

Challenges to Scaling Inclusive Innovations: Four Case Studies from the Healthcare Sector in the Western Cape Province of South Africa

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Abstract—Inclusive innovation has been suggested to provide some solutions to societal problems such as access to clean water, healthcare, financial services, electrical power, modern communications, and education to marginalized communities. Through inclusive innovation the underserved may become a dynamic consumer market or a diverse source of supply.

We consider various growth strategies and enterprise development strategies to promote scaling of inclusive innovations in the healthcare sector in South Africa. By applying the case study method we consider 4 cases each focused on a specific delivery channel namely: 1) primary healthcare; 2) secondary and tertiary healthcare; 3) devices, and 4) networked products. Through the case study method we uncover and map typological elements for considering inclusive innovation business models in the healthcare sector.

In line with the study objective, we ascertain the implications of our findings to the existing perspectives on constraints to inclusive businesses and strategies that can be employed to scale such projects. Limitations as well as opportunities for further research are noted and integrated in a suggested research agenda framework.

I. INTRODUCTION

Although extreme poverty has decreased globally and market systems have brought greater prosperity and better living conditions for many, it has also been associated with increased inequalities. Popularised by Prahalad [1] [2] the “Base of the Pyramid” refers to the wealth distribution and income generation capacity that may be represented in a pyramid configuration. The top of the pyramid is formed by the wealthy, and have the means to generate high income levels through high levels of education and capital which is concentrated in the hands of the few. Case in point - 50% of the world’s wealth will be concentrated in 1% of its population by 2016 [3]. A population greater than 4 billion form the “Base of the Pyramid” and live on less than US\$2 per day, where US\$8 per day fall under the poverty line - the amount that is supposed to be enough to sustain an individual [4].

Notwithstanding the shortcoming of the capitalist market system and the concentration of capital, it is however a key requirement for economic growth and the reduction of poverty to have systems to exchange commodities, services and goods as well as systems to deliver basic services such as education, health and food to assist people to escape poverty. Without such systems the critical goals of competitiveness and inclusivity simply cannot be achieved [5][6].

The market system is a lens through which such systems may be viewed and could provide a means to understand and

also design interventions. The goals of developing market-systems for development recognises that in order to improve the poor’s terms of participation in market systems, the functions of these systems need to be changed. Such interventions are about deep rooted change that address root-cause issues and leverage systems actors to bring about systems change where sustainability and inclusive growth are key concerns.

In light of the above, the past few years have seen inclusive innovation and in particular market based approaches gaining popularity as an effective tool to alleviate poverty in developing countries [7]. Organisations are developing service, product and business model innovations that have the potential to disrupt and tip the scales of competitive advantage in established markets [8].

II. PROBLEM STATEMENT – A NEED FOR INCLUSIVE INNOVATION BUSINESS MODELS

The “poverty penalty” or “double jeopardy”, refers to the higher cost that poor individuals need to incur to participate in a market economy. There are a wide range of causes and forms that the marginalisation of the poor may take on. Mendoza [9] provides an in-depth analyses of this situation and outlines five possible forms of the poverty penalty i.e. poorer quality, higher prices, non-access, non-usage and the catastrophic spending burden – these are subsequently briefly explained.

Poor people are often sold poor quality goods (e.g. expired medicines, contaminated food, faulty devices and products) and often have to pay more than individuals in higher income environments for the same service or products. The price and quality dimensions may also have further implications - where prices are unaffordable this may result in “non-access” to goods. Also where goods or services are priced too high or are of poor quality this may lead to “non-usage” where the poor may have to choose to opt out of consuming a good or service. Mendoza [9] also highlights the catastrophic spending burden dimension which refers to certain cases (often related to healthcare) where poor individuals have to make a choice for instance between non treatment or to indebt him/herself so much that they have to, for example, close a business or take a child out of school [9].

Companies find it difficult and often more costly to penetrate this market segment [10]. Often goods and services have not been designed for these individuals and their specific needs. Traditional models of low cost, low margin with high penetration rates where the poor is merely seen as a

customer is failing due to inter alia unrealistic penetration levels that is required of up to 30% to make this economically feasible [11]. Here factors such as non-usage, non-access and unawareness make such business models unsustainable.

This situation presents itself inter alia due to a lack of sound distribution infrastructure like roads, distributors, logistics and warehouses as well as a lack of skills and awareness of possible solutions and limited resources. To respond to these challenges, there is a need for new innovation approaches and strategies which enable the design and production of goods or services that can serve and even transform the living conditions of disadvantaged communities [12].

III. THE CONTEXT OF THIS STUDY

South Africa has amongst the highest HIV/AIDS and tuberculosis incidence rates in the world. The disease burden in South Africa is also changing with an increase in lifestyle related diseases like obesity and diabetes [13]. Notwithstanding advances in the medical field and increased financial investment the “delivery gap” continues to exist where low income communities have poor access to basic healthcare services and medicines.

Healthcare service provision for poor communities in South Africa takes place mostly through the public health system which is under resourced and poorly managed. For many in rural environments and informal settlements, hospitals and health centres are located far away, which makes it difficult for these communities to get diagnosed and receive treatment, should they be fortunate enough to find healthcare facilities equipped with qualified personnel and medication available [14].

