SIEMENS | Stiftung

Social Enterprises as Job Creators in Africa

The Potential of Social Enterprise to Provide Employment Opportunities in 12 African Countries 2020-2030

STUDY – PART III

Case Studies

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Deep Dive: Five Social Enterprise Case Studies

About This Study

This study was conducted and published by Siemens Stiftung. The project was funded by The Special Initiative on Training and Job Creation of the German Federal Ministry for Economic Cooperation and Development (BMZ), implemented among others by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Invest for Jobs

African countries increasingly offer attractive prospects for companies and investors: a young population, growing availability of workforce and skilled labor, rising purchasing power, new markets, and integration in global value chains. However, additional support is sometimes required to overcome local challenges and to leverage existing potential. With the Marshall Plan with Africa and the G20 "Compact with Africa" investment partnership as its starting point, BMZ has set itself the goal of supporting German, European, and African companies and investors in investment activities that have a high impact on employment in Africa. Under the brand Invest for Jobs, the Special Initiative offers advice from experts in Germany and Africa, contacts and financial support to overcome investment barriers. The objective in terms of development is to create good jobs and apprenticeships and to improve the working conditions in Côte d'Ivoire, Egypt (in preparation), Ethiopia, Ghana, Morocco, Rwanda, Senegal and Tunisia.
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Main Authors / Editing Partners

Emily Barran (Open Capital)
Dr. Aline Laucke (Studio Nima)
Leonhard Nima (Studio Nima)
Mukund Prasad (Intellecap Advisory Services)
Carola Schwank (Siemens Stiftung)

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Content:

I. Introduction

With social business models that are designed around impact creation and financial sustainability, social enterprises have been hailed as being particularly durable organizations. As such, they carry the potential of being providers of decent employment opportunities in areas that are often neglected by traditional commercial market players. However, knowledge about the actual job creation potential of social enterprises in Africa – and elsewhere in the world – remains very fragmented.

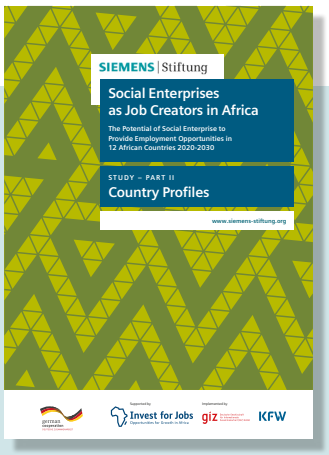
Commissioned by the Gesellschaft für Internationale Zusammenarbeit (GIZ), Siemens Stiftung has approached the task of identifying job creating as well as job inhibiting factors for social enterprises working in different country contexts. Overall, the results were used to derive specific recommendations for the development of technical and financial interventions that may significantly increase the number and the quality of jobs created by social enterprises in Africa.

This document features elaborated case studies of five social enterprises: MeshPower (Rwanda), Sesi Technologies (Ghana), Tebita Ambulance Prehospital Emergency Medical Services (Ethiopia), TakaTaka Solutions (Kenya) and WASHKing (Ghana). Together, the case studies belong to the database of the study "Social Enterprises as Job Creators in Africa", which has been published as a trilogy:

PART I

Main Report

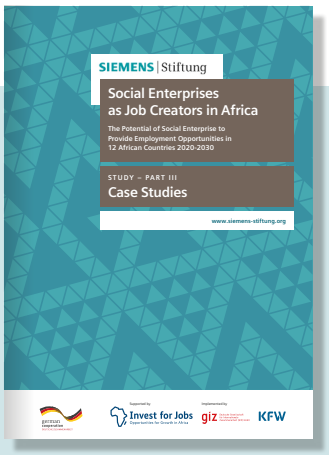
A main comprehensive document that contains the overall findings of the study about the job creation potential of social enterprises in Africa. This also includes the specific recommendations, as well as detailed elaborations about the approach and methodology that has been applied to conduct the study.



PART II

Country Profiles

A first satellite document with detailed country profiles that have been elaborated for the macro-level projections on social enterprises' job creation potential.



PART III

Case Studies

A second satellite document with five detailed case studies that provide a deep understanding of the job creating and job inhibiting factors that influence social enterprises' ability to create significantly more and better jobs.

We hope the case studies can inform players who seek detailed information about social enterprises, such as analysts, researchers, potential investors and local organizations or other stakeholders whose mission is related to the creation of decent jobs in Africa. For an embedded perspective on the case studies as part of the larger study, please refer to the main document (Part I).

II. Methodology and Approach

To further understand the job creating potential of social enterprises in Africa, five case studies on social enterprises spread across four countries in Africa were carried out. They covered investigations about the business model, the financial model including projections, and an analysis of the job creation potential of the five social enterprises.

The case studies were conducted in a three-pronged approach, including project planning and selection of social enterprise case studies (Phase I); the development of qualitative briefing documents including growth paths (Phase II); and the development of growth and job creation support models for social enterprises (Phase III). Based on this, the specific growth journeys and the potential of social enterprises to create more and better jobs could be analyzed in depth.

More detailed information about the methodology of the case study research can be found in the main document of this study (Part I).

The case studies analyze the growth and job creation potential of five social enterprises. Factors that promote and those that inhibit job creation are put forth.

Selection of Social Enterprise Case Studies

As described in in Chapter III of the Main Report, organizations that fit the definition of social enterprises in this study were sought in the focus countries. After discussions with potential participants for the study, five social enterprises qualified for the study and agreed to participate.

The case studies were conducted based on a research design with a predefined structure that allowed for cross-case comparison, but simultaneously enabled the researchers to account for the specific characteristics of social enterprises as well as the differentiated contexts in which they operate.

No.	Social enterprise	Geography	Case for social entrepreneurship
1.	**MeshPower**	**Rwanda**	MeshPower provides reliable off-grid solar AC/DC electricity at an affordable price in rural Rwanda. MeshPower installs solar mini grids and operate them on a sustainable basis. The enterprise has created decent job opportunities for its employees both in the cities as well as in rural areas. It further creates income generation opportunities by powering up the village economy to undertake value-added activities through provision of electricity and their usage for productive loads. MeshPower also provides cheaper DC electricity in a tiered pricing manner to accommodate those not able to afford it.
2.	**Sesi Technologies**	**Ghana**	Sesi Technologies is an agritech company that seeks to enhance farmers' income by reducing post-harvest losses. Sesi Technologies' key innovation is a moisture meter that enables farmers/processors/ aggregators to not only determine the quality of produce but also determine the best mode for storage to enhance shelf life. The enterprise employs nine full- and part-time employees.
3.	**TakaTaka Solutions**	**Kenya**	TakaTaka is a solid waste management enterprise that seeks to create value out of waste generated by households and commercial establishments. TakaTaka, through its waste management operation, aids reduction of environment pollution and aids in creating a circular economy. TakaTaka has created decent job opportunities for over 250 employees, many of them fall under the low skilled category.
4.	**Tebita Ambulance**	**Ethiopia**	Tebita Ambulance primarily provides emergency medical care services for people in Ethiopia. The enterprise operates a unique cross subsidization ambulance service model where it subsidizes the ambulance service cost for poor clients by providing high margin services to corporate/international clients. Tebita Ambulance has created decent job opportunities for over 50 employees.
5.	**WASHKing**	**Ghana**	WASHKing is an enterprise working in the sanitation sector and seeks to provide low cost, reliable, hygienic toilets to the underserved communities in Ghana. The enterprise constructs environmentally-safe biodigester toilets that have a lower water footprint. The enterprise employs 16 personnel including 13 sanitary artisans.

Figure 48:
Overview of case studies

III.

Case Studies

CASE STUDY 01

meshpower rwanda

MeshPower: Affordable Off-Grid Solar Electricity (Rwanda)

Analysis of MeshPower's business model

Company ownership and history

MeshPower is a renewable energy company that was founded in 2012 at the Imperial College, London and began its operations in Rwanda in 2014. It provides electricity as a service to rural households with the aim of connecting communities through clean energy. MeshPower does so through building and operating solar powered mini grid systems that provide electricity through AC/DC systems. It earns revenues through the sale of electricity, appliance financing, and internet access. MeshPower also provides internet connectivity through Wi-Fi hotspots and provides asset-financing services to its customers. Currently, MeshPower operates about 50 mini grid stations, scaled down from its initial 70 stations. The downsize was in response to a change in Government of Rwanda's rural electrification strategy. As some of the sites MeshPower operated in were featured in national grid coverage plans, those grids had to be closed down.

Value proposition

MeshPower has a competitive advantage among other players because of its continuous innovation and customer-centric model. It is one of the most successful companies in Rwanda that has developed solar DC mini grids, with connection fees much lower, in comparison, to the national grid. This allows MeshPower to offer competitive prices to its customers in a tiered pricing manner, depending on the customer's payment capacity. Customers can therefore select the package they prefer depending on their income levels. MeshPower has also developed AC and hybrid electricity systems that are smart metered, which allows customers to pay on a pay-as-you-go basis. Furthermore, MeshPower's expansion into value-added services, such as internet provision and appliance financing, give it an edge in the market.

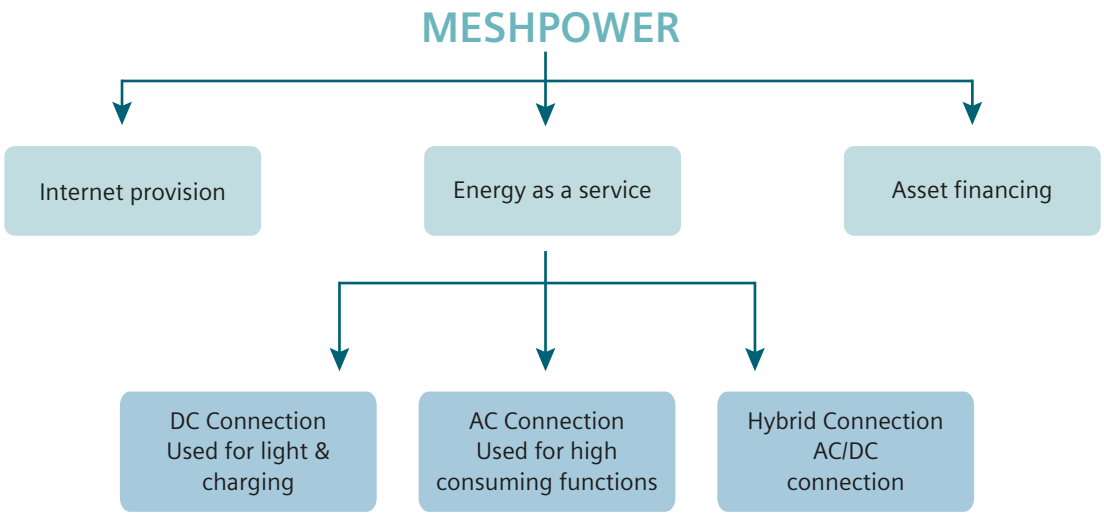


Figure 49:
Summary of MeshPower's service offering

Services offered

- **Energy as a service** is the main service provided by MeshPower. The enterprise provides electricity through a Direct Current (DC) connection, Alternate Current (AC) connection, or a hybrid connection. The DC connections provide power to a specific set of ports per household and the daily charges are calculated on a port basis. AC connections are metered and the customers pay based on actual usage on a pay-as-you-go model. Power line communications have been added to the distribution lines of the DC mini grids. This enables MeshPower to meter and control individual customers in a cost-effective way. The DC connections can also be integrated with 220V AC connections, creating a hybrid AC/DC grid. On such hybrid grids, AC connections power commercial activities and productive loads, while the DC connections are used for low electricity consumption needs such as powering bulbs. While adding AC increases the cost to the consumer, it enables the operation of higher wattage productive loads that can be used for economic activities such as sewing, shaving, irrigation, etc. Pricing and payment plans for electricity are as follows:
  - For DC connected customers: There is a fixed price per day depending on the package subscribed. For instance, a typical DC bundle provides six hours of high brightness light, unlimited low brightness light and USB charging for several phones.
  - For AC connected customers: Pricing is based on the electricity (kW/hr) consumed. The rate is dependent on the time of day and the plan subscribed to by the customer. Daytime usage is encouraged through provision of a cheaper rate for consumption due to the availability of solar energy. Different customer plans have limits on maximum power that can be consumed during the day and the maximum daily rates applicable. This helps the company to manage the peak load factor of the individual grids.
- **Internet connection:** MeshPower also provides low-cost internet connectivity through its distribution lines. This is a pilot project that is being financed through support from Microsoft. So far, sites that have been selected for testing include Gitaraga village in Bugesera district, which has a relatively larger number of high-income residents. The internet is provided at a competitive price in comparison to other service providers.
- **Asset financing:** With support from DOEN Foundation, MeshPower recently started an asset financing service for customers based on "rent-to-own" lease plans. Through this service, MeshPower provides appliances to customers with payment terms ranging from three to 12 months and collects payments on a regular basis for each appliance sold. The company has started its pilot with the sale and distribution of TVs.
- **Standalone solar system:** In 2018, MeshPower added a standalone solar system to its portfolio of service offerings. The company has completed custom installations at Lake Bunyoni, Uganda, Kigeme, Nyabiheke, and Mahama refugee camps in Rwanda, Buhanga in Rwanda, as well as two installations in the Northern Province. Standalone solar systems are a cost-effective way for development programs to electrify facilities in off-grid areas, adding value to beneficiaries and improving the quality of services in those areas. MeshPower standalone systems typically range from 3kW to 5kW in size, but can also be custom designed to customer needs after a site visit and load assessment.

Customer segments

MeshPower serves both B2C and B2B clients by providing electricity for lighting, charging, and for productive uses as summarized in the table below.

Target customer segmenst	Description
B2C customers	These are clients who are not covered by the national electrification grid and have low electricity consumption requirements.
	Some of these clients are small businesses that use electricity for productive uses. They include SMEs such as tailor shops and farmers, among others.
B2B customers	These include developmental partners and private industries who commission Meshpower for one-off installation projects dubbed 'single payer projects'. These clients are the largest revenue driver for Meshpower

Figure 50:
Customer segments of MeshPower

Other operational processes

- **Site Identification:** MeshPower conducts a feasibility study and identifies area/villages that are not connected by the national electrification grid, through data provided by the Rwanda Energy Group (REG). Once an area is assessed to have geographical optimization, community mobilization and education are conducted and sign-ups done. MeshPower requires a minimum of 70 interested households before they can roll out their micro grid establishment process.
- **Customer service:** MeshPower has two layers of customer service – the first level of service is provided by local agents, who are trained to be technicians and respond to primary issues faced by the customer. Furthermore, MeshPower has also established a call center that address customer queries and manages customer relationships. It has also established remote management systems that allow significant trouble-shooting to be done remotely.

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MeshPower's job creation impact

Job creation and human capital

MeshPower currently employs 52 permanent and contractual employees. These employees are spread out over management, local technician, and sales agent positions. Twelve employees are staffed in the main office, 11 are local technicians, and about 30 are sales agents. The role of the local technicians is to oversee the management of each site, while the sales agents assist customers with their daily top-ups to pay for energy consumption.

MeshPower's ability to directly create more job opportunities will be dependent on its ability to increase the number of mini grids it operates and manages. This will be dependent on the availability of patient capital. The graph below summarizes the total number of direct jobs that is linked to the growth of MeshPower.

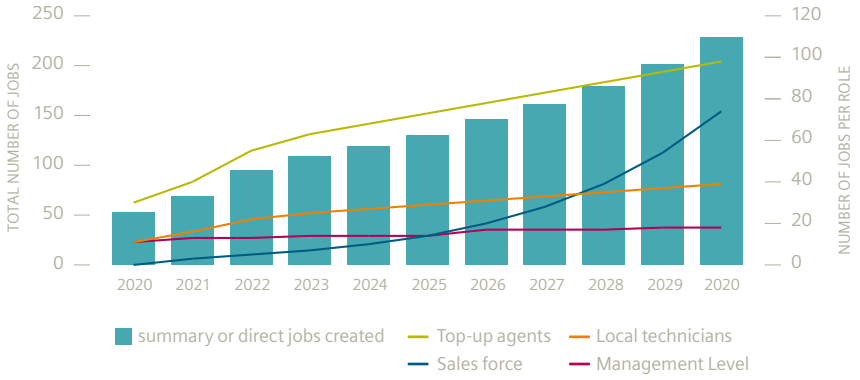

Figure 51:
Summary of projected number of direct jobs created by MeshPower

A key gap in MeshPower is the lack of a dedicated marketing team that can generate awareness and push sales. Pre-COVID, MeshPower was looking to hire a sales and marketing manager, which was put on hold at the onset of the pandemic. Further, MeshPower is aware of the need to create a sales team especially on the asset financing side. This sales team will need to have differentiated capabilities and would be required to push products into the market.

