturity	Long-term			Short-term	
Partner Integration	Low		Medium		High

Table 4: Business model elements of “Market” (Di Valentin *et al*, 2014)

Customer Type	Educational Institution (Private & State)	Business		Commercial Customer		Individual Learner	
Customer Positioning in the Value Chain	Downstream Supplier	State	Institution	Wholesale	Merchant	Service Provider	End User
Customer Relationship	Personal Assistance	Communities		Co-Creation		Automated Service and Self Service	

Table 5: Business model elements of “Strategy” (Di Valentin *et al*, 2014)

Investment Horizon	Own Requirements Model		Income Model		Growth Model		Speculation Model	
Competitive Factors	Quality	Customization	Efficiency	Price	Customer Relationship	Innovation Leadership	Network	Speed

Table 6: Business model elements of “Finance Model” (Di Valentin *et al*, 2014)

Revenue Model	Usage Fee	Open Source	Basic Fee	Mediation Fee	Licensing	Sell Rights	Freemium	Advertisement
Pricing Model	Fixed Price	Usage-based	Customer-based	Per Contact	Local		Time-based	Pricing Bundle
Sales Volume	Low			Medium			High	
Cost Structure	Value Driven		Cost Driven		Investment Capital		Market Research Based	
Profit Margins	Low			Medium			High	