Of late a set of new healthcare innovations have been developed by private sector organizations which address challenges in the healthcare sector particularly for poor communities. Advances in technology and new delivery mechanisms have been employed to achieve improved access to healthcare services, lower costs, improve healthcare delivery quality as well as scaling up programs thereby increasing the reach of programs. A major challenge experienced by these enterprises is that few of them reach scale thus constraining the impact and benefits achieved [15][16].

In this paper, inclusive healthcare projects were evaluated through a business model framework. Challenges affecting inclusive businesses were identified relative to key delivery channels. The primary objective of this project was to analyse and provide an overview of scaling issues faced by inclusive innovation businesses in the healthcare sector. This was achieved through the following objectives:

- Conduct a thorough analysis of the literature on inclusive innovations and inclusive innovation business model frameworks.
- Adopt a business model framework which will be used to guide analysis of scaling issues.

- Identify the operational challenges that are faced by the evaluated inclusive innovation projects in key healthcare delivery channels. As well as Identify how these challenges can be overcome.
- Interpret the results of the research and develop a typology of the main challenges that each channel will face and make recommendations.

IV. LITERATURE REVIEW

A. What are inclusive innovation business models?

Inclusive innovation has been proposed as a possible mechanism for creating new growth paths towards poverty alleviation and potentially addressing the issues of inequality. Through inclusive innovation goods and services could be developed for or by a wider range of actors with specific focus of this paper on benefitting the marginalised and often also poor in the African context. This may entail the inclusion of the pressing issues of the poor in problem statements, an in-depth understanding of the needs and definitions of societal problems that affect the poor; and the process of innovation and engagement with the poor to develop new innovations. Furthermore inclusive innovation entails the adoption of absorption of innovations where the poor is able to afford and access innovations and very importantly the factors of economic inclusion where the poor is able to benefit economically from innovations [17]–[20].

Apart from the prerequisites of a deep understanding of the root cause of delivery failures and the specific requirements and condition of poor communities, the development of products often include the engagement of poor people to understand consumer habits and needs. This requires a favourable environment where innovators and entrepreneurs may learn as they go along and has as a prerequisite favourable regulatory environment that allows for instance for new uses of ICTs to deliver services or in the case of healthcare possibly to dispense medications in a new way or store sensitive information in databases. For instance the success of MPesa¹ in Kenya was largely due to a favourable regulatory environment that allowed for this type of service development [21], [22]. Success in the base of the pyramid has shown that existing infrastructure has proven to be crucial to allow for achieving scale as this may assist in overcoming obstacles which may include delivery networks, ICT platform technologies, knowledge sources and databases of data and information [22].

A key driver of achieving scale with these projects are however often due to private entrepreneurial initiative and for-profit business models that ensure incentive on the side of the entrepreneur to expand business activities. These business models are essential for successful long term growth

¹ M-Pesa (M for mobile, pesa is Swahili for money) is a mobile phone-based money transfer, financing and microfinancing service, launched in 2007 by Vodafone for Safaricom and Vodacom, the largest mobile network operators in Kenya and Tanzania.

strategies that create new market based opportunities. They seek to eliminate market inefficiencies, solidify supply chains and build future brand loyalty [23].

A range of business model innovation has been implemented in India which has shown some real successes, especially in the financial sector and areas through which the world's poor may gain the ability to procure goods or services. Providing the poor with access to credit savings and insurance proved to boost their purchasing power. These may include purchasing models such as pay as you go (users pay small amounts instead of long term contracts and high costs), tiered pricing (high income users cross subsidise lower income users), microleasing (customers procure rights to use not ownership) and chain financing (access to financial solutions) [22], [23].

Product and service innovations such as no frills offerings also provide the poor with products that are very specific in what is truly necessary and valuable for them. The process of integrating the poor in the development of innovations has taken place through soft networks where community networks and knowledge is leveraged and has been used to address low demand due to limited access to information.

Supply chain innovations such as deskilling and standardisation has been powerful in integrating the poor in supply chains by dividing processes into simple tasks that can be performed by power skilled workers while highly skilled workers developed the more complicated tasks and process. Market based approaches to inclusive innovation aims to include and leverage the poor and give them access to markets [22], [23].

Although no formally accepted definition for a business model exists, a wide range of authors have attempted to define and unpack the core elements of such models. Morris et al [24] developed an in-depth review of more than 30 definitions and breaks it down to three major levels namely economics, operations and strategy.

An inclusive innovation is considered to be successful if it manages to reach a large segment of those living in poverty. While inclusive innovation healthcare is made up of distinct phases and stages in which attaining scale is a dynamic process that calls for deliberate action and opportunity. Scaling up refers to the progression from serving the first customer in service, to a state of serving multiple customers in a sustainable way. This is facilitated through ideas that formalize and commercialize the inclusive innovation through business models and the participation of the poor. Attaining scale means that an inclusive innovation has been able to grow its demographic reach or has managed to replicate itself. It ensures that market based solutions reach the poor communities they are intended to serve. Offering a wider range of services, replicating the innovation in a new area and increasing the number of people served, are some of the strategies that inclusive innovations in healthcare make use of so that they can attain scale [25], [26], [22].