- **Challenges in recruitment and retention:** From a recruitment perspective, MeshPower faces challenges arising from the limited pool of qualified talent available in Rwanda and the demand for similar resources from bigger international players.
  - Competition for talent with international organizations: Quality talent available in the market is very limited especially at the management level. Furthermore, this limited pool is being tapped into by international organizations that offer lucrative salaries compared to what MeshPower can offer.
  - Accessibility to quality talent especially with technical experience is limited: Due to the education system in Rwanda, which encourages theoretical knowledge, most graduates lack the practical technical experience required for a role at MeshPower. As such, MeshPower is forced to hire based on basic education background and provide the necessary skill training on the ground.

From a retention perspective, MeshPower has lost talent due to closure of sites, competition, or due to staff members seeking to pursue higher education.

- Employee compensation and incentive structure: MeshPower's compensation package is competitive when compared to other solar companies. MeshPower fixes salaries of different levels based on discussions with HR recruiting firms to ensure that salaries offered are benchmarked to market rates. The composition of the salary is dependent on roles and responsibilities. MeshPower offers both monetary and non-monetary incentives including bonuses, travel allowances, workman's allowances, health insurance, pensions, and paid leave days.

Creation of indirect employment opportunities

Access to reliable, cost effective electricity is a key driver of economic growth and subsequently employment creation. MeshPower developed the solar-based hybrid AC/DC system, which can power higher productive commercial loads and thus has the potential to enhance economic growth and increase employment opportunities. Examples of productive uses can be in workshops for welding and carpentry. In the food sector, electricity can be used for refrigeration, drying of produce, and running commercial kitchens among others.

MeshPower's financial model and path to sustainability

Revenue projections

MeshPower's revenue streams comprises four components: a) Revenue from energy sales; b) Revenue from setting up a "single payer system" and service revenues; c) Revenue from appliance sale & financing; and d) Revenue from technical services, feasibility studies, and technical surveys. Among these, the sale of energy was the mainstay of MeshPower during the first two years. However, in 2018, MeshPower set up its first single payer AC system and, in 2019, revenue from this line of business had become the largest contributor to the company's annual revenue. While the value of each "single payer system" varies depending upon the capacity, on an average each "single payer system" can contribute about USD $50,000 revenue. Other revenues have also historically come from technical service assignments and sales of appliances. MeshPower believes that the sale of appliances could become a significant revenue stream in the future.

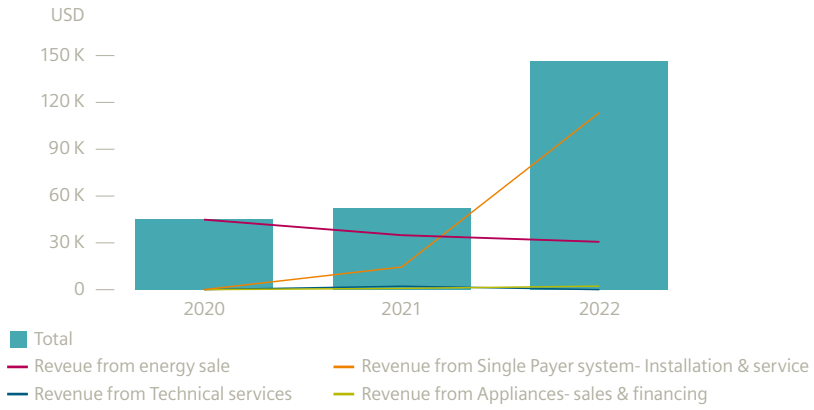

Figure 52:
Summary of historical revenue streams of MeshPower (USD)

In the future, MeshPower intends to focus more on installing AC mini grids. This shift in focus is in line with the national electrification plan of Rwanda, wherein the government is encouraging off-grid operators to install AC mini grids. It also continues to bank strongly on a "single payer system" to boost its future revenues.

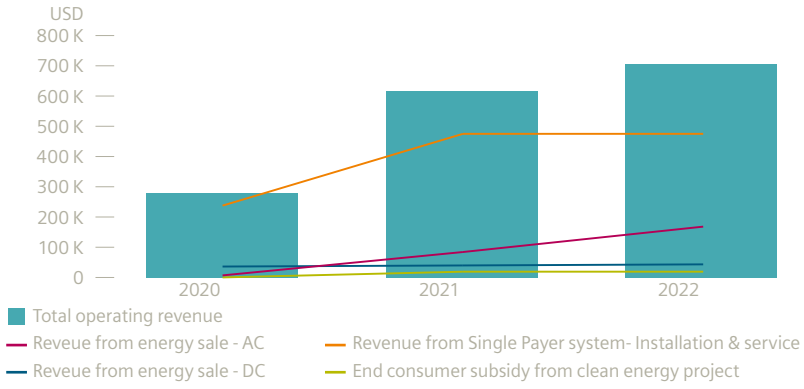

Figure 53:
Summary of future revenue streams of MeshPower (USD, 000s)

MeshPower's expenses and gross margins

Over the past three years, direct costs as a proportion of revenue have decreased and are expected to decrease further in the upcoming three years. The direct cost intensity for DC mini grids, AC mini grids, and single payer systems vary widely from one another. The individual customer operational direct cost for a DC micro grid covering 40 customers would be similar to the individual customer operational direct cost for AC microgrid covering 200 customers. However, margins are significantly better in the case of a single payer system.

The gross margins of MeshPower have improved substantially since it started executing a single payer system. On the other hand, the margins from DC and AC mini grids are dependent on capacity utilization. Additionally, since AC mini grids offer pay-as-you-use metered services, the margins for AC mini grids also depend on the consumption level of individual customers.

EBITDA margins took a hit in 2018 on account of a substantial increase in overhead. This was the period when MeshPower invested heavily in improving operational capacity in preparation for a significant scale-up effort. However, this scale up was not possible as the government off-grid plans changed. At the end of 2018, it was decided that a new operational model was necessary – one whose fortunes were not so dependent on government-controlled timelines. This resulted in a focus on single payer systems and a consequential increase in revenues. MeshPower is projecting EBIDTA margins to reach around 27-28% during the next three years.

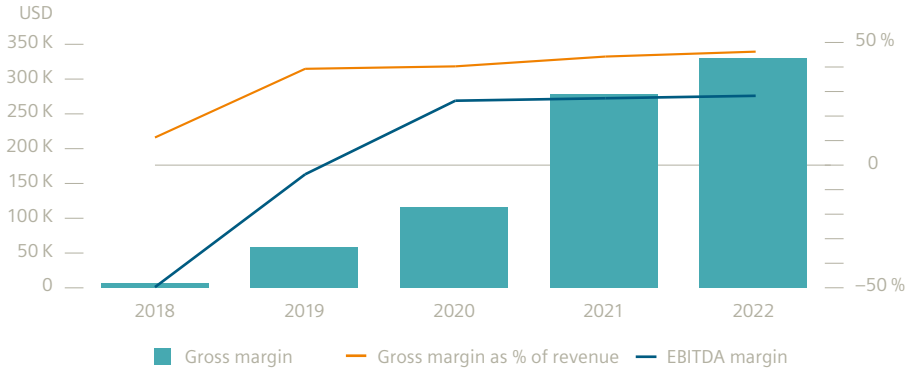

Figure 54:
Gross margin (USD) trends of MeshPower - past & projected

Capital Structure

MeshPower is able to make positive gross margins and the company is able to make surplus from its operations. Nevertheless, MeshPower relies on grant support for meeting capital expenditure costs, associated with mini-grid installations. However, the degree of grant support required varies from site to site and between technologies. MeshPower has a capital requirement of about USD $3-5 million in the next three years. The company intends to raise this capital with a mix of equity, grants and government subsidies, and debt.

Effects of COVID-19

The COVID-19 crisis has impacted MeshPower in several ways including:

- **Revenue reduction:** Once COVID-19 was declared as a pandemic, the national electricity grid reduced their pricing and, in response, MeshPower reduced its pricing by about 50% so as to remain competitive in pricing. Furthermore, most SMEs that MeshPower services had closed down their businesses due to the pandemic and thus business was slow from their end. As a strategy to retain its customers, MeshPower reduced its pricing to accommodate such customers. This adversely affected Mesh-Power's revenues.
- **Inconsistent cash flow profile:** As a result of the lockdown and low business volumes, some SMEs were not able to sustain their electricity payments. This had a trickledown effect on the cash flows of MeshPower.
- **Increased turnaround time for resolving customer issues:** Due to the lockdown and subsequent travel restrictions, field movement of technicians had been restricted. Although MeshPower was classified as an essential service provider, technicians were not able to move around as frequently as before. All of this resulted in increased turnaround time for addressing customer issues.
- **Delay in delivery and increase in cost:** MeshPower imports many of its raw materials from China. As the country went under lockdown, MeshPower's orders were delayed by two months. Simultaneously, shipping costs had also doubled; to cope up with these challenges, MeshPower diverted its focus to procure materials from within Africa as much as possible.

Opportunities and Barriers for growth and employment creation

MeshPower's growth opportunities and factors that will drive employment creation

- **Tapping into productive consumer demand:** To grow, MeshPower must focus on providing electricity to service providers who add value in different value chains within the village economy. This is because the growth in household consumption of electricity is minimal, which has previously led to below-optimal utilization of mini grid capacity that affects the unit viability. As such, MeshPower has set up AC mini grids that can power income-generating equipment at the SME level like sewing machines, coffee washing stations, welding, flour milling machines, etc. Opportunity for job creation: By providing electricity for productive uses, MeshPower contributes to the reduction of unemployment rates in Rwanda by indirectly increasing job opportunities at the SME level. MeshPower's ability to stimulate the local economy, subsequently leads to job creation.
- **Reduction in hardware cost and capital expenditures:** MeshPower estimates its current capital expenditure for AC mini grids to be at about USD $500-700 per connection, whereas the hybrid grids are at about USD $200-250 per connection. The major component of costs is the hardware cost of solar PV modules, batteries and inverters, and associated logistical costs. Bulk purchases and the clustered approach of setting up mini grids can help MeshPower reduce costs and optimize utilization of resources. However, both financing as well as regulatory issues will have to be resolved to ensure that such benefits amass for MeshPower.
- **Low cost capital:** The cost of commercial debt is as high as 16.5% in Rwanda and such high-cost capital does not support the efforts of MeshPower to scale. Hence, MeshPower is in need of low-cost capital to finance its growth plan. MeshPower has a capital requirement of about USD $3-5 million in the next three years and the company intends to raise this capital from a blend of equity, grants and government subsidies, and debt.

Constraints to be alleviated to support growth

- **Regulatory uncertainty:** MeshPower installs mini grids in areas that have been designated specifically for private players by the Rwanda Energy Group (REG). These are areas where the national electrification grid has no coverage, and will not for the next several years. However, there is some uncertainty about the areas in which the national electrification grid will expand to in the coming years and this uncertainty poses a risk for growth of MeshPower. For instance, MeshPower previously had 70 mini grids, however the national electrification grid expanded into some of the mini grid sites of MeshPower and, because of this, the company had to scale down to 50 mini grids. This regulatory overhang will pose a risk especially when MeshPower considers scaling up the number of mini grids in Rwanda.
- **Ability and willingness to pay:** The willingness and ability to pay by the end consumer is extremely low for the target customers of MeshPower. MeshPower has continually lowered its price point to identify the right pricing point. So far, MeshPower has identified that with a price point of USD $5 per month, per household, a mini grid system can be become sustainable in 18 months. However, customers currently pay less than 50% of this identified price per month.
- **Access to patient capital for upfront capital expenditure:** Before a mini grid is set up, MeshPower requires available financing to take care of the capital expenditures needed. Access to patient capital to help set up the grids can enable MeshPower to increase electricity access.
- **Management bandwidth and capacity:** MeshPower has diversified its services in order to sustain the company in case the mini grids were unable to payback initial investments. However, this has posed a challenge where the company has stretched out its bandwidth in terms of employee capacity, especially at the senior management level. Furthermore, some streams require specialized skillsets which the company may not necessarily have. For instance, the asset financing side of the business requires expertise in credit risk analysis, which the company does not currently have. This challenge poses a risk in terms of growth, where MeshPower will be running too many business lines with stretched out capacity and bandwidth.

> *» AC grids require significantly-high capital expenses and, thus, the right regulation to safeguard these investments is needed. When the national grid moves into an area that has AC connection before five years lapse, it becomes catastrophic for us because there is no chance for us to make a return on the investment made. «*
>
> **Richard Mori, CEO MeshPower**

> *» Even at the current price point we off er for our customers, some of them are still unable to pay. This is why we have to diversify our product off erings to remain sustainable. «*
>
> **Richard Mori, CEO MeshPower**

SWOT analysis of MeshPower

Based on the analysis of the business model, the company's strengths, weaknesses, opportunities, and threats that influence job creation opportunities can be summarized below.

Strengths	Weaknesses
• MeshPower's technological innovation has enabled it to provide electricity to individual households cheaper than competitors. • MeshPower has a strong management team with an experienced board of directors. • MeshPower has deployed local teams, who understand the terrain of the Rwanda to become local technicians. • MeshPower provides competitive remuneration and both monetary and non-monetary incentives to boost staff retention. • MeshPower conducts regular training for its local technicians to ensure they are kept abreast of changing market requirements.	• MeshPower lacks a dedicated marketing team which could push sales for the company, affecting the company's growth and thus its potential to create jobs. • MeshPower hires low-skilled technicians, which requires large investments in training. • MeshPower is yet to achieve optimum staff utilization of local technicians due to the uneven geographical spread of the grids. • At the management level, the bandwidth is stretched too thin due to the many service offerings being piloted and, in some cases, unavailability of specialized skillsets.
Opportunities	**Threats**
For MeshPower to create more jobs it needs to increase the number of mini grids it operates. Opportunities that would facilitate the increase in the number of grids include: • The Government of Rwanda has demarcated 48% of the coverage for off-grid operators. And has received support from the World Bank to support off-grid technologies. • The government has introduced fiscal incentives and non-fiscal incentives to encourage private sector participation. • The government has allowed 50% investment allowance (apart from depreciation) and free repartition of profits to encourage private investment in to off-grid companies.	Any threat that obstructs the setting up of mini grids impedes MeshPower's potential to subsequently grow and create job opportunities. These threats include: • Regulatory uncertainty about areas where the national electrification grid will expand into poses a threat to MeshPower's growth and expansion, and thereby its ability to create jobs. • The average household electricity consumption is low, hence the growth in average revenue per customer is expected to be low. This will, thus, affect the growth rate of MeshPower and its ability to increase employment opportunities.

Figure 55: SWOT analysis of MeshPower's busines model

MeshPower business growth model and path to sustainability

MeshPower is a solar micro grid company founded in 2012. Since inception, the company has been providing low-cost DC electricity for residential consumption with a peak of close to 80 DC micro grids (2018). However, the recent rural electrification strategy of the Rwandan government has brought many of these areas under national grid expansion. The company has reduced dependence on DC micro grids and has pivoted to a model that offers AC/hybrid micro grids to better compete on both capacity and costs.

	SHORT TERM →	MEDIUM TERM →	LONG TERM →
	Manage transition towards AC/hybrid micro grid regime	**Achieve deeper penetration within Rwanda and enhance utilization levels**	**Expand to potential geographies outside Rwanda**
MeshPower's business growth model	Immediate focus is to navigate through the new regulatory framework. • Increase focus on securing AC/hybrid micro grid projects • Experiment different value addition machineries as key anchor loads for AC grids • Special focus on attaining turn key contracts with "single payers"	In the medium term, enhance market penetration, increase capacity utilization and reduce costs to move towards sustainability. • Scale up number of AC/hybrid micro grids • Drive up utilization of existing grids by supporting more productive loads • Increase household consumption by providing appliances • Reduce cost of installation through innovation, scale & bulk purchase	Scale up of mini grid installation & operations outside Rwanda • Identify opportunities for executing "single payer system" projects in East Africa • Leverage parent companies R&D strength to reduce cost of installation • Leverage AC smart meter technology to provide electricity at affordable price to new consumers • Improve systems for better operational & financial control
Inputs that will aid business growth	• Philanthropic capital to fund AC/hybrid micro grid installation • Philanthropic capital to experiment different anchor load machineries • Government policy stability regulations and subsidies for mini/micro grid operation	• Patient capital to fund business growth • Programs to support village level micro-entrepreneurs to generate anchor load activities • Connections to sourcing channels	• Enhanced management capacity • Augmented partnerships: DFI & NGO linkages to facilitate expansion • Legal protection for Intellectual property rights • HR advisory support
Job creation outcomes	• Each new AC grid installed generates opportunity at both a sales (recharges) level as well at a technical level • Indirect employment is also generated by supporting villages to set up new facilities to add value locally	• Contractual & casual employment for micro grid installation • Indirect job creation through incremental village production • Creation of greater managerial and techno-managerial jobs	• In addition to creation of local jobs in new countries, MeshPower Rwanda will also see an augmentation of personnel who can help train and transfer the business model to target countries • More operation and control jobs will also be created
Social & Environmental impact outcomes	• Improvement in access to low cost and clean electricity • Increase in village GDP as result of productive usage of electricity		

Figure 56:
MeshPower's growth model

Short-, mid-, and long-term growth

MeshPower is currently in the process of realigning its business to be in line with the new electrification strategy of the Rwandan government. Owing to the affordability of DC electricity, the company still foresees scope for DC micro grids, however the future growth of MeshPower will largely be depended on AC/hybrid micro grids.

- **Short-term growth:** In the immediate term, MeshPower will focus on navigating the new policy environment with an objective to sustain its current DC operations. For the purpose of financial sustainability, it is imperative that MeshPower operates micro grids for a certain minimum period. Apart from sustaining DC micro grid operations, MeshPower will also focus on increasing AC/hybrid micro grid installations through its "single payer system" where development/philanthropic agencies support electrification projects for provision of electricity supply.
- **Mid-term growth:** In the mid-term, MeshPower will focus both on increasing the number of installations as well as enhancing the capacity utilization of existing setups. The increase in the number of AC/hybrid micro grid operations can help MeshPower achieve economies of scale, reduce cost of installation and, thus, bring down the recovery period of capital investment in micro grids. This would be critical for MeshPower to attract commercial capital.
- **Long-term growth:** In the long-term, MeshPower is likely to focus on expanding its geographical operations beyond Rwanda. The company will continue to leverage the technology development capabilities of its parent company, Xpower, and take them to end consumers through its field operations.

Inputs that will aid business growth:

- **Philanthropic capital:** MeshPower has depended on philanthropic capital for financing the installation cost of micro grids and operational costs are recovered by MeshPower from its customers. The exception is the single payer system wherein the project cost is provided by the client and MeshPower is responsible only for grid setup. In the short- to mid-term, MeshPower will be dependent on a) development agencies' projects for installation of AC/hybrid micro grids and b) grant support for supporting village entrepreneurs to set up different productive machineries for potential anchor loads.
- **Debt capital:** Since the company uses a prepaid service model, its cash flows are sufficient to meet its working capital requirement until now. Nevertheless, as the company scales up the AC microgrid model with the provision of an AC smart meter, it may want to test different payment models and, hence, availability of affordable debt capital to finance its working capital needs at this juncture will be important.
- **Government policy stability:** Until 2017-18, MeshPower installation didn't come under the purview of government licensing, hence, the installation process was seamless with the support of local communities. However, Rwanda's recent rural electrification strategy has made government licensing mandatory for micro grid operations. This new regime has brought in uncertainties regarding procedures, duration, as well as on the security of investments in micro grids. With that said, government policy regulation support will enormously help in bringing forward a business-friendly environment.
- **Human advisory support:** MeshPower had previously recruited high cost executives to head operations, finance, and technology, focused on DC grid operations. However, these recruitments didn't materialize into business growth and the executives left the organization within a short span. Similarly, at the lower rung of the organization, most technicians are high school graduates whom MeshPower trains. This training and erosion of trained people wanting to pursue college graduation enhances the overall cost of operations. To address these issues, MeshPower will require HR advisory support to devise strategies on organization structure design, talent acquisition, and talent retention.

Job creation outcomes

Job creation outcomes of MeshPower's business growth are both in the direct employment domain as well as indirect income generation; the following points are the job creation outcomes for MeshPower.

- **Installation and operations of micro grids:** On the installation front, MeshPower manages its workload by deploying its technician team from their Kigali office and, depending on specific field requirements, the company may hire technicians and casual workers on a contractual/daily wage basis. As the number of installation projects increase, the chance of engaging contractual and casual workers also increase. On the micro grid operations front, each micro grid ideally generates full-time employment for one local technician who attends to customer service requests. There is also an employment generation opportunity for a sales/commission agent who provides mobile money pre-paid recharge services.
- **Indirect income generation opportunities:** As electricity is a key enabler for growth of economically-productive activities, there is a tremendous scope for creating indirect income generation activities at each micro grid site. As MeshPower starts focusing on AC/hybrid micro grids, the success of each micro grid relies upon the establishment of anchor loads- major electricity consumers. These anchor loads are key potential machineries pertaining to different rural value chain activities for agriculture and rural services.
- **Sales and marketing:** Single payer systems have been a major contributor to MeshPower's revenues as well as its profitability. The gross margins of this business are very high and, hence, MeshPower in the immediate to mid-term has plans to establish a dedicated sales team to pursue opportunities in the single payer system space.

CASE STUDY 02

Sesi Technologies: Increasing Farmers' Income by Reducing Post-Harvest Losses (Ghana)

Analysis of Sesi Technologies' business model

Company ownership & history

Founded in 2018, Sesi Technologies is a budding social enterprise based out of the Kumasi region in Ghana. Isaac Sesi founded the company with a vision to tackle poverty and hunger by providing farmers and other stakeholders with affordable technology to increase yield and reduce post-harvest losses. Sesi Technologies currently manufactures and sells "GrainMate" a meter that measures the moisture content in grains.

Sesi Technologies' product offering

– **GrainMate:** GrainMate is the product of three years of research and development involving academia and industry experts. Institutions in Ghana (KNUST) and the United States (Kansas State University), and experts from the United States Department of Agriculture contributed to the product design. GrainMate has been calibrated to measure moisture content in many popular grains and legumes grown in Africa including corn, soybean, wheat, sorghum, rice, and chickpea. Furthermore, the product can also be calibrated to support up to 32 different commodities. The sub-assemblies for GrainMate manufacturing are sourced from China, the US, and Ghana. Sesi Technologies can currently produce about 100 units of GrainMate in a month. The company currently has eight days for assembling sub-components in a month to align production capacity with demand requirements. Sesi builds up an inventory of sub-components on each production day rather than building finished products. The sub-components are assembled into finished products on an as-needed basis. This also optimizes inventory storage requirements for Sesi Technologies. The current version of GrainMate (GM 101) is priced at GHS 500 (Ghanaian cedi), which is four times cheaper than other alternatives on the market, ensuring that more farmers can afford it. GM 102, which is currently under development, is intended to be a more advanced version of the product and in particular will support remote operation.

Figure 57: GrainMate

– **Other Products & Services:** Apart from GrainMate, Sesi Technologies is also a reseller of Purdue Improved Crop Storage (PICS) bags and Zero Fly Hermetic Storage bags (ZFHS). These products complement GrainMate and assist in enhancing the shelf life of the produce. The bags are priced at GHS 5/50kg bag and at GHS 9/100kg kg bag. Sesi Technologies is also in the process of developing the GrainMate mobile app and a platform helps farmers to monitor moisture data over a period of time. These services will be leveraged by Sesi Technologies to offer value added services and products to their customers.

Target customer segments

– **Grain farmers:** As per FAO[1], about 60% of all farms in Ghana are less than 1.2 hectares in size, about 25% of the total farms are in the range of 1.2 hectares to 2 hectares in size, and only 15% are above 2 hectares in size. Sesi Technologies targets farmers whose farms are greater than 1.2 hectares. Typically, Sesi Technologies' customers are grain farmers who store grains in large quantities before selling them in the market at an appropriate time. For this segment of farmers, managing the moisture content of the grain is a key contributing factor to safe storage. These farmers currently utilize traditional practices to estimate moisture content but these practices are not foolproof and aren't reliable enough.
– **Poultry farmers and poultry feed producers:** Poultry farmers store grain to be used as poultry feed. GrainMate enables these farmers to maintain the grains at recommended moisture levels, thus reducing insect infestation and aflatoxin contamination. Maintaining appropriate moisture levels also ensures that grains retain their

nutrient content thus ensuring that the feed prepared contains nutrients in the righ proportions for optimum productivity of birds and egg production. Sesi Technologies has estimated that poultry farmers having a minimum of 12,000 birds can afford to purchase the product outright.

- **Crop aggregators and food processing companies:** Aggregators purchase grain from farmers in large quantities and resell to processors. Aggregators can use GrainMate to transparently assess the quality of grains purchased from farmers and ensure compliance with moisture levels demanded by food processing companies. The moisture determination process also helps them in stock management and liquidation. This also enables better product discrimination and price discovery across the value chain.
- **Development partners:** NGOs and donor agencies who work with smallholder farmers (less than 2 hectares) purchase GrainMate to aid smallholder farmers, covered under their agriculture development programs.
- **Government agencies:** Agri extension officers employed by the government can use GrainMate to educate smallholder farmers about the role of moisture content, drying and proper storage of grains in reducing post-harvest losses.

Sesi Technologies' sales and distribution channels

The primary focus of Sesi Technologies' current outreach is to establish both the benefit of moisture testing as well as establish GrainMate's brand identity among its target customers. Over the past year, Sesi Technologies has undertaken activities that create awareness of GrainMate among potential customers, including grain farmers, poultry farmers, grain aggregators, and processors. In the absence of tangible market information about consumer needs, Sesi Technologies uses the awareness generation activity simultaneously for conducting market research. The company works with development partners like World Food Program (WFP) and the Ghana National Board for Small Scale Industries (NBSSI) to reach out to these potential clients.

The company has so far been able to reach about 50 smallholder farm-based organizations (FBOs) and poultry farmers in seven regions of the country (Northern, Upper East, Upper West, Bono, Ashanti, Volta, and Greater Accra regions). The partners usually create the opportunity for the company to meet with farmers in their networks.

Market competition

International manufacturers like John Deere, Dickey John, and Agratronix are the key players in grain moisture meter product space. However, the GrainMate grain moisture meter retail price (USD $100) is only one third of John Deere's moisture meter retail price (USD $300). One key aspect that makes overseas products expensive is the fact that the Government of Ghana levies import tariffs on foreign manufactured products.

Apart from these, Sesi Technologies also faces competition from Chinese-manufactured moisture meters. Though these moisture meters are cheaper than GrainMate, they have limited grain coverage (at the most two types of grains can be measured) that reduces their attractiveness. Furthermore, Chinese moisture meters require a separate sample collection process for measuring the moisture content and provide no after sales service.

Sesi Technologies job creation impact

Impact on job creation

The management team at Sesi Technologies is led by Isaac Sesi who is the CEO and Head of Product Development. He is assisted by the Head of Operations in managing the day-to-day operations. While the Head of Operations is a full-time employee, the Product Design Head and the Hardware and Manufacturing Head are currently contracted employees. To assist in operational activities, Sesi Technologies has two employees to manage Administration and Accounting related activities. Two hardware technicians are engaged on a contractual basis to assist in manufacturing. In summary, Sesi Technologies has four full-time employees and four contractual staff.

The entire production team is composed of employees on contractual terms, the team works for eight days in a month. The current agreement for contract staff offers them a six-month renewable contract and includes details on number of working days per week, salary, and job description. Sesi Technologies also engages Papa Kwaku, a mechanical engineer, on a part-time basis. Papa helps Sesi Technologies on the product design front.

Owing to the small team, Sesi Technologies has not put in place standardized HR processes in recruitment, HR manual for full-time and contractual staff, training, and capacity building of human resources in the company. The recruitment is still handled by the CEO, whereas HR operations are handled by the Operations Head. The company has plans to appoint an HR manager in the next three years to set up standard HR processes. Current employees were hired either based on referrals or prior work relationships with the CEO.

Job growth potential in Sesi Technologies

To achieve its future growth plans, Sesi Technologies recognizes the need to significantly build out its organizational capacity across levels and functions. Based on its business projections, Sesi Technologies estimates that there can be an addition of about 15 employees and four contractual staff by 2025. The mix of employment categories is primarily to optimize resource utilization at the given scale. Furthermore, depending upon Sesi Technologies' ability to sustain business growth, there is scope for the addition of more employees apart from the conversion of part-time and contractual roles into full-time roles.

- **Production and operations:** On the production front, Sesi Technologies has plans to hire three full time resources to support the expanded scale of operations by 2025. The organization has an immediate need for a quality control lead to put in place processes that will ensure quality assurance at a greater scale of operations. In the mid-term, Sesi Technologies plans to hire a lab technician and a production manager in the next two years. Sesi Technologies plans to scale up production capacity in the immediate future by increasing the number of production days in a week from the current two days to five days in a week. Sesi Technologies also plans to increase the number of production technicians (contractual) gradually over the coming years in line with production requirements.
- **App and platform development:** As mentioned earlier Sesi Technologies is working on an app and a platform to connect with farmers to provide other value-added services. To operationalize this plan, the company plans to set up an entirely different team of over six employees. Sesi Technologies plans to appoint a Technology Lead to lead the development process and intends to hire four software engineers plus an embedded system engineer. The company anticipates that these recruitments would be staggered and spread over the next five years.
- **Sales and marketing:** Sesi Technologies has relied heavily on direct marketing activities to create awareness among farmers and generate demand for its product. The company had employed a Sales and Marketing Head until June 2020. However, since the person left the organization, Sesi Technologies intends to find a replacement as soon as possible. Furthermore, Sesi Technologies plans to set up a complete sales team comprising of four marketing and sales executives, a customer relationship officer, and a field support officer. This new team will help Sesi Technologies to achieve its targeted unit sales in the coming years.

Financial model

Revenue projections

In 2019, Sesi Technologies sold 83 GrainMate units, of which, 73 units were sold within Ghana and 10 units were sold outside of Ghana. All of these units were sold by the organization through its direct marketing efforts and through development partners like World Food Program (WFP). Sesi Technologies has sold about 28 GrainMate units so far in 2020. The COVID-19 lockdown, ensuing travel restrictions, and social distancing norms have affected Sesi Technologies' direct marketing and awareness creation activities. Nevertheless, Sesi Technologies is confident it will sell 500 units by end of this financial year on the back of the upcoming harvest season (August to September) and the recent conclusion of a key partnership with Vestergaard.

In addition to their GrainMate product, Sesi Technologies also sells safe and pest resistant storage bags. The organization expects to sell around 500 bags in 2020 through two models:

- **Partnership driven sales model:** Sesi Technologies has been directly undertaking awareness creation activities among poultry and grain farmers through support from agriculture development projects like WFP in Ghana. The company has also been undertaking radio and social media marketing to create awareness about GrainMate. In addition to its partnership with WFP, Sesi Technologies has been onboarded as an Agtech partner by Vestergaard, a Danish humanitarian enterprise. This partnership will help Sesi Technologies increase its sales in the immediate future as Vestergaard intends to provide the moisture meter to grain aggregators and farmers in their supply chain. This partnership will help Sesi Technologies acquire new clients in Kenya and other parts of Africa.
- **Distributorship driven sales model:** Sesi Technologies has also been augmenting its distributor network in Ghana, Rwanda, and Kenya. So far, it has identified and onboarded a farm input dealer in the Bono region of Ghana and it has identified a farm input dealer in Rwanda. Both of these distributors are expected to start selling from the end of 2020. On the back of its own organic direct marketing efforts complemented by extended outreach through partners and distributors, Sesi Technologies intends to grow rapidly over the next few years. The projected revenues for GrainMate and storage bags are provided below.

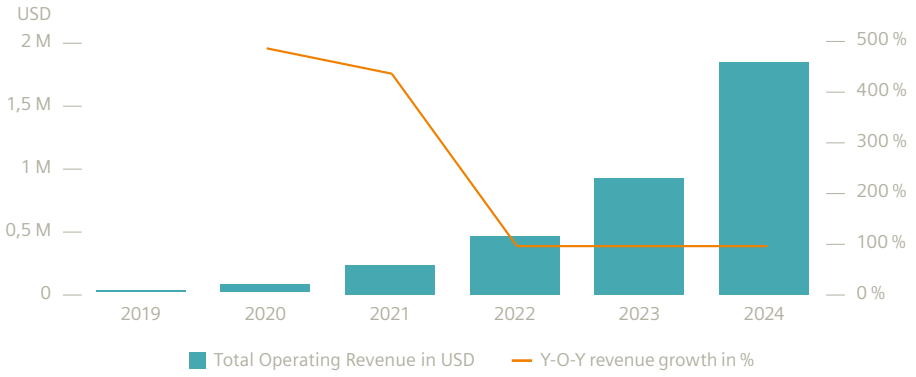

Figure 58:
Projected revenues of Sesi Technologies

Future revenue opportunities

Sesi Technologies has realized that there are significant unmet needs among its target customers both from an advisory perspective as well as from an input sourcing perspective. Sesi Technologies has developed a GrainMate companion app that enables it to stay connected with their GrainMate moisture meter clients.

Sesi Technologies intends to develop the app into a platform capable provide additional services relevant to customer needs. The beta version of the app is ready and the final app is likely to be rolled out in early 2021. The platform will provide services to farmers to manage their inventory better as well as support them in identification of buyers and selection of appropriate warehouses for safe storage of the product. The enterprise plans to charge GHS 10 (Ghanian cedis) per month as a subscription fee for access to the GrainMate platform.