Reaching scale is challenging for any enterprise, and even more challenging for businesses that engage with poor

communities in a sustainable way. A number of hindrances exist for inclusive healthcare organisations that are aspiring to attain scale in South Africa. The income levels of a large segment of the population are still low, obstructing citizens from reaping the full advantages of healthcare innovations and new technologies. Inclusive innovation healthcare organisations still lack adequate knowledge on the needs of poor populations. The infrastructure and distribution channels in poor communities are inefficient, making it costly for inclusive healthcare organisations to serve poor customers [13].

Pathways to scale comprise of both private and public sector channels. Some of the successful models of scaling are through organizational growth, social impact investment, franchising of business models, public private partnerships (PPP's) and public procurement [22]. Furthermore. Policies play a critical role in releasing untapped potential of inclusive healthcare innovations, addressing some of the challenges that are the cause of constrained development and limited scale. Possible areas for policy support include endeavours to connect the diverse actors in inclusive innovation like research institutes, universities, the private sector, financial institutions and non-governmental organisations. Access to capital for inclusive innovations are still insufficient, hence policies aimed at easing financial constraints are important. Moreover, providing infrastructure, technology access to knowledge and technical expertise are some of the key tools that can be used to transform inclusive healthcare innovations [22].

B. A review of inclusive business model frameworks

A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It integrates the internal aspects of an organisation that converts technological characteristics through to products and offerings [27]–[29]. The business model is perceived as a device that mediates between economic value creation and technology development [30]. Business models of Inclusive innovation are more distinctive. They seek to benefit poor communities by including them into a company's value chain. This is done by bringing communities into the formal economy as clients and consumers on the demand side or on the supply side as producers, employees or entrepreneurs in a sustainable way (UN, 2008).

Formulating business models is essential for successful long-term growth strategies that create new market based opportunities, eliminating market inefficiencies, solidifying supply chains and building future brand loyalty [23]. An effective business model can unlock latent value from innovations, here the concept of value creation refers to a process whereby a company produces or facilitates what is essential to the customer and allows the company to achieve its goals whether it is for profit or social contribution. The value proposition portrays that which the business promised to give to its clients.

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TABLE 1: SUMMARY OF BUSINESS MODEL FRAMEWORK COMPONENTS

Existing frameworks (Chapter 2)	Elements included in the framework	Context in which the framework has been applied	Main advantages/Merits of the framework	Weaknesses
Four A's of Inclusive Innovation [31]	<ul style="list-style-type: none"> • Acceptance • Awareness • Availability • Affordability 	<ul style="list-style-type: none"> • It was proposed by Anderson (2007) as a framework that could be used for tackling common challenges that are encountered when serving the BoP market from our case study analysis. • It has been used to guide efforts for adoption improvement and spreading of inclusive innovation in agriculture, healthcare, distribution and other challenges in the BoP. 	<ul style="list-style-type: none"> • Provides a convenient framework for identifying and tackling common challenges that are encountered when serving the BoP market • It's a simple four-dimensional framework that can help a business position itself well in the BoP market. • The 4A's have proven to be an effective framework to capture insights from case studies. • Provides the parameters that an organization must satisfy to enter the BoP market. It is also customer focused. 	<ul style="list-style-type: none"> • It does not clearly address key issues like value propositions and growth strategies for an inclusive innovation.
Chesbrough's Business Model [32], [33]	<ul style="list-style-type: none"> • Value proposition • Market segments • Revenue model • Growth strategies • Competitive strategy • Value chain segments 	<ul style="list-style-type: none"> • The model was developed in order to explore the role of a business model in capturing value from technology. It focused on examining the transformations of spinoff companies that emerged from Xerox PARC. • The business model is perceived as a focusing device that intermediates between technology development and economic value creation. 	<ul style="list-style-type: none"> • Gives key insight into business model elements that enables business processes to capture value from innovations. • The business model presents a coherent framework that takes technological characteristics and potentials as inputs, and converts them onto economic inputs through customers and markets. 	<ul style="list-style-type: none"> • The business model does not give in-depth information on how one can apply it .It only provides definitions of its components. • Focuses mainly on the revenue model.
Osterwalder's Business Model Canvas [34], [35]	<ul style="list-style-type: none"> • Value proposition • Target customer • Distribution channel • Customer interface • Value configuration • Capability • Partnership • Cost structure • Revenue model 	<ul style="list-style-type: none"> • The Business Model Canvas was designed to give organizations an ability to generate and conceptualize the model of their enterprise and analyses the models of competitors. • It has been used to evaluate inclusive businesses in different sectors in ICT, artisanal goods, health care, consumer products, farming, and so on. This was done using it as it is or in a modified format that allowed it to suit the target segment in conjunction with case studies. 	<ul style="list-style-type: none"> • Makes it easier to comprehend how the various components of a business relate to and affect each other. • Seeks to simplify the visualization of key components. This, enables practitioners to have a visual framework that they can use. 	<ul style="list-style-type: none"> • Some components need to be altered so that the business model canvass can suit low income communities. • The limitation of Osterwalder's Business Model Canvas is that it only depicts the system of commercial value creation.
Yunus Business Model Framework [36]	<ul style="list-style-type: none"> • Value proposition • Value constellation • Economic profit equation • Social profit equation 	<ul style="list-style-type: none"> • It was developed after a realisation that Grameen (an innovative bank for the poor involved in financing small inclusive innovation businesses in Bangladesh), could not simply depend on replicating orthodox for-profit business models. Alternative business model elements had to be formulated. • Has been used in evaluating social inclusive innovations. 	<ul style="list-style-type: none"> • Features two systems of value creation, the financial business model and the social business in addition to the value creation model. • Offers a new business model where stakeholders replace shareholders for value maximization. • Facilitates an analysis that focuses on the specific features and innovations relating to the revenue management model, the model of governance and the social impact of inclusive businesses which traditional models are not able to capture. 	<ul style="list-style-type: none"> • Does not provide visualization of key components which aids practitioners to have a visual framework they can use.