	2021	2022	2023	2024
Subscription fee revenue (USD)	$24,480	$48,960	$97,920	$195,840

Figure 59:
Projected revenue from GrainMate platform subscription

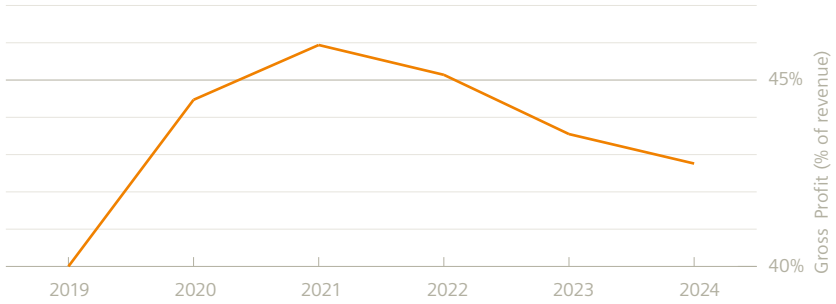

Figure 60:
Sesi Technologies gross profit trends

Gross profit margin

The gross profit margin during 2019 was 40% and the projected gross margin for the next five years level is likely to be around 40-45%. Given the intensity of import fees in overall business costs, projected gross margin levels could be impacted materially by the exchange rate of Ghanaian cedis.

Direct Cost Head	% of Selling price
Manufacturing cost	50%
Sales commission (only for sales through distributors)	10%
Logistics & Shipping cost (only for sales through distributors)	6-12%

Figure 61:
Direct costs head

Manufacturing cost includes: a) Cost of raw materials including electronic components bought from China and assembly and packaging of material sourced locally in Ghana; b) Logistical costs associated with sourcing from China; c) Import duties levied by the Government of Ghana; d) Assembling costs at Sesi Technologies premise in Kumasi, Ghana. Sales commission costs are applicable only for sales through the distributor network. The margin sharing arrangement with distributors is based on volumes of GrainMates sold per month. The commission is about 10% of the selling price.

Capital structure

Sesi Technologies has been reliant on its internal resources and grant money to fund its business. Sesi Technologies has not raised any external equity to date. The company has been able to win social enterprise competitions and grants. These funds have been a crucial source of financial support for Sesi Technologies in the early stages of its growth journey. Since 2018, Sesi Technologies has won USD $142,000 in grants through various innovation challenges and grant support programs. Sesi Technologies has deployed this amount to finance its product development, working capital, and other operational requirements.

Total capital	USD $37,573
a) Paid up equity	USD $170
b) Retained earnings*	USD $28,838
c) Loan from Directors	USD $8,565

*The major contribution towards retained earnings comes from the operational grant (non-operating income) of USD $48,479 received during 2019

Figure 62:
Sesi Technologies capital structure

Impact of the COVID-19 pandemic

The COVID-19 pandemic has impacted Sesi Technologies in all three critical aspects of its operations, including manufacturing, marketing and customer outreach, and cost of raw materials.

Ghana had implemented a partial lockdown restricting physical movement with exceptions only for essential services. Sesi Technologies' manufacturing activities did not fall under essential services and, as a result, the production activities of Sesi Technologies came to a halt. To mitigate the impact, the team tried to shift machineries to their home to undertake the sub-assembly and assembly processes. Nevertheless, this stop gap arrangement had drawbacks in terms of reduction in productivity.

A critical component of Sesi Technologies' demand generation engine is the direct marketing and awareness creation activities it undertakes. Because of the lockdown, the team couldn't travel to field locations to meet poultry and grain farmer groups. As the travel restrictions were relaxed in June 2020, the entire Sesi Technologies team was on road for extended periods of time travelling to upcountry regions to undertake awareness creation and training activities.

The COVID-19 situation has increased shipping costs substantially and this has adversely impacted the manufacturing cost and direct sales costs. Eunice, the operations head mentioned that Sesi Technologies was supported by DHL services under the micro-enterprise support program, wherein their shipping cost was substantially lower than regular market rates.

» Currently we are not in a position to get private equity as we haven't proven our business model. We will, hence, be bootstrapping to grow our business organically and once we have proven our business model, we will be able to get private equity into the company. «

Isaac Sesi, CEO Sesi Technologies

» Consumer behavior change requires a lot of behavioral research and investment in behavioral change communication. A small organization like ours cannot finance such initiatives at scale. Development agencies can help us by providing our customers with knowledge and driving behavior change. In addition, piloting innovative product financing mechanisms targeted at farmers will also enable the greater adoption of technology among farmers. «

Isaac Sesi, CEO Sesi Technologies

» *Hardware product development and manufacturing process optimizations is painful and time consuming due to limitation in access to knowhow. It is also difficult to get the product certified through the different processes in different countries. Availability of technical support in product development, manufacturing process and engineering technology will help Sesi Technologies overcome the above mentioned bottlenecks.* «

Isaac Sesi, CEO Sesi Technologies

» *Linkages to development agencies helped us to access their farmer networks through their existing project channels, both locally and internationally. If development agencies can plug us in to their existing project system we can use their trusted channels to conduct awareness creation among different stakeholders.* «

Eunice Akowuah, Operations Lead Sesi Technologies

Sesi Technologies' growth opportunities and factors that will drive employment creation

Factors aiding revenue and employment growth

- **Access to capital:** Sesi Technologies has been reliant on its founder's capital, grant money, internal accruals, and loans from directors to fund its capital requirements. The organization is also set to receive further grant money of about USD $50,000, which the organization plans to use to enhance production capacity. However, to utilize the new capacity to optimum levels and to meet its supply chain requirements, Sesi Technologies requires access to working capital funding. Owing to high interest rates for debt capital (30%) in Ghana, Sesi Technologies looks to low-cost capital or grant support to fund its working capital requirements. An enhanced availability of working capital requirement would enable Sesi Technologies to be more aggressive in building a robust distribution network in Ghana and other countries. Sesi Technologies has estimated a capital need of about USD $3 million to achieve its growth plans for the next five years.
- **Customer behavior changes and access to finance:** One of the key challenges faced by Sesi Technologies is to convince target customers about the pay-off gained from investing in technological products like GrainMate. The primary reason for this behavior is the presence of immediate competing priorities for customers like sourcing quality farm inputs, paying school fees, healthcare, and other expenses. This results in an unwillingness to invest especially when commercial benefits of the investments will take time to accrue. Another barrier is the lack of affordable and flexible financial products that can support the purchase of products like GrainMate.

Constraints to be alleviated to support growth

- **Access to technical know-how:** Sesi Technologies' founder, Isaac Sesi, has about three years of experience in technological instrument manufacturing. Under his leadership, the organization has so far addressed manufacturing related challenges "on the fly". This approach has cost Sesi Technologies crucial down time and slowed its growth. For the organization to achieve its growth aspirations it is important to have access to manufacturing experts who can support in developing more robust manufacturing processes to ensure high-quality manufacturing at scale. However, the high cost associated with engaging high-quality talent and their preference to work in an established enterprise are some of the limiting factors for Sesi Technologies.
- **Access to new markets and partnerships:** Sesi Technologies' sales projections will require access to multiple markets and multiple distribution channels. Based on the success of its partnership with WFP, Sesi Technologies has identified the potential opportunity in curating partnerships with development organizations like GIZ and USAID which have access to farmers and aggregators across Africa through various agriculture development projects.

SWOT analysis

Based on our analysis of Sesi Technologies' business model, an analysis of the company's strengths, weaknesses, opportunities, and threats that influence job creation opportunities is summarized below.

Strengths	Weaknesses
• Sesi Technologies has been able to leverage support from development partners like USAID and World Food Program to a) create awareness among farmers, and b) sell GrainMate through project funding. • Sesi Technologies has invested in establishing a direct sales team and expanding product reach by leveraging the existing agri inputs distributor network. • Sesi Technologies is in control of the product development and plans to ramp up the technical team to develop new products and services. • Sesi Technologies has set up a local production line that provides employment for local technically skilled labor. Sesi Technologies' business model has created business opportunities for local vendors by engaging them in its supply chain. • GrainMate is priced three times cheaper than other global brands in Ghana and the product can measure moisture content in multiple grains unlike competitors from China.	• Sesi Technologies has been dependent on grant money for meeting business needs. In our experience, entities that focus on grants tend to optimize for the mid-term rather than for the long-term. • Awareness for the need of moisture monitoring is low among Sesi Technologies' key customers - poultry farmers, aggregators, processors, and grain farmers. • Owing to limited capital, Sesi Technologies doesn't have a separate marketing budget to create consumer awareness and demand. • Typical of early-stage enterprises, the recruitment function is centralized at the CEO level and the organization has limited HR systems & processes.
Opportunities	**Threats**
• There is enormous potential to reduce post-harvest losses through adoption of technology. • Sesi Technologies has plans to enhance its product and service offerings on post-harvest management, facilitate connections with quality suppliers, and promote access to institutional buyers. • There are no domestic competitors to Sesi Technologies and there are markets for agritech in many African countries outside Ghana. • Sesi Technologies' planned expansion of product and services, as well as geographic areas of operations, has the potential to create high-quality jobs in production, sales, marketing and distribution.	• Sesi Technologies' raw material sourcing model is concentrated to a few suppliers in China. Chinese manufacturers of cheaper moisture meters can innovate to cover a wide range of grains, thereby removing the competitive advantage of Sesi Technologies. • Access to early-stage equity funding would be limited in African context. • The salary packages offered by large private sector players may attract the scarce high quality technical talent away from small scale manufacturing enterprises like Sesi Technologies.

Figure 63:
SWOT Analysis of Sesi Technologies' Business Model

Sesi Technologies business growth model and path to sustainability

Sesi Technologies is a germinal social enterprise, which has been in existence for only two years. The enterprise has standardized a moisture meter product and the enterprise is currently taking the product to market. Since there is no existing market available for the product, the enterprise is also focusing on generating consumer awareness and creating demand for the product. The growth model of Sesi Technologies can be summarized as below:

	SHORT TERM	MEDIUM TERM	LONG TERM
			Deepen customer relationships by providing complimentary products / services
		Optimize production capacity and institute internal controls	
	Experiment with multiple sales channel to assess revenue growth potential		
Sesi Technologies' business growth model	• Since Sesi Technologies is in a product business, its immediate imperative is to identify business channels that can spur sales • Undertake consumer awareness and demand creation activities • Build distributor network in Ghana, Zimbabwe, Kenya, and Uganda, build direct partnerships across Africa	• In the medium term, Sesi Technologies needs to de-risk its manufacturing supply chain and make its manufacturing process more reliable to meet customer needs • Increase production capacity by upgrading manufacturing assembly line • Introduce technology to bring operational & financial control • Roll out app platform and provide advisory services	• In the long term, Sesi Technologies can transition to being a trusted partner of farmers especially in the post harvest phase • Provision of warehouse storage on rentals • Digital platform sale of agri commodities • Identify opportunities where existing farmers can be benefitted by leveraging technology solutions
Inputs that will aid business growth	• Opportunities to access famer networks & agri projects of DFIs • Risk capital: low cost debt to fund working capital requirements • Grant capital to fund research & consumer awareness creation	• Grant capital to increase production capacity • Training and capacity building of team members • Industry connect to streamline manufacturing process & product development • Support to establish operational & financial controls	• Grant capital to experiment additional product development • Skilled manpower on agritech • Legal support for intellectual property rights • HR advisory support • Partnership opportunities with different stakeholders in agri value chain
Job creation outcomes	• A dedicated sales team to identify sales channels and drive sales • Social media team for running awareness campaigns	• Expanded manufacturing and sourcing teams • Dedicated technology team to operationalize app platform • Finance and control team	• New business development team • Professionals to strengthen the sales and marketing, operationalize new lines of business
Social & Environmental impact outcomes	• Reduction in post harvest losses and increase in farmers income and • Increase in availability of good quality food for human consumption		

Figure 64:
Sesi Technologies growth model

Short-, mid-, and long-term growth

Sesi Technologies is an early-stage, product-oriented social enterprise that supplies a meter to measure moisture content (GrainMate). The product is used for measurement of moisture content in six agriculture commodities. The enterprise had spent the last two years largely on standardizing the product and setting up a basic production process.

- **Short-term growth:** In the immediate term, Sesi Technologies will refine its customer acquisition strategy. The enterprise will also focus on increasing the capacity of its sales channel to market the product. The enterprise intends to focus on setting up distributor networks in Ghana, Zimbabwe, Kenya, and Uganda. To achieve this, Sesi Technologies will build partnerships with agro-processing industries, DFIs, NGOs, and farmers' associations to gain access to their distribution networks, farmers, and agriculture development projects as the case may be.
- **Mid-term growth:** In the mid-term, Sesi Technologies will focus on adding more value to its customers as well on increasing its production capacity. To add value, Sesi Technologies intends to roll out an app platform to provide value-added services to customers. To enhance production, Sesi Technologies intends to upgrade the machinery used in the assembly line, set up a modern production line, and deploy additional manpower. On the organizational front, Sesi Technologies is likely to deploy control systems to bring in operational and financial control.
- **Long-term growth:** In the long-term of five to seven years, Sesi Technologies is likely to focus on diversification into additional products and services that are targeted at farmers and businesses in the agriculture value chain. The list of possible additional services includes providing warehouse storage on a rental basis to farmers, providing a digital platform to trade agriculture commodities. On the other hand, the product innovation would be driven by the opportunity gaps available in the farming ecosystem for technology intervention.

Inputs that will aid business growth:

- **Access to farmer networks and agriculture projects:** To date, Sesi Technologies has sold the majority of its GrainMate product through direct sales. In the recent past, the enterprise has partnered with Development Funding Institutions (DFIs), like USAID, and accessed their farmer network to sell GrainMate. The enterprise also had an opportunity to collaborate on a World Food Program project, implemented by the Ministry of Agriculture in Ghana through DFI partnerships. Sesi Technologies has a high degree of conviction that DFI and project partnerships would aid business growth of Sesi Technologies in the short- to mid-term.
- **Partnership with different stakeholders in the agriculture value chain:** Sesi Technologies has also partnered with association of food processors in the past which had helped the enterprise to sell additional GrainMate products. Sesi Technologies was recently onboarded as a technology partner to Vestergaard, a Dutch humanitarian food enterprise and, in this partnership, Sesi Technologies will provide GrainMate to Vestergaard's suppliers in Kenya. Partnerships of the above nature will provide Sesi Technologies access to new markets beyond Ghana.
- **Market insights, consumer behavior and market creation:** In the short- and mid-term, market insights and better understanding of consumer behavior will aid Sesi Technologies to better understand market potential and devise appropriate go-to market strategies.
- **Availability of grant and risk capital:** Sesi Technologies had been solely relying upon internal surplus and grant money secured from social enterprise challenges and business idea competitions, to fund its working capital as well as growth investments. Hence, in the short- to long-term, access to grant capital from philanthropic agencies will aid Sesi Technologies in new product development and increasing production capacity. Apart from grant capital, Sesi Technologies is also in need of debt to finance its working capital requirements. Since the cost of debt capital is as high as 30% and requires collateral security, Sesi Technologies is unable to access it. Hence, a risk capital funding for working capital requirement could aid business growth for Sesi Technologies.

– **Human resource support:** As Sesi Technologies grows, it will need to reduce its dependency on its CEO as well its reliance on part-time staff for its manufacturing function. Sesi Technologies will also need to build up in-depth management functions as well as in manufacturing, sales, and service. To achieve this, Sesi Technologies will need the availability of trained manpower at an entry level, skilled manpower at an experienced level as well as advisory support in setting up and managing a more complex organizational structure.

Job creation outcomes

– **Production and operations:** On the production front, Sesi Technologies has plans to hire full-time resources to support the expansion of operations in the immediate to medium term. It also has plans to hire a lab technician and a production manager in the next two years. Sesi Technologies plans to scale up production capacity in the immediate future and this will result in an increase of gainful employment days for contractual employees in the manufacturing line. Sesi Technologies also plans to gradually increase the number of production technicians over the coming years in line with production requirements.
– **App and platform development:** Sesi Technologies is currently working on an app and platform to connect with farmers to provide other value added services. To operationalize this plan, Sesi Technologies plans to set up a core technology development team. The team will comprise a technology lead to chart the roadmap and spearhead the development process. The lead will be supported by a team of software engineers plus embedded systems engineers.
– **Sales and marketing:** Sesi Technologies has relied heavily on direct marketing activities to create awareness among farmers and generate demand for its product. Sesi Technologies plans to support the sales head with a complete sales team to manage both direct sales as well as channel sales. This new team will help Sesi Technologies to achieve its targeted unit sales in the medium term.

CASE STUDY 03

TakaTaka Solutions: Leveraging the Value of Waste for a Circular Economy (Kenya)

Analysis of TakaTaka Solutions' Business Model

Company ownership and history

TakaTaka Solutions (TakaTaka) is a Nairobi-based waste collection and recycling business that was founded in October 2011 and began commercial operations in 2014. It has grown to be one of the largest waste management entities in Kenya by volume of waste handled and also by the number of staff employed. TakaTaka currently operates an end-to-end waste management system where it collects, separates, and sorts waste at its centralized sorting stations. Currently, the company is serving more than 20,000 customers and handles up to 50-60 tons of waste daily.

Business model analysis

TakaTaka is the only waste company in Kenya that does the end-to-end waste management. It is also the only company that operates mixed waste sorting sites in Kenya. TakaTaka's business model is summarized below.