We considered four inclusive innovation business model frameworks that are linked to inclusive innovations in literature. A business model framework can be used to describe a business and to facilitate analytical studies. They can also be used to describe how a firm operates or how it functions. The analysis of business model frameworks from academic literature shows that each model is comprised of different elements.

Table 1 identifies the key elements of four business model frameworks considered for the purpose of this study, the context in which the framework was used in as well as the strengths and weaknesses of each framework. Three common elements that were found in each framework are the product or service which has been proposed to customers, the organization of an enterprise that enables it to deliver a product or service to its customers, and the revenue model.

V. THE FRAMEWORK

This section introduces the channels through which inclusive innovation healthcare is delivered. In order to facilitate the assessment of organisations operating in inclusive innovations in the Western Cape, the four business framework which were discussed in in the previous section are evaluated. The most suitable business model framework for evaluating inclusive healthcare organisations is identified with respect to five elements that were considered essential in the evaluation of an inclusive innovation healthcare business.

In order to select an appropriate framework for analysing scaling challenges for inclusive innovation programmes in the healthcare sector, it makes sense to firstly consider the range of delivery channels through which inclusive healthcare innovations can be delivered. Table 2 outlines four main channels that are considered for the purpose of this

study namely: networked devices and technologies, innovative devices and consumables, primary care delivery and outreach, as well as secondary and tertiary care hospitals [23].

The four frameworks that were introduced in the literature were assessed to provide answers to understand scaling challenges for such projects. A synopsis of the frameworks is carried out to identify the strengths and weakness of each model. These are then analysed and a fitting framework was identified.

To evaluate an inclusive healthcare innovation business, the following aspects are essential in a business model framework:

- Element 1: Applicability to the inclusive healthcare innovations environment
- Element 2: Champions social contribution
- Element 3: Can provide guidance for scaling inclusive healthcare innovations
- Element 4: Facilitates analysis of business challenges in inclusive healthcare organisations
- Element 5: Unpacks how the inclusive healthcare innovation creates value, generates income and how it distributes this value

These five aspects were considered as the elements that are required in a business model framework that will be used to evaluate and unpack inclusive healthcare innovations in this project. Grounded within these insights, the researcher proposes that Yunus’s business model framework, be chosen for use in this research over its counterparts. The framework facilitates understanding of dual value creation through its commercial and social value propositions (see Table 3).

TABLE 2: FOUR HEALTHCARE DELIVERY CHANNELS

Channel	Description
Networked devices and technologies	<ul style="list-style-type: none"> • Technological medical devices that performs diagnostic tests and make use of ICT networks for healthcare provision • Information systems and software’s for service delivery players such as hospitals, clinics etc.
Innovative devices and consumables	<ul style="list-style-type: none"> • Frugal innovations and healthcare products Innovative low-cost diagnostics and therapeutic devices not dependent on technology/information networks or infrastructure/skilled caregivers.
Primary care delivery and outreach	<ul style="list-style-type: none"> • First contact care providers, located close to patients focus mainly on promotive-preventive care, health education, basic curative care.
Secondary and tertiary care hospitals	<ul style="list-style-type: none"> • Hospital chains focusing on in-patient care provide diagnostic tests and treatment, including surgical procedures across multiple specialties.

TABLE 3: EVALUATION OF BUSINESS MODEL FRAMEWORKS

	Element 1	Element 2	Element 3	Element 4	Element 5
Four A’s of Inclusive Innovation	Yes	No	Yes	Yes	No
Chesbrough’s Business Model	Yes	No	No	No	Yes
Osterwalder’s Business Model Canvass	Yes	No	Yes	No	Yes
Yunus Business Model Framework	Yes	Yes	Yes	Yes	Yes

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TABLE 4: THEORETICAL ISSUES FOR EACH DELIVERY CHANNEL AS PER YUNUS BUSINESS MODEL FRAMEWORK [36]

	Delivery Channel 1	Delivery Channel 2	Delivery Channel 3	Delivery Channel 4
Value proposition	Innovative ways through which primary healthcare is delivered.	The quality, efficiency, and constraints that exist in delivering secondary healthcare services.	What the organisation offers, and why is it considered as an innovation.	What the organisation offers, and why is it considered as an innovation.
Economic profit equation	Funding issues (working capital), revenues and cost structure.	Cost structure, revenue model, partnership networks.	Payment models, cost structure, stakeholders, profits generated.	Payment models, cost structure, stakeholders, profits generated.
Value constellation	Factors that facilitate delivery of primary healthcare e.g. logistics and supply chains.	Availability of infrastructure, skilled personnel, technology, information and other support structures.	Market information and awareness of networked devices and technologies supply chains and government policies.	Infrastructure, distribution networks power supplies, awareness government policies and technical skills.
Social profit equation	Provision of quality primary healthcare and attainment of scale.	Benefits that the inclusive innovation brings to the community and how this can be enhanced and scale issues.	Target segment to be served, the benefits that will be reaped by the poor and scale issues.	Target segment to be served, the benefits that will be reaped by the poor and scale issues.

Table 4 maps out the theoretical issues in line with each element of Yunus's business model for each inclusive healthcare delivery channel. This provides a foundation for the assessment of the business models of the organisations to be selected for case studies. Issues considered essential for each delivery channel were unpacked.

VI. METHODOLOGY

The literature review introduced and discussed a number of business model frameworks that can be used to unpack and understand the greatest barriers to growth and scaling of inclusive businesses.

Data was collected from 4 selected inclusive healthcare organisations operating in the Western Cape Province of South Africa. Care was taken to select a range of projects across different delivery channels namely primary and secondary and tertiary care, networked solutions and medical devices. The case studies were developed through a secondary research phase where online resources were consulted regarding these projects and their suitability and appropriate definition as inclusive businesses.

Interview questionnaires were developed from the adopted business model framework proposed in the framework development section of the paper. The specific questions to be asked were developed from knowledge gaps identified from the data that was obtained from websites. Interviews were administered and provided a clearer understanding to the specifics of the business models but also, the growth barriers faced by these businesses.

TABLE 5: EVALUATION OF BUSINESS MODEL FRAMEWORKS

Models	Case study
Networked devices and technologies	Powerfree Education Technology
Innovative devices and consumables	Medical Diagnostech
Primary care delivery and outreach	Unjani clinics
Secondary and tertiary care hospitals	Broad reach Healthcare down referral model

VII. ANALYSIS

The previous chapter articulated the research design and methodology that was used in analysing the chosen four illustrative cases for inclusive healthcare innovations, under the auspices of Yunus's business model framework. The case analysis allowed the identification of the main characteristics of each of the inclusive healthcare innovation channels and their business models. This section provides brief description of the case studies and then concludes with highlights of the findings of the case studies specifically unpacking business models and highlighting key scaling-related challenges.

A. Case study 1: Unjani clinics

Unjani Clinics provide quality primary healthcare services to poor communities at an affordable price. They run a fee-based service to ensure that the business is sustainable and make use of women in communities to run the clinic. Much emphasis is placed on the provision of basic services in these clinics with running water, a reception area, examination facilities, a toilet and a medicine dispensary. The clinic is owned by a registered nurse and administrative person.

The model is a for-profit franchising model where the Imperial Health Services (HIS) and partners provide start-up and growth capital. The nurse is a business owner expected to pay back the R300 000 that it costs to set up the clinic. Recent financial reports show that the clinics have been able to realise an overall positive revenue which has enabled them to pay for their overhead expenses. The model's success is proven in the statistics or numbers of patients that they see and the impact they have made in these patients lives.

Scaling is taking place as the services offered by the clinic has expanded from primary services to also include eye wear. This illustrates the bundling of services for increasing revenue streams offered through such a clinic and to make the overheads and the business model more sustainable. The program currently operates out of 7 outlets and it has managed to scale up through providing a wider range of services.

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TABLE 6: UNJANI CLINIC'S BUSINESS COMPONENTS AND SCALING CHALLENGES

	Business model components	Identified scaling related challenges
Value proposition	<ul style="list-style-type: none"> Provision of low-cost primary care out of shipping containers with state-of-the-art equipment and well-trained personnel Bundling of primary care services, over the counter medicines and eye ware Franchising model, ownership of clinic to certified nurse 	<ul style="list-style-type: none"> Lack of trained staff and managerial skills Lack of investment to improve service delivery Lack of skilled workers ,with professionals only volunteering when they have time
Value constellation	<ul style="list-style-type: none"> Challenges remain to affordability and to sustainably allow professional nurses to own and operate the business. Large logistics company is the major partner and funds the construction of clinics but owners repay investment over 5 year period; Another partner, Vision Spring, also sells eyewear and vision screenings in clinics. 	<ul style="list-style-type: none"> Shortage of trained staff Limited only to a certain degree of healthcare provision Delays in payment negatively affects procurement Lack of data and market intelligence Weak infrastructure and facilities negatively impact on quality of service
Economic profit equation	<ul style="list-style-type: none"> For-profit model ensure the sustainability of the delivery of services at clinics while the costs of building clinics is borne by nurses that own the clinic. Multiple revenue streams through eye wear, over the counter drugs and eye wear. Costs are capped for consultations and treatment. 	<ul style="list-style-type: none"> Shortage of trained staff Limited only to a certain degree of healthcare provision Delays in payment negatively affects procurement Lack of data and market intelligence Weak infrastructure and facilities negatively impact on quality of service
Social profit equation	<ul style="list-style-type: none"> Individuals that fall in the 20% to 40% per capita earnings in South Africa; primary care. 	<ul style="list-style-type: none"> Slow expansion Restricted delivery of services by untrained personnel