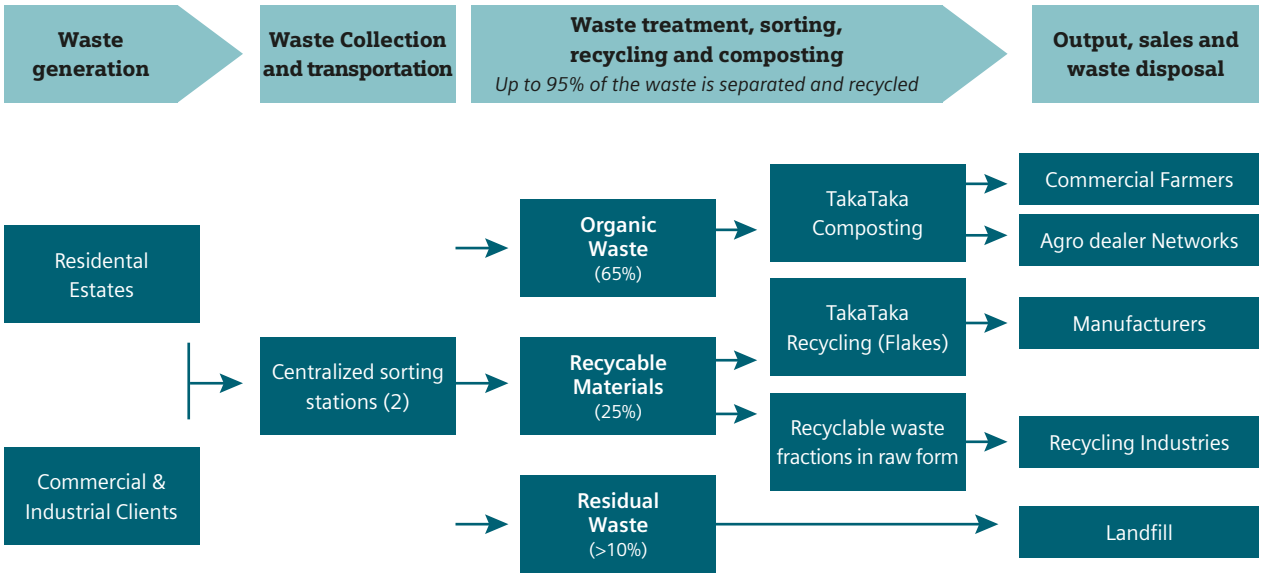

Figure 65:
Summary TakaTaka's business model

- **Waste collection:** TakaTaka has a fleet of 10 trucks complemented by a collection team of two to four per truck to go around and collect waste from residential areas, commercial establishments, such as hotels, restaurants, and shopping malls. Taka-Taka collects waste from residential areas twice a week, while for the bigger clients such as hotels, restaurants, and malls, waste is collected on a daily basis. However, the frequency of waste collection is customized based on the type of client, amount of waste generated, and contractual agreement with the client. Waste from malls is usually compacted on-site and sold directly, especially if the waste fractions do not require much sorting. TakaTaka has placed employees and compacting machines in each mall that it serves to compact the waste, which is then transported to the off-takers. The rest of the waste collected is transported to one of TakaTaka's sorting sites.
- **Sorting:** Waste is then taken to TakaTaka's sites where it is offloaded and separated through mechanical separation (using drum sieve technology) into over 40 waste fractions at two central sorting sites - one in Banana (Limuru) and another in Kangemi in Nairobi county.[2] It is soon planning to open another sorting site in Kikuyu, which will serve waste collected from the southern areas of Nairobi. The sorting capacity per site has increased from 180 kg/line/day to the current 2-3 tons/sorting line/hour. The sorting site in Banana has two sorting lines, which make its capacity 40 tons/day for single shift operations.[3] The Kangemi site has a single line that has a capacity of about 15-16 tons/day.
- **Waste trading:** TakaTaka also picks up waste collected by informal third-party waste pickers to augment the quantity of waste it processes as well as to ensure that the waste is managed scientifically. TakaTaka has set up a collection facility near Nairobi's big dumpsites (Dandora and Thika) to buy waste from waste pickers.
- **TakaTaka recycling:** Some waste fractions, such as single use plastics, that TakaTaka sorts do not have sufficient end-use markets in their raw form. TakaTaka, however, realized that there is adequate demand if these are converted to pellets. Therefore, the company started a unit for the conversion of these waste fractions. The specified waste fractions are fed into a conveyor belt where further sorting is done. Each sorting belt has about seven people standing on each side, further separating the waste. The sorted waste is then fed into cold and hot wash systems for cleaning and subsequently fed into a system that dries and separates the waste materials. Depending on what the intended outcome of waste fraction, some of the system valves are closed and the separated material is fed into a machine that pelletizes the material. Each pelletized material has a different value in the market depending on the demand. The recycling side can employ at least 25 people. These employees are staffed in the sorting lines, supervisors, machine operators & maintenance and collection and bagging.

– **Composting:** Composting involves the conversion of organic waste into organic fertilizer and soil conditioners. TakaTaka has a central composting facility. The sorted organic waste is separated into two parts – (a) pig food which is usually less than 5% of the waste, and (b) waste that will be converted to organic fertilizer. The conversion rate of waste to organic soil ratio is about 30%. After the organic fertilizer has matured, it is taken through a sieve machine that is used to separate the fertilizer depending on size of particles. After sieving, the bio-fertilizer is packed and sold under the brand name 'Soil Plus'.

Customer segments and value proposition

Although there are over 200 private players in the waste sector industry in Nairobi, TakaTaka is the only player providing end-to-end waste management services. The customer segments served by various services offered by the company are summarized below:

– **Waste collection services:** On the waste collection side, the clients that TakaTaka serves include residential estates, and industrial and commercial clients. Among residential customers, TakaTaka collects waste from low-, middle-, and high-income residences. TakaTaka has been strategically focusing on increasing the share of high- and middle-income households as these have better waste value realization potential. Commercial and industrial clients include supermarkets, restaurants, and malls among others. For such clients, the price of each contract varies depending on the value of recyclable fractions and the quantity of waste collected, which influences the frequency of collection. Unlike household waste, the waste from these commercial segments differs in their composition. For example, waste from malls comprises high levels of recyclables whereas waste from hotel & restaurants have high levels of organic waste. Among customers in the commercial segment, malls offer the highest scope for revenue from recycling, followed by schools and offices, and then hotels and restaurants.
– **Waste recycling:** On the recycling side of the business, TakaTaka serves B2B clients who purchase clean pelletized flakes as a raw material input for the manufacturing of other molded plastic, single-use plastics, plastic chairs among other uses. Other fractions such as cardboard is sold to paper industries and PVC fractions are sold to other B2B private industries.
– **Waste composting:** On the composting side, TakaTaka serves both B2B and B2C clients. The B2B clients include agro-dealer shops and farmer groups, who then sell the organic fertilizer to individual smallholder farmers. TakaTaka favors the B2B distribution method due to its efficiencies and ability to carry out bulk purchases. B2C clients include large commercial farmers who purchase the product in bulk.

Marketing and distribution channels

TakaTaka has adopted a strategy of targeting industrial/commercial clients and larger residential compounds for its waste collection services. The company has adopted a mix of various marketing strategies to ensure they convert such customer segments into sales leads. These strategies include door-to-door marketing, online canvasing for clients, and referrals from other clients.

To ensure a good relationship with customers, the company provides other add-on services over and above the waste collection services. This is done to increase the percentage of repeat clients and renewal of contracts. Furthermore, some of these strategies are used to convert the more environmentally-aware clients into customers. These add-on services include provision of a green building sticker/certificate to a client after enlisting the services of TakaTaka and providing data analytics, generating waste data and reports for different clients. This report breaks down the percentage of waste fractions collected from the client and allows the client to make better decisions and be more environmentally conscious.

Challenges of collection, sorting, recycling and composting

- **Difficulty in enforcing separation of waste at the source:** There is lack of cooperation from clients to enforce separation of waste at the source, despite TakaTaka's efforts to provide separate bin liners. This is because of the behavioral norms of consumers. This means that TakaTaka has to still heavily invest in the separation of dry and food waste.
- **Limited markets for some waste fractions:** Some of the sorted waste fractions have a very limited market due to the few industries available that use them as raw materials. This poses a challenge for TakaTaka in disposing of some of these fractions that could otherwise be useful.
- **Heavy capital expenditure:** Machinery required to set up an end-to-end waste management plant is very expensive and thus it becomes challenging to scale and grow quickly.
- **Challenges of accessing land:** In Kenya, the municipalities do not allocate land required to set up sorting and waste management sites. As such, land becomes very limited and TakaTaka has to lease or rent the land that it uses, which is very expensive. Furthermore, Kenya does not have proper zoning in the city and thus the likelihood of setting up a sorting site near a residential area is high, and this brings about community hostility due to lack of acceptance.
- **Limited understanding of the benefits of organic fertilizer:** Most farmers are unaware of the benefits of organic fertilizer and tend to purchase more inorganic fertilizers. This limits the volume of 'Soil Plus' that can be absorbed by the market. There is, therefore, a need for intensive farmer education and behavioral change to increase demand for the product.
- **Promising product in the market:** TakaTaka's entry to the compost market is still early and thus customers are yet to be familiar with the product and brand name. Therefore, there is a need for the company to conduct intensive marketing to ramp up the demand for 'Soil Plus'.

» In Europe where I grew up, it is a cultural norm to separate waste even in households. I see this culture generally lacking here in Kenyan households where all waste is mixed. «

Andreas Haueisen,
COO TakaTaka Solutions

Governance and human capital

Job creation and human capital

The end-to-end nature of TakaTaka's business operations results in a higher manpower intensity of its operations. The company employs 293 staff on a full-time basis – this is more than four times as many people per ton of waste handled compared to if the company were to adopt a traditional 'collect-to-dispose' model.[4] At TakaTaka, 42.7% of the employees are staffed on the collection side and 43.7% staffed on the separation side. The other 10% are spread across the composting and the management team. As the company seeks to open the new site in Kikuyu, it will be recruiting at least 60 more employees who will be staffed in collection, sorting, and separation.

TakaTaka creates indirect jobs by sourcing waste from waste pickers and collectors, waste transporters, and people working at recycling industries as they are integrated within the company's value chain.

By 2025, the current levels of TakaTaka's business growth will generate an additional 700 direct jobs and about 2,500 indirect employment opportunities. If the organization continues to sustain its growth levels, by 2030, there is potential to create an additional 1,500 direct jobs and well over 5,000 indirect employment opportunities.

Recruitment and selection criteria

Recruitment of staff is done after the identification of a gap in the processes by the line manager, and after discussions with the COO and other relevant managers, a decision to hire is made. For TakaTaka, the most important requirements are the soft skills of a potential employee and their experience, rather than their education level and achievements. This is done to attract agile and flexible employees who can fit into various roles.

Employee compensation and incentives

TakaTaka's overall remuneration packages can be up to 1.5-2 times higher than the packages offered by other players in the market and industry standards. Base compensation is given as per the laws of Kenya where the minimum wage is stipulated as KES 13,572 (Kenyan shilling) per month (~USD $135). Over and above that, TakaTaka provides allowances and incentives based on various incentive structures to make the salaries competitive. Generally, on average, staff receive about 10% of their basic salary as commission which is paid out on a weekly basis, upon achieving certain KPIs.

TakaTaka has also adopted some non-monetary incentives to promote employee participation including provision of medical insurance, provision of protective equipment, and contribution to the pension scheme. The company also provides paid training for its potential staff for one month, daily lunches for its current staff, and the employees are allowed to be part of the company's savings group.

Human resource gaps and challenges

- **Difficulty in finding quality talent for mid- and top-level management:** There is a lack of quality talent that can be recruited for top-level management in Kenya. Those who are available are very expensive to hire. This poses a challenge especially when recruiting.
- **Investments in training:** Although recruiting staff in junior level positions is easy for TakaTaka because the position requires a low level of skill (i.e. minimum secondary level graduation), this subsequently means that training of staff should be thorough. The training is done for a minimum of one month, and as an incentive to the potential employee, they are paid within the month of training. This pushes up the training costs borne by the company.

» Circular economy approaches in waste management have significant potential for job creation across developing countries. This is because the various steps involved, from collection, sorting, recycling and composting, are all highly labor intensive. «

Daniel Paffenholz,
CEO TakaTaka Solutions

TakaTaka Solutions' financial model

Revenue trends

TakaTaka's major revenues are from waste collection fees, sales of recyclables, and bin/liner sales. The biggest revenue driver for the company is waste collection fees which have historically contributed to about 80% of the revenues annually. The sale of recyclables has been the second biggest revenue earner for the company, contributing an average of 13% to the total revenue. Revenues from composting sales have been small as it is a new revenue stream for the company.

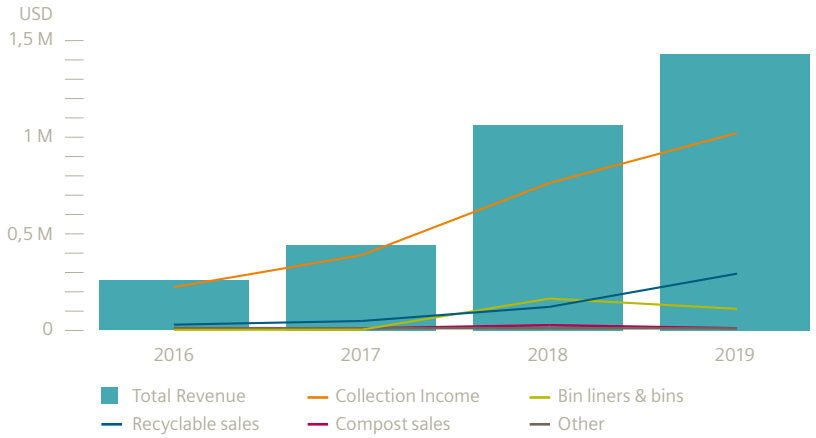

Figure 66:
Historical revenues from each business line

EBITDA margins

Direct labor, materials and bin liners, and motor vehicle running costs account for over 75% of the cost of goods sold. The company became profitable in the 2018 financial year on a net level and expects to remain profitable in the future.

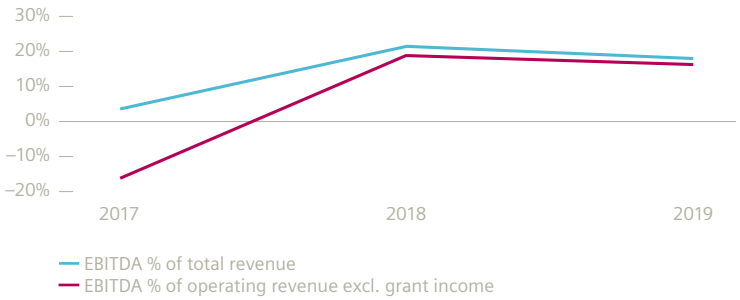

Figure 67:
Historical EBITDA margins (%)

Capital structure & funding

TakaTaka's financing partners for both grant and debt financing include leading development players such as USAID, KFW DEG, and Siemens Stiftung, as well as financial institutions. The company's capital allocation strategy is influenced by the fact that it operates in a sector that has very few organized players and with nascent business models. TakaTaka tends to leverage grant capital to experiment with either new technology or new ways of doing business. This enables TakaTaka to leverage patient and more risk-tolerant capital to innovate and learn. TakaTaka relies on commercial capital to scale validated technologies/business models thus creating greater employment and environmental impact.

Impact of COVID-19 pandemic

The COVID-19 crisis has impacted TakaTaka in several ways, including:

- **Decrease in the volumes of waste collected:** Due to the closure of hotels and restaurants, and lower foot traffic in commercial places, the volume of waste that TakaTaka has collected reduced by about 50%.
- **Decrease in the number of trips per truck:** Although TakaTaka has been classified as an essential service provider in Kenya, and thus not affected by the curfew times, the company chose not to operate after curfew hours. This is because such operations both come with enhanced health risks as well as the fact that administrative requirements would increase costs.
- **Decrease in the number of people per truck:** To maintain social distancing and ensure the safety of staff, TakaTaka reduced the number of people sitting in the driver's cabin to just the driver. Previously, each truck had a total of three employees – a driver and two passengers.
- **Decrease in revenues:** Not only has TakaTaka been impacted by the reduction in volume of waste collected, the value of recycled waste has also come under pressure from clients pushing for discounts.

In response to the pandemic, TakaTaka has implemented several strategies to manage its cash flow and remain sustainable despite the crisis. They include:

- **Optimizing the number of trips taken by collection trucks:** To manage cash flow, some of the routes that the collection trucks take have been combined to ensure optimal utilization of assets and prudent management of expenses.

- **Introduction of 'COVID waste' management:** TakaTaka has introduced another waste fraction dubbed 'COVID waste'. This includes all the PPEs (face masks and gloves) that are disposed of in malls, hotels, supermarkets, and residential areas. TakaTaka collects this waste with appropriate safety precautions and disposes of it separately by incineration to minimize spread of infection.
- **Re-organization of staff:** Although no lay-offs have been made TakaTaka has reorganized its staff, especially from the collection side due to the reduced volumes of waste collected. For instance, some staff from collection side were redeployed to work in composting and others in separation and sorting. This reorganization affected about 20- 25 staff.
- **Increment of salary put on hold:** Although TakaTaka did not implement any salary pay-cut, the company put any salary increments on hold to ensure better cash-flow management.