TABLE 7: MEDICAL DIAGNOSTECH'S BUSINESS COMPONENTS AND SCALING CHALLENGES

	Business model components	Identified scaling related challenges
Value proposition	<ul style="list-style-type: none"> Provision of low cost quality, high sensitivity diagnostic kits for, pregnancy, drug abuse and malaria. Distribution selling products on behalf of the company worldwide. Costs are cheaper relative to other diagnostic equipment in the market. Effective innovative devices are superior in sensitivity. 	<ul style="list-style-type: none"> Acceptance of the devices, as patients and other small clinics prefer the ones they are used to. Lack of committed partners. Economic downturn resulted in a decline in revenues from private funders. Healthcare providers as well patients require time to get to trust the products, hence product diffusion and acceptance takes longer.
Value constellation	<ul style="list-style-type: none"> Challenges remain of influx of cheaper kits from foreign destinations. There is need for government to regulate imports that render. local products less competitive. Local government structures like SEDA have helped the company in accreditation. 	<ul style="list-style-type: none"> Co-ordination of distribution and sourcing can be a challenge in ensuring that the right components and products are readily available. Fluctuations in product prices globally affect organisation's profitability and value position. Crucial role for public procurement to stimulate growth in this sector but stifled through complex procurement procedures.
Economic profit equation	<ul style="list-style-type: none"> For profit model. Multiple revenue streams, mainly through sales of devices. 	<ul style="list-style-type: none"> Inability of government to protect local products. Heavy taxes on innovative companies that are still growing.
Social profit equation	<ul style="list-style-type: none"> Populations living in remote settlements and peri-urban communities that fall in the 20% to 40% per capita earnings in South Africa. 	<ul style="list-style-type: none"> Lack of awareness and poor marketing of the products results in them making less impact in the market. Association of low price with poor quality leads to low acceptance rates.

There has been an increase in patient volumes, signalling growth in operations. Entrepreneurial behaviour by nurses through actively considering additional revenue streams have also bolstered the cash flow of these clinics through the selling of over the counter drugs. The long term vision is to replicate the clinics in other countries.

Table 6 provides a summary of the business model components that were uncovered through the primary research phase.

B. Case study 2: Medical Diagnostech

Medical Diagnostech is a Cape Town based manufacturer of low cost, quality, high sensitivity diagnostic kits for pregnancy, drug abuse and malaria. The devices are aimed

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meant to be affordable, easy to use accessible for low income communities that are faced with malaria or drug abuse. Other kits are used for pregnancy, HIV and fertility tests.

The company operates on a for-profit basis, thus its revenue is generated from sales. Malaria test kits are sold through distributors both locally and in 25 countries. For over five years Medical Diagnostech has been successfully providing companies with quality products. The use of innovative technologies has facilitated the superiority in sensitivity, specificity and stability of the testing kits compared to other kits that are still in use.

Some of the company's partners include the Small Enterprise Development Agency (SEDA) which helped it to facilitate the accreditation of the company and assisted the company to expand. The company has managed to scale through increasing the number of products distributed and also through a network of distributors.

Table 7 now unpacks Medical Diagnostech's business components and scaling challenges.

C. Case study 3: BroadReach Healthcare down Referral Model

Broad Reach Healthcare's Down Referral Model is an innovative healthcare system that reduces the reliance on the overstretched public healthcare through leveraging on the existing capacity in the private sector in treating people living with HIV/AIDS patients.

Patients are initiated at a public healthcare facility, the Wellness Centre, where they are stabilized for six months. Stable patients are identified daily and referred to a private

clinic on government-funded treatment, based on geographic convenience of the patient. Drug adherence is enhanced through workshops, home visits adherence counsellors, SMS reminders and support groups. General practitioners are given training and mentoring so that they can take care of the needs of their patients. HIV-positive peer educators and speakers are also employed. This encourages patients to take part in training programmes as well to adherer to their medication.

BroadReach Healthcare down Referral Model works in conjunction with the Department of Health to conduct the referral of patients from hospitals into the programme. This ensures continued feeding from clinics through the national Nurse Initiated Management of ART platform. Quality of care is monitored by Aid for AIDS, the largest Disease Management Organization (DMO) in South Africa.

The program is primarily funded by donors and in kind contributions from the President's Emergency Plan for AIDS Relief (PEPFAR), under USAID. The department of Health (DOH) and USAID have been assisting in covering the incurred operational costs of the BroadReach Healthcare down Referral Model so far. The partnership with department of health has ensured sustainability of the model. The cost per patient per month is currently R646, which is lower than the cost per patient per month in the primary health care clinic model of R724. The Number of outlets involved has increased to 35 across the country, employing at least 49 personnel.

Table 8 unpacks BroadReach Healthcare down Referral Model's business components by applying Yunus's business model framework.

TABLE 8: BROADREACH HEALTHCARE'S BUSINESS COMPONENTS AND SCALING CHALLENGES

	Business model components	Identified scaling related challenges
Value proposition	<ul style="list-style-type: none"> Innovative healthcare system that reduces the reliance on the overstretched public healthcare through leveraging the existing capacity in the private sector. Drug adherence enhancement through workshops, home visits, adherence counsellors, SMS reminders and support groups. Operational costs are covered by the Department of Health South Africa and USAID. 	<ul style="list-style-type: none"> Reliance on government and donor funding. Difficulties to attract skilled individuals due to lower pay scales. Lack of skilled workforce. High volumes of patients. Lack of information on the patients and facilities.
Value constellation	<ul style="list-style-type: none"> The government provides the necessary financial support. They work in conjunction with the Department of Health to conduct the referral of patients from hospitals into the programme. 	<ul style="list-style-type: none"> Referral linkages depend on public system. Limited investor interest in public secondary and tertiary hospitals. Poor policies.
Economic profit equation	<ul style="list-style-type: none"> Non-profit model primarily funded by donors and in kind contributions from the President's Emergency Plan for AIDS Relief. Economic downturn resulted in a decline in revenue from private funders. 	<ul style="list-style-type: none"> Lack of awareness. Low paying capacity of patients. High costs of equipment and maintenance services.
Social profit equation	<ul style="list-style-type: none"> Individuals that fall in the 20% to 40% per capita earnings in South Africa; primary care. Men and women living in remote settlements and peri-urban communities which a special focus on HIV/AIDS, Tuberculosis and non-communicable diseases. 	<ul style="list-style-type: none"> Strict regulations required before a hospital can be set up hospitals. Poor connectivity limited access to patients to hospitals.

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TABLE 9: POWERFREE EDUCATION TECHNOLOGY BUSINESS MODEL COMPONENTS AND SCALING CHALLENGES

	Business model components	Identified scaling related challenges
Value proposition	<ul style="list-style-type: none"> Innovative technological devices and teaching tools that help to improve maternal survival and healthcare of newly born and unborn babies in developing counties. Low-cost, power independent and robust medical devices and learning material that help in making life saving decisions. 	<ul style="list-style-type: none"> Lack of visibility in the distribution channels, coupled with infrastructure deficiencies especially in the rural communities. It is difficult to sell or give away devices at a lower price should they not be subsidised by NGO's or government. Unavailability of subsidies and protection by government.
Value constellation	<ul style="list-style-type: none"> Funding is a major issue, with the organisation not benefiting anything in terms of returns. This led PET to partner with Philips technologies. Awareness of the technology. Prices are high for small clinics. 	<ul style="list-style-type: none"> It is expensive to produce the devices, e.g. in the case of PET, where the medical devices are not manufactured locally. Some of the devices are not produced locally which creates logistics problems at times. Theft and vandalism of technological devices.
Economic profit equation	<ul style="list-style-type: none"> Not for profit. Medical facilities cover costs of devices. Funding from donors cushion funding shortfalls up to 50-60% of total costs. Mostly NGOs, grants from technology companies and meagre sales. 	<ul style="list-style-type: none"> Meagre returns from medical devices. The companies have to rely more on donor funding. Some parts of the county do not have power and telecommunication networks are bad, making it difficult to use technological medical devices in times of need.
Social profit equation	<ul style="list-style-type: none"> Pregnant mothers and children under the age of five. Bottom 20% of per capita earnings in low- and middle-income countries. 	<ul style="list-style-type: none"> Prices are high for small clinics. Resistance to adapt to new technology due to lack of awareness and misconceptions by the patients. Lack of awareness of the technology.

D. Case study 4: Powerfree Education Technology

Powerfree Education Technology is an organisation that mitigates the healthcare delivery gap through developing innovative technological devices and teaching tools that help to improve maternal survival and healthcare of newly born and unborn babies in developing counties. The company lobby's for the development of low-cost, power independent and robust medical devices and learning material that help in making life saving decisions. They offer remote diagnostic tool devices such as the Foetal heart rate monitor, and the Pulse Oximeter. These products are affordable, energy independent and durable. The price for the devices in developing countries is nearly \$200 per device, without a change in the quality of the product.

PET operates not for profit however health facilities pay for the medical devices to ensure that the project is sustainable. However revenues obtained from sales are meagre in comparison to the total operational costs that are incurred by PET. This deficit is cushioned by funding from donors. At present, donors fund between fifty to sixty percent of the overall cost of the technological devices. The Grand Challenges Canada, Bill & Melinda Gates Foundation and Save the Children are also involved.

PET has created key relationships with healthcare professionals from Wales and India who manufacture their equipment. They also have a partnership with Philips Healthcare that seeks to facilitate the expansion of its distribution to other countries as well as in commercializing the innovative Foetal Heart rate monitor. The partnership is also considered to lower production costs whilst maintaining high product quality. This will enable the devices to reach the disadvantaged communities across Africa (Alan, 2014). Table 9 outlines the business model components and scaling challenges for Powerfree Education Technology.

VIII. CONCLUSION

Through assessing the strength and weakness of four business model frameworks, Yunus's business model framework was adopted to guide an analysis of inclusive innovation healthcare businesses. It was then used to identify how inclusive healthcare organisations operates in each of the four identified healthcare delivery channels.

Yunus's business model explored the four organization's value propositions, market segment, distribution, governance, value chain, partner network and economic features by means of exploratory case studies. The perceived challenges to scale were identified for each inclusive innovation healthcare channel at value proposition level, value constellation level, economic profit equation level and social profit equation level. These challenges that face inclusive innovation healthcare organisations are summarised in Table 10 with respect to each healthcare delivery channel.

A number of challenges that impede growth and scalability of inclusive innovation healthcare organizations that operate for profit or not for profit were identified from the case studies and secondary sources in literature. Options for addressing these challenges were generated from these challenges through divergence and convergence tools. Divergence stimulates new thinking by exploring and it helped in arriving at relevant ideas. What-if analysis and brainstorming techniques were used for idea generation. Convergence then refined and filtered ideas for final selection. The COCD box canvas was used to facilitate convergence of ideas. Typical Questions for further research were also suggested. In Table 10, each challenge is linked with the corresponding strategy by its numbering, for instance challenge 1 in the primary delivery and outreach channel is addressed strategy 1 in the strategies column. The recommendations are based on the research results and were formulated such that they can be adopted for use in the field.