Opportunities and barriers for growth and employment creation

TakaTaka's growth opportunities and factors that will drive employment creation

- **Government intervention on the waste sector:** There has been a push from the Government of Kenya to increase adoption of circular economy principles. This has increased the willingness of local government and residential societies to engage formal waste collectors and ensure that waste is properly treated. This ultimately increases the potential for the company to create more jobs for waste collectors and sorters. Although this is an emerging intervention from the government, such influence from relevant authorities is necessary to enhance the growth of the sector.
- **Increase in the volume of waste collected and sorted:** TakaTaka's growth opportunity lies in increasing the volumes of waste collected, sorted, and processed. This ultimately leads to an increase in the number of people that TakaTaka directly employs on the waste collection and sorting sides of the business. Furthermore, through the increase in volumes of waste sorted and recycled, TakaTaka can create indirect job opportunities for people employed in the recycling industries. TakaTaka can adopt different approaches as it seeks to increase the volumes of waste collected. These include:
  - **Integrating more waste pickers into the business model:** TakaTaka is already working with waste pickers at the Dandora and Thika dumpsites. These waste pickers supply TakaTaka with waste that is subsequently sorted into different fractions and sold to recycling industries. Ramping up this trading business has the potential to create indirect jobs for the waste pickers and increase the growth potential for TakaTaka.
  - **Lateral expansion:** TakaTaka's growth strategy is to expand into a company that offloads waste from other waste collection companies at a cheaper price than what these companies currently pay to dump at dumpsites. This can increase waste volumes processed and increase employment opportunities for sorters at TakaTaka's facilities.
- **Increase the number of recycling plants:** Some of the waste fractions that TakaTaka sorts currently do not have sufficient markets in their raw form. As such, TakaTaka is seeking to expand and increase the number of recycling plants to recycle more of such fractions to increase their market value in the off-take market. This expansion will increase the number of jobs that TakaTaka can directly create in the waste recycling plants.
- **Increase in the volumes of organic fertilizer distributed:** TakaTaka is steadily increasing its market share for the organic fertilizer. TakaTaka was previously selling directly to farmers and was able to sell about 2 tons a month. However, TakaTaka has recently entered into an agreement with a distributor to sell up to 100 tons per month. This increases the potential of TakaTaka to directly employ people on the organic waste and composting side.

Barriers for growth and employment creation

- **Competition from the unregulated sector:** Generally, the waste management sector in Kenya is very fragmented and characterized by informal operators. The sector has very low market entry barriers and informal operators provide relatively cheaper services since they do not undertake any processing to reduce environmental impact. These operators dump waste illegally to maintain lower costs since treating waste is generally more expensive.
- **Land unavailability:** Getting land to operate a sorting site in Kenya is very expensive and tedious. This is because municipalities in Kenya have not adopted zoning laws that define specific areas for waste disposal and management. As such, TakaTaka has to look for private land, which is expensive. Moreover, getting licenses to operate near residential areas is very difficult and thus impacts logistics costs. This will impede the rate at which TakaTaka scales, especially if it is to ramp up its volume of waste collected, which will create a need to open up new sorting sites.
- **Collapse of the recycling markets:** The collapse of global crude oil prices has put a downward squeeze on the prices of recycled pellets made from plastic waste. This challenge has recently been heightened by the COVID-19 pandemic. This will pose a challenge to TakaTaka's business economics especially if the purchasers of recyclable material continue to significantly reduce their prices.
- **Access to patient capital for CAPEX investment:** For TakaTaka to replicate its business lines by increasing sorting centers, it needs to incur heavy capital investments. Establishment of a sorting center incurs a capital requirement of around USD $500,000. These investments can be in the form of commercial capital such as debt/equity since the business lines have already been proven to break even on an operational level. However, not many investors focus on waste management as a sector and generating conviction in the business model entails a significant time commitment from TakaTaka management. For business lines that are yet to be proven, TakaTaka prefers relying on long-term capital in terms of grant financing to validate the business and operational model. However, according to the company, most grant making institutions currently in the market tend not to prefer investments that are capital expenditure heavy.

> *» TakaTaka is operating in a sector that is heavily fragmented with a lot of illegal waste operators. In a market that has very price sensitive customers, this could be an inhibiting factor in the growth of TakaTaka. «*
>
> **Daniel Paffenholz, CEO TakaTaka Solutions**

TakaTaka Solutions' SWOT analysis and market differentiation

TakaTaka's unique value proposition lies in the fact that it provides reliable waste collection services to its clients at a relatively competitive price point and it is the only company in Kenya providing end-to-end waste management services. It is also the only company operating a mixed waste sorting line in Kenya. The company's strengths, weaknesses, opportunities and threats are summarized below:

Strengths	Weaknesses
• TakaTaka is the only company in Kenya that does end-to-end to waste management and has incorporated mixed waste sorting line. • TakaTaka has its own recycling plant, which enables it to add value to some of the waste fractions before selling it to recycling industries. • TakaTaka has relationships with over 20 recycling industries that buy sorted and recycled fractions from them. • TakaTaka has a strong and innovative management team that is able to implement the strategic vision of the company. • Unlike many waste collection agencies, all frontline workers of TakaTaka are full-time employees of the organization. • TakaTaka's business operations generate indirect employment opportunities for un-skilled and minimal skilled labor force in Kenya. • Attrition rate among frontline workers within TakaTaka is far below industry average. • Apart from paying the standard minimum wage rates, TakaTaka also pays performance based variable incentives to frontline workers in China.	• Sorting capacity per person is low due to limited automation of sorting lines. • Lack of availability of adequate skill sets in supervisory roles, which leads to micro-management from top level management. • There aren't any opportunities within TakaTaka for un-skilled/low-skilled front line workers to learn skills and move up the employment value chain. • There is scope for improvement of institutional safe-guard mechanisms for frontline workers to protect themselves from occupational hazards.
Opportunities	**Threats**
• The government is slowly pushing legislation for a circular economy, which is opening up the sector. • High volumes of waste are projected to be generated by residential households and industries in Nairobi due to increase in population and economic growth. • The uptake of organic fertilizer & soil supplement is increasing in the market. • There is surplus availability of unskilled/low skilled youth labour force in Kenya that can be employed in the waste management sector.	• Numerous illegal waste pickers in the market. • Collapse of the recycling market globally due to COVID-19, which affects the pricing of various waste fractions. • Limited availability of land that can be used when expanding sorting sites. • Fewer investors in the market that provide CAPEX and patient capital. • Cultural attitudes towards waste management sector can limit the participation of workforce in the sector.

Figure 68:
TakaTaka Solutions' SWOT analysis

TakaTaka Solutions' business growth model and path to sustainability

TakaTaka's growth lies in its ability to increase the volume of waste collected, sort it, and generate value from waste fractions. TakaTaka's growth model is described below.

	SHORT TERM →	MEDIUM TERM →	LONG TERM →
			Lateral & geographical expansion
		Increase value of waste generated by increasing the number of recycling plants	• TakaTaka can expand into a company that off-loads waste from other waste collection companies at a cheaper price than what the other companies currently pay at dumpsites. • Further, TakaTaka will consider expanding into other locations other than Nairobi
TakaTaka's business growth model & path to sustainability	**Increase volumes of waste collected & sorted** • TakaTaka intends to enhance waste collection while keeping costs low • Incorporating more waste pickers into business operations • Increase number of residential and industrial clients	In, the mid-term, TakaTaka could aim to increase the value generated from waste. This can be done through: • Increase the number of recycling plants. Recycling can increase the uptake of some of the waste fractions that may not have markets in their raw form • Increase in processing of organic waste	
Inputs that will aid business growth	• Curate partnerships with tech companies to increase automation in the sorting lines • Regulate the number of illegal waste collectors in Nairobi • Support in acquisition and access to land for waste management	• Increase uptake of recycled materials in the value chains of local and global companies • Promote circular economy • Enhance access to patient risk capital (grant & equity) • Mass education to increase market for bio-fertilizer	• IT planning and routing systems to optimize collection, sorting and recycling • Increasing management capacity to manage operations in various locations
Job creation outcomes	• Increase in economic opportunities for waste pickers • Increase in the number of direct job opportunities in the sorting line of TakaTaka	• Increase number of quality direct jobs for workers in the recycling plant & supervisors • Increase in indirect job opportunities employees along the recycling value chain	• Increase number of indirect job opportunities for personnel working in waste collection companies • Increase the number of opportunities for top management level
Social & environmental impact outcomes	• Reduction in carbon emission due to proper waste management • Increase in the quality of food due to uptake and use of organic fertilizer		

Figure 69:
TakaTaka Solutions' growth model

Short-, mid- and long-term growth

TakaTaka is a growth stage social enterprise that has already been able to find innovative ways to address customer demand for waste disposal. Its immediate growth lies in the ability to increase the volume of waste collected and sorted thus enhancing the livelihoods of employees. A financially sustainable TakaTaka can increase its staff capacity, whilst ensuring staff utilization is optimized.

– **Short-term growth:** In the short term, TakaTaka's growth lies in its ability to increase the volume of waste that it collects and sorts. This can be done through (a) incorporating more waste pickers into the model. TakaTaka plans on working and incorporating more waste-pickers into its model. This will increase the volumes of waste sorted and consequently, the volumes of waste sold to recycling industries.

And (b) increasing the number of residential areas served: increasing the number of residential and industrial clients it serves, will increase the volume of waste collected, which will increase revenues from the collection side and, similarly, revenues from on-selling recyclable materials to recycling industries.

- **Mid-term growth:** In the mid-term, TakaTaka will grow by increasing the value of waste generated, which can be done through increasing the number of recycling plants. TakaTaka will increase the number of waste fractions it recycles to increase the value of waste that is sells to manufacturers and recycling industries, which will consequently increase its margins. As such, TakaTaka would need to set up new recycling plants to handle both increased volumes of waste and increased number of waste fractions. Furthermore, TakaTaka will increase the quantity of organic waste processed. However, this will be dependent on behavior change for farmers to take up organic fertilizer, which will ultimately increase the market for bio-fertilizer.
- **Long-term growth:** In the long-term, TakaTaka will consider expanding both laterally and geographically. Lateral expansion will involve the company growing into a waste management company that off-takes waste from other waste collectors, adding value to this waste and selling it to manufacturers, which will increase its margins. Additionally, once TakaTaka has established its business operations in Nairobi, it will expand into other Kenyan counties that produce significantly high volumes of waste.

Inputs that will aid business growth:

- **Curate partnerships with technology companies to increase automation:** Through support from developmental partners, TakaTaka can establish partnerships with technological companies, supporting them to further automate the sorting lines they run to increase the sorting capacity due to the increased volumes of waste collected.
- **Access to patient risk capital:** To grow TakaTaka's established waste business, it would require access to debt capital. Furthermore, TakaTaka would require patient, risk capital in the form of grant financing, which will be used when expanding business lines that are CAPEX heavy and in testing new models that have yet to be fully established and/or tested. This includes opening up new recycling plants and expanding geographically.
- **Mass education to increase uptake of organic waste:** Through support from ecosystem players in the agriculture sector, farmers can be educated about the benefits of using organic fertilizer, which will increase the uptake and demand of bio-fertilizer in the market.
- **Increased uptake of recycled material in global markets:** Once the global markets for recyclables improve, demand for recycled materials by manufacturers will increase and consequently the margins for recyclable materials.
- **Government initiatives that will enhance a circular economy:** The government, with support from ecosystem players, should work on championing the benefits of a circular economy. This can be done in various ways such as championing for policy change, or even through setting up of green bonds that can be drawn down by waste companies to enhance their sustainability.

Job creation outcomes

- **Increase in number of decent job opportunities for waste pickers and collectors:** By integrating more waste pickers into its model through the trading business line, TakaTaka will provide decent job opportunities for waste pickers, who will receive better payment for the waste value they collect and deliver to TakaTata. The number of waste pickers is projected to increase from 400 in 2020 to 2,400 in 2023.
- **Increased number of direct job opportunities in the collection, sorting, and recycling business:** Increasing the number of residential and industrial clients, would increase the volume of waste. As such, more human resource capacity would be needed to collect the waste and, subsequently, sort it. This staff capacity is projected to increase from 350 who operate three sorting sites to about 820 who will operate eight sorting sites. Furthermore, as TakaTaka increases the number of recycling plants, more people would be employed in the recycling plants to handle the increased volumes. Approximately 25 people are employed per recycling plant.
- **Increased management capacity to manage operations in various locations:** As TakaTaka expands laterally and geographically, more staff would be required in top-level management roles to oversee operations either in the different locations or manage operations with various cohorts of waste collectors that off-load waste to TakaTaka.

CASE STUDY 04

TEBITA
AMBULANCE
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Tebita Ambulance: Medical Care for Everyone (Ethiopia)

Analysis of Tebita Ambulance's business model

Company ownership and history

Tebita Ambulance Prehospital Emergency Medical Services PLC, herein referred to as Tebita Ambulance, is a social enterprise that operates in Ethiopia across three states including Oromiya, Somalia, and South Nation and Nationality Region (SNNR), with its regional office in Addis Ababa. The company was launched in 2008 with the aim of addressing a social challenge in the healthcare sector, where there is a lack of an organized emergency medical response service (EMS) in Ethiopia.

Tebita Ambulance is now the leading private provider of emergency medical services and pre-hospital care in Ethiopia and it has provided ambulance services to about 40,000 patients – with the majority of these patients come from poor socio-economic backgrounds. Tebita Ambulance is licensed with the Addis Ababa Health Bureau, to provide emergency pre-hospital medical services, and has achieved ISO 9001:2008 certification in quality management systems. Tebita Ambulance has also since grown to provide quality and decent employment opportunities to about 60 permanent and contractual employees.

Value proposition

Tebita Ambulance is one of the few private providers of emergency medical service providers in Ethiopia. It has grown its on-ground ambulance fleet to include advanced ambulances, which are fitted with mechanically operated ventilators compared to other providers that only have basic life support ambulances. The ambulances have also been modified to be used by people with special needs. Apart from facilities provided by the government and the Red Cross, the market has few licensed private sector operators providing EMS services in the country. Tebita Ambilance's ISO certification gives it an edge in the market especially while serving institutional clients.

Business model analysis

Currently, Tebita Ambulance has 15 ambulances, five of which are advanced life support ambulances and 10 are basic ambulance services. The business model of the company is depicted on the following page.

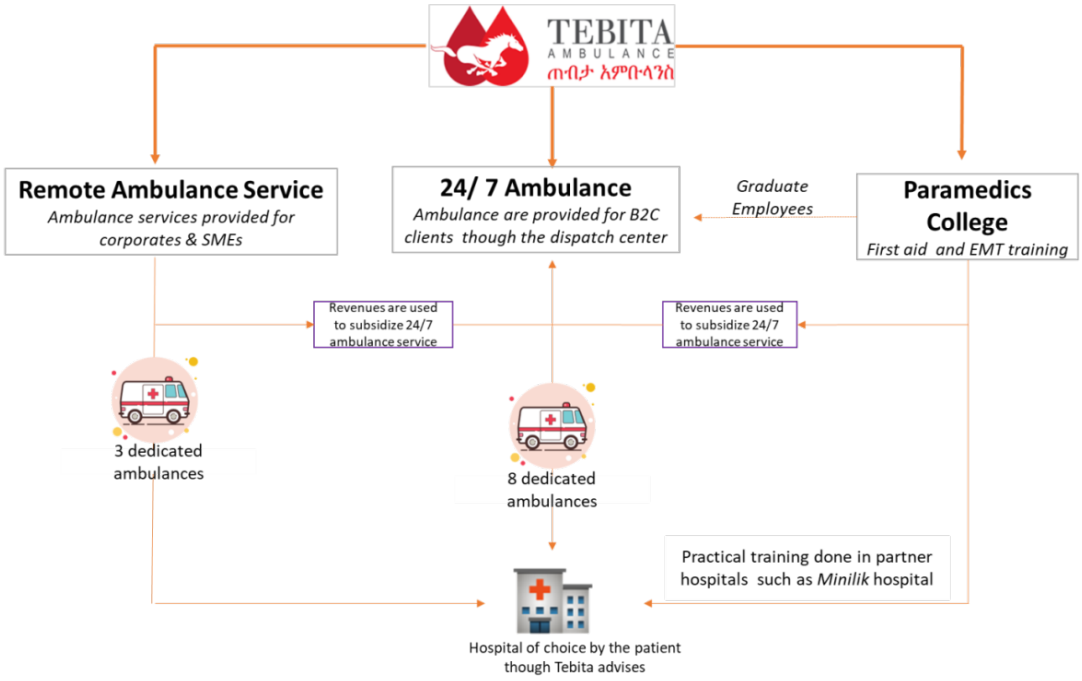

Figure 70:
Tebita Ambulance's business model

Services offered

– **24/7 Ambulance services for low income customers:** 24/7 ambulance services are provided to low-income B2C clients to enhance access to timely medical care. Costs are kept low by using the more remunerative B2B Emergency Remote Services to cross subsidize B2C operations. Tebita Ambulance has a central dispatch call center in Addis Ababa, which has five staff that work full time and is equipped with sleeping rooms for night shifts.

  Once a call is received, the dispatch team dispatches an ambulance depending on the location of the caller, availability of ambulances and the severity of the case. Payment for service is made after ambulance services have been rendered but the cost is cross- subsidised by other revenue streams. This is in line with Tebita Ambulance's social objective to still serve low-income customers, while remaining sustainable. Over 4,000 24/7 ambulance rides are made in a year.[5] Currently Tebita Ambulance has staffed 14 drivers, 5 nurses and 13 paramedics, on the 24/7 ambulance services.

– **Remote emergency care services:** The remote emergency care services are offered to B2B clients especially multinational corporations (MNCs). Tebita Ambulance enters into contractual agreements with these organizations to provide ambulances services for their employees. The ambulances are stationed at the premises of the client in case of any emergency. The company has set aside 3 advanced life support ambulances for this purpose.

  Tebita Ambulance pays for the accommodation and food expenses for its staff, who are stationed at the MNC's premises. Under this service offering, the company incorporates other services (auxiliary revenue) depending on the need of the client. These include providing a) "Peace of mind services" - this is given to clients' personnel who live in and around Addis Ababa to ensure fast and reliable response time to meet any emergency needs. And b) "International evacuation services" - Tebita Ambulance provides proper evacuation systems and protocols for its clients and its personnel when necessary.

– **Emergency Medical Training (EMT) services:** Tebita Ambulance provides emergency medical training services directly to individuals or through partner organizations. All the short-and the long-term training curriculum used for the training is standardized as per the country's standards and the courses are categorized into basic life support training, short-term emergency training for health professionals, and professional EMT training. Tebita Ambulance partners with various hospitals and health centers where the students are posted to conduct their practical training. After completion of training, Tebita Ambulance absorbs some of the students from the EMT course as paramedics in the company, though this is not an exclusive arrangement.

Customer segments

Tebita Ambulance targets both B2B and B2C customers depending on the services being offered as summarized in the table below.

Type of Service	Distribution model	Target Customer segments	Description
24/7 ambulance	B2C	Individuals	Individuals from the BoP segment who cannot necessarily afford to pay the full cost of emergency ambulance services.
Remote ambulance service	B2B	International organizations, MNCs, corporate institutions & event organizers	These are institutions that desire to have access to high quality reliable ambulance services for their staff.
EMT Training (depending on course taken)	B2B	Health institutions & hospitality industries	Institutions that want to provide refresher courses to their staff in the area of emergency pre-hospital services.
	B2C	Individuals	These are individuals who want to work in the sector and can be a talent pool that Tebita Ambulance taps into for its operations.

Figure 71:
Tebita Ambulance's Customer Segments

Distribution and marketing channels

To reach these target customer segments, Tebita Ambulance has adopted both B2B and B2C distribution channels. Similarly, it has adopted various marketing strategies especially given the low ambulance utilization in the country. These include TV and radio advertisements, print and outdoor marketing, social media marketing, and door-to-door marketing. Tebita Ambulance also works with an external marketing company to reach out to B2B clientele. Tebita Ambulance recognizes that it has to significantly invest in changing people's perception and ultimately influence behavioral change to increase uptake of ambulance services.

Other operational processes

- **Procurement of medical consumables:** Medical consumables are procured on a monthly basis from specific local suppliers, and it imports some medical consumables from Dubai and Germany. This is due to limited availability in the local market.
- **Procurement of ambulances and ambulance parts:** Tebita Ambulance procures brand new ambulances from Dubai or Turkey and maintenance is done locally. Currently, all ambulances are fully owned by Tebita Ambulance.
- **Waste disposal:** Medical waste from ambulances is collected, separated, and disposed depending on the type of waste. For instance, infectious waste is put in waterproof plastic and transferred to Migbaresenay hospital for incineration.

Tebita Ambulance's job creation impact

Job creation and human capital

Tebita Ambulance currently has created decent jobs for 56 permanent employees (42 male, 14 female) and six contractual employees. Tebita Ambulance has different reporting structures and departments where the CEO, who reports to the board, is responsible for Tebita Ambulance's strategy execution, partnership development, and fundraising. The general manager (GM) and the paramedic college dean, on the other hand, take charge of all operational matters within the ambulance services and the college services respectively. Tebita Ambulance has also hired various departmental heads to assist the GM and the dean.

The key driver of employment growth is two-fold - the drive to serve more B2C customers leading to better ambulance utilization levels and serve more B2B clients to ensure that the cross subsidization model continues to be economically sustainable. The graph on the following page summarizes the job creation potential of Tebita Ambulance.

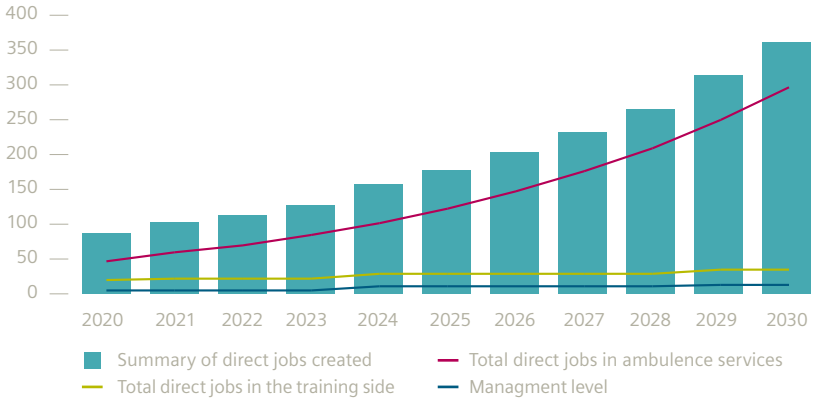

Figure 72:
Summary of total projected number of direct jobs created by Tebita Ambulance

Staffing

Each employee is expected to work up to a maximum of 192 hours per month as stipulated by the country's labor laws. If an employee works for more than stipulated hours, overtime is paid. The HR manager and the ambulance crew head are in charge of staffing and tracking the number of hours completed by each employee, which include the number of hours in a round trip of an ambulance.

- **Staffing for 24/7 ambulance service:** Each ambulance is staffed with one driver and two paramedics and/or a nurse to cater to a diversity of case severities. The fleet head and the crew head are responsible for deciding who is staffed in which ambulance, and this is decided on a weekly basis.
- **Staffing for the remote ambulance services:** Staffing is done per ambulance and is based on the contract signed. Rotation is done after every three months.
- **Staffing for the paramedics college:** For the college, a full- and part-time structure has been adopted. The HR manager together with the dean of the college is responsible to ensure staffing of the college, which has five full-time lecturers, with part-time lecturers as well.

Recruitment process and policies

Over time, Tebita Ambulance has developed quite a mature and well-developed recruitment process. The process tries to ensure transparency and aims to implement a fair recruitment policy with an overall objective of attracting and employing the most competent persons. Before hiring, a needs analysis is conducted, and job advertisement prepared. Screening of the possible candidates is done through interviews and the final selection completed. After the employee joins the company, the HR manager follows an onboarding plan, which includes the new employee taking up first aid training lessons and is expected to shadow other experienced staff to promote on the job learning. Challenges of recruitment: There is a lack of employees with experienced skill sets in Ethiopia and more so for healthcare sector professionals. Such professionals are in high demand and this makes it hard for Tebita Ambulance to identify and recruit new talent for positions that require specialized skill sets. Further, the talent available is limited in terms of capability and this forces Tebita Ambulance to invest more in training.

Employee compensation & incentives

Tebita Ambulance offers a decent and relatively competitive salary compared to other players in the market. Salary is rewarded based on the employee's position and is reviewed after every two years. Salary review takes into consideration factors such as increases in cost of living, directives by the government on minimum wage, and the current market wages. Furthermore, the company offers its employees competitive incentives, both monetary and non-monetary, to boost retention, including paid leave days, flexible working hours, and promotions. Other monetary incentives include provision of per diem, overtime and allowance payment, and medical insurance.

Tebita Ambulance's financial model and path to sustainability

Revenue projections

Tebita Ambulance's historical (2016 and 2017) revenues were driven by the revenues from the 24/7 ambulance services. In 2018, Tebita Ambulance signed two large contracts to provide remote ambulance services. This increased the contribution of the remote services revenue, making it the largest contributor to revenue in that specific year. However, in 2019, the number of contracts from the remote services declined and this slightly reduced the revenues.

In the future, Tebita Ambulance's revenues will depend on three key drivers including its ability to increase its ambulance utilization capacity, to increase the number of B2B clients who pay top-dollar for the remote ambulance services, and to ramp up marketing and increase the number of students it trains both for the short- and long-term courses. Once these revenues have been optimized within Ethiopia, Tebita Ambulance will look into diversifying its revenue streams and expanding into other regions within Eastern Africa. However, this will be a long-term plan.

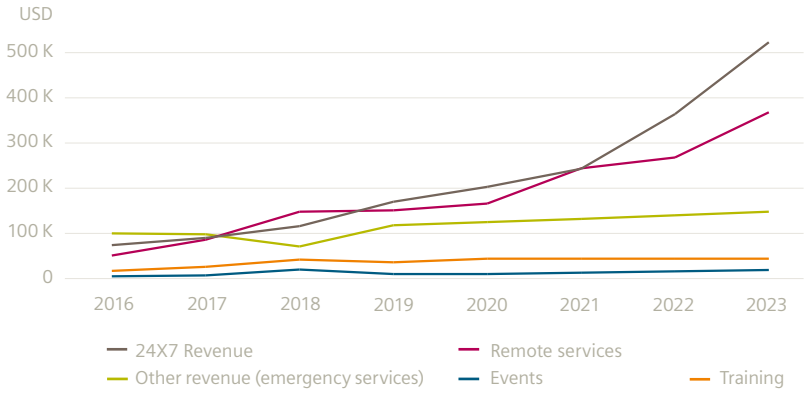

Figure 73:
Historical and projected revenue trends for Tebita Ambulance 2016-2023

Tebita Ambulance's expenses and gross margin

Tebita Ambulance's total expenses have historically grown with a CAGR of 31.9%. The major cost drivers have been the salary and benefits expense, rent expense, advertisement, and repair and maintenance costs. With the growth of the business, Tebita Ambulance has increased the pool of manpower it employs. The significant increase in 2018 can be attributed to the opening of the paramedics college within the same year. For the future outlook, Tebita Ambulance projects the expenses to follow a similar trend where the salaries and wages contribute significantly to the total expenses, as it seeks to increase the number of job opportunities.

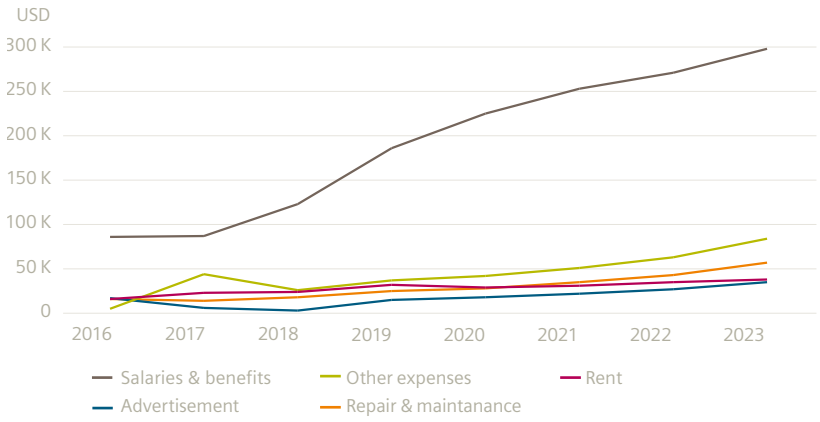

Figure 74:
Tebita Ambulance's historical and projected expense trends

Tebita Ambulance's gross profits have historically grown with a CAGR of 22%. On an EBITDA level, the margins dropped from 39% in 2016 to 24% in 2017. This was largely due to the increase in the SG&A expenses, specifically rent costs and miscellaneous expenses. Subsequently, as of 2020, the EBITDA margins are projected to steadily increase. The graph below summarizes the trend in the EBITDA and EBITDA margins.

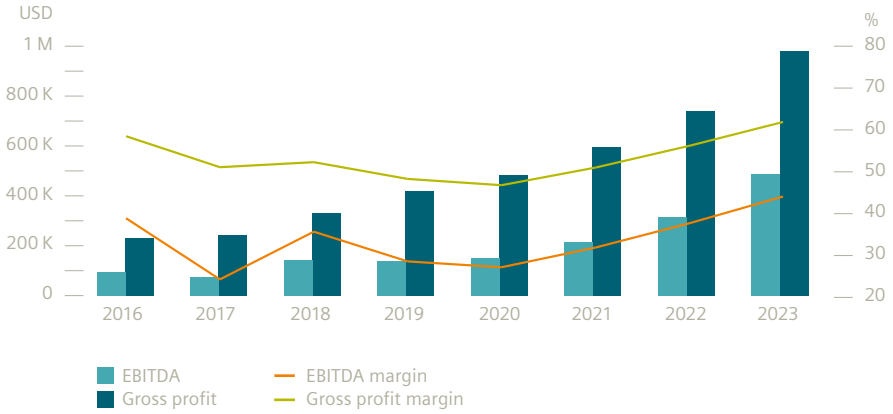

Figure 75:
Gross profit & EBITDA, EBITDA and gross margins trends

Sources of capital

Tebita Ambulance has received funding and support from different ecosystem players to finance its growth. Funding has been a mix of founder's capital, grant financing, debt financing, and equity funding. Tebita Ambulance has received over USD $380,000 in grant financing and over USD $495,000 in both debt and equity financing. Challenges in raising capital include:

- **High interest rates and unattractive terms:** The terms of debt financing in Ethiopia are not attractive to social enterprises. For instance, the market interest rate given by banks ranges from 11%-18%.
- **Expectation of collateral:** Debt financing is only available to SMEs that can produce matching collateral, which posed a challenge for Tebita Ambulance especially in the earlier stages of the company, when acquiring debt financing from the bank.
- **Restrictions on foreign equity capital:** Ethiopia has stringent investment policies for instance; the government limits foreign currency trade as well as the amounts that individuals and corporations can hold. This not only creates significant shortages of foreign currency reserves in the country but also makes it harder for investors to invest in foreign currencies, which are more stable and makes repatriation of profit from investments within the country harder.

Impact of COVID-19 Pandemic

The COVID-19, crisis has impacted Tebita Ambulance in several ways including:

- **Decrease in revenues due to underutilization of ambulance services during the pandemic:** The COVID-19 pandemic has increased the reluctance of people to (a) seek medical assistance at hospitals and medical facilities, and (b) the desire of patients to use ambulances. As such, the calls to Tebita Ambulance's dispatch center has dropped and consequently the number of ambulance rides.
- **Incurring of unplanned costs:** Due to the pandemic, some of the employees of Tebita Ambulance can no longer use public transportation to come into the office due to the increased risks. Tebita Ambulance has therefore opted to facilitate movement for some of their employees within Addis Ababa to go into the office and as such, this has increased the expenses for the company.
- **Increase in costs of PPEs:** Due to the COVID-19 crisis, there has been an increased demand for PPEs in the market and since the supply is limited, it has caused acute shortage of PPEs. This has led to the exponential increase of the costs of procuring PPEs, which are essential in an ambulance.

In response to the pandemic Tebita Ambulance has implemented several strategies to manage its cash flow and remain sustainable despite the crisis. They include:

- **Targeting other new customer segments:** Tebita Ambulance has decided to engage a potentially new customer segment, i.e. Ethiopians residing in Europe or the USA. They are targeted to avail services as part of which Tebita Ambulance's staff conduct regular home check-ins for elderly relatives residing in Ethiopia and any relatives who are vulnerable with pre-existing conditions.
- **Closure of the training college:** Tebita Ambulance closed operations of its paramedic training college to control and curb the spread of the virus due to overcrowding. Students who were enrolled were sent home.
- **Implementation of staff austerity measures:** To boost cash flow in the business, Tebita Ambulance has decreased the salary of top management employees by 20%. Tebita Ambulance has also temporarily stopped the pay out of incentives to employees and has send some of its staff such as some paramedics and nurses for their annual paid leaves, to reduce office overhead costs.

Opportunities and barriers for growth and employment creation

Tebita Ambulance's growth opportunities and factors that will drive employment creation

- **Expansion of ambulance fleet:** To increase its on-ground fleet of ambulances, Tebita Ambulance is considering asset light models compared to acquisition of new ambulances. They include:
  - Partnering with various hospitals: Tebita Ambulance will largely benefit from partnering with hospitals, which are mandated by law to have ambulances, yet their ambulances are being underutilized.
  - 'An Uber for ambulances' model: Tebita Ambulance will opt for privately owned vans that can be transformed into ambulances and get into contractual agreements with the owners of the vans. Through a revenue share basis, Tebita Ambulance will use these vans as ambulances. This is based off of other similar models such as 'flare' in Kenya that have been successful.
- **Opportunity for job creation:** Through such an expansion, Tebita Ambulance has the potential to create direct employment opportunities that will be required to staff the extra ambulances including at the dispatch center to handle increased calls from the other areas as summarized below.