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TABLE 10: CONCLUSIONS OF SCALING CHALLENGES AND STRATEGIES OF THE FOUR DELIVERY CHANNELS FOR INCLUSIVE HEALTHCARE BUSINESSES

	General challenges per channel	Strategy for addressing challenges
Primary care delivery and outreach	<ol style="list-style-type: none"> 1. Lack of managerial skills on the personnel manning some primary healthcare initiatives 2. Low remuneration and difficult work conditions are obstacles in attracting the scarce medical personnel 3. Stunted capital for growth 4. Unavailability of well-trained medical personnel 5. Poverty limits the paying ability of the patients resulting in delays in payments 6. A few investors are interested in primary healthcare organisations 7. Insufficient awareness for primary or preventive healthcare services 8. Weak infrastructure in poor communities 9. Lack of market intelligence and information on primary care industry. 	<ol style="list-style-type: none"> 1. Draw on abundant low skilled human resources for other hospital operations 2. Offer incentives to healthcare personnel working in under developed areas 3. Create alliances with local organisations, financial institutions NGO's, Government and other stakeholders who can assist financially or through other key areas like research. 4. Facilitate mentorship and strategic advisory services to local healthcare practitioners 5. Offer substitute payment methods such as instalments 6. Create awareness campaigns that enable people to know the offering of the primary healthcare provider 7. Increase availability of human resources for health and build relationships with community leaders 8. Substitute physical distribution with technology. Make use of readily available technology like mobile phones and leverage cheaper modes of transport carts, scooters and motorcycles to enhance transport efficiency 9. Partner with community leaders, youths, women's groups in awareness campaigns
Secondary and tertiary care hospitals	<ol style="list-style-type: none"> 1. There is a need for large patient volumes for viability of for-profit models 2. Continual dependence on government support makes the business model vulnerable to changes in policies 3. Lack of managerial skills on the personnel manning some primary healthcare initiatives 4. Unavailability of well-trained medical personnel 5. Weak or none existent referral linkages between public and private primary healthcare providers 6. Unavailability of low-cost, high-quality medical equipment. Maintenance services are also expensive. 7. Non-existent market information and learning from other successful models that have managed to attain scale 8. Poor infrastructure, remuneration and a supportive environment hinders attraction and retention of healthcare personnel 	<ol style="list-style-type: none"> 1. Establish relationships with smaller local clinics and home based care initiatives. This will create a large pool of patients 2. Establish partnerships with NGO's, Companies Universities and other stakeholders who will partner with the institution financially or in other key areas 3. Train and equip staff appropriately 4. Draw on abundant low skilled human resources for other hospital operations 5. Offer shared access models with the local communities 6. Enable micro- financing or instalment payments platforms for the patients and engage the government to ease of importing medical equipment that is not produced locally, at a cheaper price 7. Create awareness campaigns that enable people to know the offering of the primary healthcare provider 8. Offer incentives to healthcare personnel working in under developed areas
Networked devices and technologies	<ol style="list-style-type: none"> 1. Non-existent market information and learning from other successful models that have managed to attain scale 2. Lack of awareness of the benefits of innovative products in the market 3. To attain viability, low-cost products require high purchase volumes to attain viability of for-profit models, which is difficult in the BOP that are operating for –profit to penetrate the market 4. High investments are required for research and development and manufacturing and maintenance of technology devices 	<ol style="list-style-type: none"> 1. Establish relationships with other organisations so that experiences in overcoming challenges can be shared. Also establish a relationship with the customers - it facilitates better understanding of their needs and preferences 2. Use educational programmes and social marketing campaigns to market the devices 3. Enable micro- financing or instalment payments platforms for end users(Provide Cheaper pricing models) 4. Build strategic partnerships that strengthen value chains through addressing demand and supply challenges. Create effective distribution networks as well into third party distribution networks e.g. MFI's, NGO's and so on
Innovative devices and consumables	<ol style="list-style-type: none"> 1. Inertia and resistance by healthcare personnel as well as the patients 2. Lack of awareness and acceptance of new innovative technology solutions by patients 3. Unreliable telecommunications networks and electricity supply in poor communities hinder efficient use of the devices 4. Weak technical and managerial skills of distribution partners have a negative impact of the diffusion of the innovation 5. High investments are required for research and development and manufacturing and maintenance of technology devices 6. Lack of distribution robust networks and linkages with other critical partners in the health ecosystem 	<ol style="list-style-type: none"> 1. Have relationship with the end users for whom the products are being made 2. Use educational programmes and social marketing campaigns to market the devices 3. Asses the models of other operators who have managed to attain scale 4. Outsource distribution to other entrepreneurs or franchises in order to ease business operations 5. Build an ecosystem of entrepreneurs 6. Create effective distribution networks and invest in credible partners and suppliers

In conclusion, this research paper creates a platform for future research in inclusive Healthcare in South Africa by suggesting challenges and potential solutions to address these challenges. Although much has been done in terms of creating an understanding of how inclusive business models may function in the healthcare industry, much remains to be explored in terms of ensuring the true sustainability of these enterprises and – as was stressed in this paper – how these can be expanded to reach a larger groups of individuals. These need to be looked into further in order to develop insight especially into the benefit, outcome and impacts to communities and patients through these projects.

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