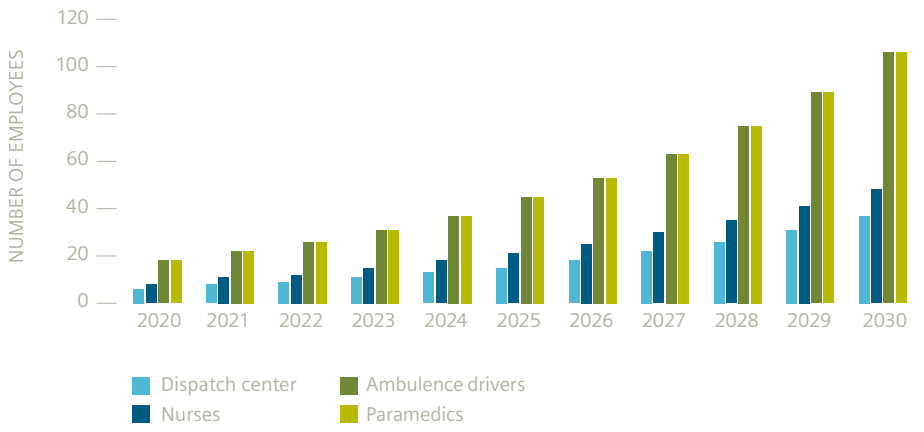

Figure 76:
Tebita Ambulance's projected number of jobs created directly by providing ambulance services

- **Geographical expansion:** Tebita Ambulance is not only looking to expand its services within Ethiopia, but it is also looking to expand into other Eastern African countries including Djibouti, Eritrea, Somalia, and South Sudan, which are highly underserved with EMS services. Tebita Ambulance is planning to open up off-site offices and dispatch centers in these countries to co-ordinate the 24/7 ambulance services and the remote ambulance service provision.
- **Opportunity for job creation:** Once Tebita Ambulance expands into other countries, the satellite offices will require human capital to ensure that they are run effectively. The direct job opportunities that will be created would mirror what is already been implemented in their Addis Ababa office. Geographic expansion will also create opportunities to recruit talent at the management level both in the target country of operations as well as in Addis Ababa. The quantum of employment would however be dependent on the scale of operations in each country.
- **Diversification of revenue streams:** Tebita Ambulance is planning to increase and diversify its revenue streams to include: (a) production and distribution of medical consumables to address the challenges of limited supply in the market, (b) set up trauma and diagnostic centers, and (c) air ambulance services. This diversification is projected to start in 2025, once the current revenue streams are optimized. Opportunity for job creation: This diversification will require different skill sets such as engineers, pilots among others. As such Tebita Ambulance will create both direct and indirect job opportunities. Based on the required skill sets and overall assumption of the number of people that can be staffed per air ambulance, trauma center and manufacturing plant, Intellecap projects that the total number of jobs created by Tebita Ambulance through diversification will be as below:

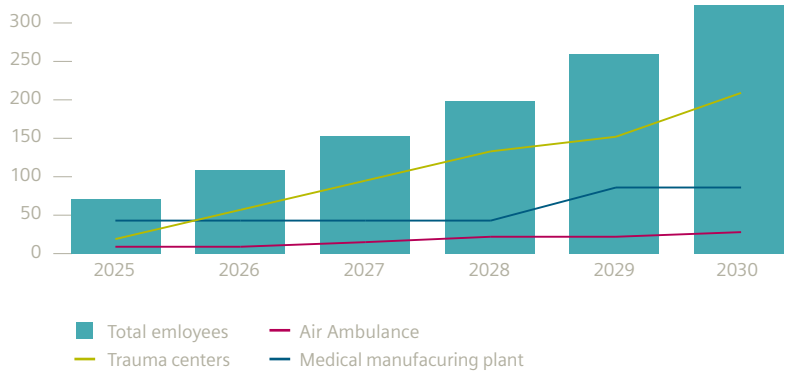

Figure 77:
Projected number of jobs created through revenue diversification

- **Increasing EMS training:** Increasing the number of students trained by Tebita Ambulance has the potential to not only increase the revenues to the company but also increase the healthcare capacity in Ethiopia. Tebita Ambulance is in discussions with the government to train up to 2,000 people with basic and advanced life support training in the next five years.
- **Opportunity for job creation:** Through increasing EMS training, Tebita Ambulance has the potential to increase both direct and indirect job opportunities. For instance, Tebita Ambulance can absorb some of the students that graduate and provide them with direct employment. The remaining trained healthcare are not absorbed by Tebita Ambulance can sort for job opportunities in other hospitals and health posts that provide EMS services. The target for Tebita Ambulance as far as job creation in the EMS training is concerned is summarized below.

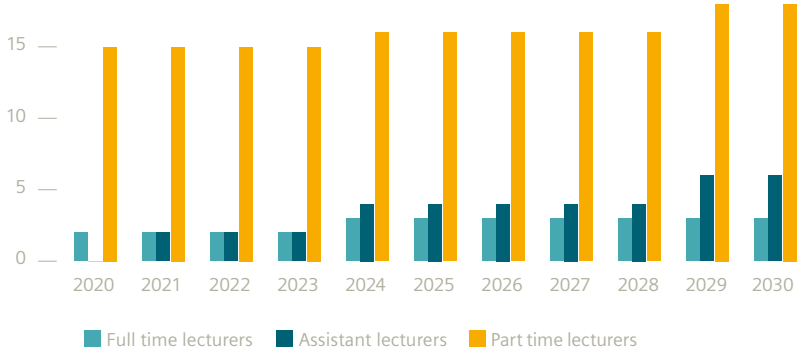

Figure 78:
Tebita Ambulance's projected number of jobs created through training

Barriers for growth and employment creation

- **Behavioral change and ability to pay:** All the growth plans for Tebita Ambulance are contingent on increasing adoption of ambulance services by the people living in Tebita Ambulance's regions of operation. However, Ethiopia's ambulance utilization level is low due and there is a general lack of awareness of the utility of ambulances as a first responder in a healthcare emergency. Patients opt to be transported by private vehicles, motorbikes, or bicycles to reach hospitals as these modes of transportation are deemed to be cheaper. Although they are cheaper, these modes of transportation do not have the necessary equipment and technical expertise required to save a life. Tebita Ambulance, therefore, has to significantly invest in changing people's perception and influence behavioral change, to increase the utilization levels of ambulances and consequently their market share.
- **Access to catalytic capital:** Tebita Ambulance is a growth-stage company that seeks to expand the range of services that it provides as well as expand its operational footprint. To successfully execute its growth plans, Tebita Ambulance needs access to capital (approximately USD $3 million up to 2023) that can fund its capital expenditure needs as well as working capital needs. However, Ethiopia has stringent restrictions on foreign currency transactions, which makes it difficult for capital to both enter as well as exit the country. These policies limit the amount of foreign capital supplied to social enterprises in the country. Limited access to capital may hamper Tebita Ambulance's efforts in meeting its growth plans and consequently the potential to create jobs.
- **Poor infrastructure:** Ethiopia has underdeveloped infrastructure, including numerous unnamed streets, frequent power outages, and cellular data network outages makes the development of time-sensitive EMS system difficult. This makes the turn-around-time (TAT) of Tebita Ambulance slower than optimal. Delays caused due to infrastructure constraints also leads to patient preferring to use private cars and motorcycles to get to the hospitals.
- **Access to talent:** To achieve its growth plans, Tebita Ambulance requires to build a capable team to support its founder and CEO. Tebita Ambulance's ability to scale and grow is dependent on the ability of its middle management to execute and implement the plans of the company. Attracting and retaining quality employees is a challenge for a relatively mid-sized company. Junior staff, such as nurses and paramedics, will also be required to be staffed in the ambulances. However, in a country such as Ethiopia, which faces a shortage in the number of trained healthcare professionals, with about 46% of full-time professionals based only in Addis Ababa, hiring quality poses a significant challenge.[6]

> *» Tebita Ambulance has great potential to scale and create significant impact in the market. However, the company needs to consider hiring a team that can carry out and execute the vision while increasing focus on sustainability. «*
>
> **Board member, Tebita Ambulance**

Tebita Ambulance's SWOT analysis

Based on our analysis of Tebita Ambulance's service offerings and business model, the company's strengths, weaknesses, opportunities, and threats that influence job creation opportunities and employee retention levels can be summarized below.

Strengths	Weaknesses
• Tebita Ambulance has a professional and experienced management team, who have local market knowledge. • The company provides regular training to all its staff to increase their job outcomes and increase the number of lives saved. • Tebita Ambulance provides competitive monetary and non-monetary benefits to its employees, which helps in increasing retention. • The company provides practical lessons for its EMT students to improve the quality staff and paramedics churned out in the market.	• Underutilization of the ambulances, which stands at about 40% leads to underutilization of staff. • Competitive salaries offered by private hospitals, which leads to attrition rate for Tebita Ambulance. • The capacity of the middle level management needs to be scaled and grown to be able to handle increased operations. • Poor cellular network in the country which limits the use and incorporation of technology in the dispatch center.
Opportunities	**Threats**
Opportunities for Tebita Ambulance to create more job opportunities lies in its ability to grow sustainably. Opportunities that would facilitate the growth for Tebita Ambulance includes: • Ethiopia's high population growth and size will ensure that Tebita Ambulance increases its market share locally, thereby creating more employment opportunities. • An accommodating government that is trying to open up the country. This can enhance ease of doing business in the country and thereby facilitate international organizations/enterprises to set up in the country. These can be targeted by Tebita Ambulance to provide emergency ambulance services. • Limited competition in the organized sector in Ethiopia.	Any threat that impedes the growth of Tebita Ambulance, impedes the company's potential to subsequently increase and create job opportunities. These threats include: • Limited human resource capacity for the healthcare sector in Ethiopia. • Psychological aversion of B2C clients to the use of ambulances, which decreases the uptake of ambulance services. COVID-19 may also have a negative impact. • Financial regulations and policies of the country, which leads to limited foreign currency in the market, decreases the ability for Tebita Ambulance to attract growth capital as well as source high quality equipment.

Figure 79:
Tebita Ambulance's SWOT Analysis

Tebita Ambulance's growth model and path to sustainability

Tebita Ambulance is a social enterprise that has established its business lines and has found product-market fit for its services. In the short term, Tebita Ambulance's focus will be on optimization of operational processes, while in the mid-term the focus will be on deepening the market and geographic expansion. In the long term, Tebita Ambulance plans to grow alternative business lines and expand regionally.

	SHORT TERM	MEDIUM TERM	LONG TERM
			Growth of alternative business lines & regional expansion
		Increase market share & geographical expansion	In the long term, Tebita seeks to expand its operational model to other countries and expand the range of services it offers to the medical community. This can be done through: • Manufacture of medical consumables • Increase range of services provided to patients such as: a) Air ambulances to provide immediate critical care b) Setting up advanced first responders centers • Geographical expansion within East Africa
	Increase operational efficiencies	In the medium term, Tebita could focus on expanding its business lines both geographically and from client perspective. This can be done through: • Add new high margin B2B clients and enable the sustainable servicing of 24/7 services to more BoP clients • Geographical expansion of 24/7 ambulance services within Ethiopia to serve more local clients • Innovate a model where students pay for long term training to increase margin	
Tebita's business growth model & path to sustainability	Tebita Ambulance's immediate focus is to increase its internal operational efficiencies. To do this Tebita could focus on: • Increase ambulance utilization levels leading to better margins • Increasing efficiencies in collection methods leading to lesser revenue leakages		
Inputs that will aid business growth	• Support awareness campaigns to drive behavior change regarding usage of ambulance services and emergency medical services • Grant support for 24/7 services • Put in place MIS and financial systems to enhance transparency • Support innovations in mobile money / fintech • Provide better infrastructure including proper naming of roads & better internet connectivity	• Training of staff to enhance: • a) Staff capacity to meet needs of B2B clients • b) Ability to handle higher volumes of operations • Access to patient risk capital a) Equity and grants for expansion b) Debt for working capital • Support government initiatives to increase uptake of EMS	• Curate partnerships with medical technology companies • Increasing management capacity to manage multiple businesses • Access to capital in foreign markets
Job creation outcomes	• Increase in the productivity & utilization of existing staff, which leads to better remuneration and incentives • Increase in indirect jobs opportunities for mobile money agents	• Doubling of decent field jobs (ambulance drivers, nurses paramedics) from 2020- 2023 • Increase number of trained human resources in healthcare	• Creation of top quality jobs in senior management to manage expanded business • Creation of jobs across all business lines both within Ethiopia and across different countries
Social impact outcomes	• Increase in the number of people receiving emergency medical services, which will increase the number of lives saved		

Figure 80:
Summary of Tebita Ambulance's growth model

Short-, mid-, and long-term growth objectives

The current need for Tebita Ambulance is to optimize its internal processes and increase efficiencies to enhance its bottom line and its economic sustainability. A more financially stable Tebita Ambulance can enhance better remuneration prospects to its current staff and create more decent job opportunities in the mid-to long-term.

- **Short-term growth:** In the short term, Tebita Ambulance will need to optimize its operational processes by increasing its ambulance utilization levels, which will result into higher revenues and margins. However, this will heavily rely on behavior change from consumers to increase acceptance and use of ambulances for EMS services. Further, Tebita Ambulance can increase efficiencies in collection methods, which will lead to less revenue leakages in the business. As such, any partnerships with non-cash-based payment providers can be curated.
- **Mid-term growth:** In the medium term, Tebita Ambulance could focus on increasing the number of B2B clients. This will not only lead to increased margins, but also increase the ability of Tebita Ambulance to cross-subsidize low cost 24/7 ambulance services that can increase the number of BoP customers who can be served. Further, Tebita Ambulance could expand its 24/7 ambulance service to other states in Ethiopia thus serving more 24/7 customers. Tebita Ambulance also needs to experiment with different payment methods for students taking up the long-term courses to repay course fees.
- **Long-term:** Once Tebita Ambulance penetrates the Ethiopian market for both remote and 24/7 ambulance services, it can consider expanding into new lines of businesses as well as geographically. The company can expand into manufacturing medical consumables for which it would need support from established medical technology companies. Tebita Ambulance can also expand into new lines of businesses such as air ambulances and setting up first responder centers to provide emergency care. From a geographical perspective, Tebita Ambulance could expand into other East African countries such as Djibouti, Eritrea, Somalia, and South Sudan, which are highly underserved with EMS services.

Inputs that will aid business growth

Awareness campaigns to drive behavioral change: Tebita Ambulance will need support from other ecosystem players such as developmental partners, to provide mass education about benefits of EMS service provision in the country. This will consequently increase awareness of the utility of ambulances as a first responder in a healthcare emergency and hence increase demand for service.

- **Provide grant support for the 24/7 ambulance services:** Tebita Ambulance can work with various developmental partners that can provide grant support to the users of 24/7 ambulances to stimulate the uptake of the use of ambulances especially to the customers that do not have ability to pay for the service.
- **Access of patient risk capital:** Tebita Ambulance will require access to patient risk capital in the medium term. This will be in form of (a) debt financing that will be used for working capital, and (b) grant and equity capital that will be used in the more CAPEX heavy business lines. This includes financing expansion regionally and within Ethiopia and acquisition of helicopters that will be used for air ambulances.
- **Training of staff:** As Tebita Ambulance grows, it will need to expand its staff's capacity and ability to handle B2B clients. This can be done through continuous training. Further, with the increased capacity of operations, the staff need to be continually trained to handle higher volumes of operations.
- **Support government initiatives that will enhance uptake of EMS:** The government of Ethiopia can be supported by ecosystem players to come up with initiatives and policies that will enhance the uptake of EMS services, which will increase the demand for service and foster the growth of Tebita Ambulance.
- **Curate partnerships with medical technology companies:** Through support from ecosystem players, Tebita Ambulance can be supported to curate partnerships with medical technology companies. Such technological companies can support Tebita Ambulance to innovate in the development of medical consumables.
- **Access to capital from foreign markets:** In the long-term, as Tebita Ambulance expands regionally into East Africa, the company would need support to access capital from these foreign markets to establish and expand its operations in these markets.

Job creation outcomes

- **Increased staff productivity and utilization that may lead to better remuneration prospects:** Increased internal operational efficiencies such as increasing ambulance utilization levels, will lead to increased staff productivity and utilization due to reduced staff down-time. As such, Tebita Ambulance can consider providing better remuneration packages to its staff.
- **Doubling the number of field jobs:** Once Tebita Ambulance increases its market share and expands within Ethiopia, it will need to hire more employees that will be staffed in the both the 24/7 ambulance and remote ambulances as ambulance drivers, nurses, and paramedics. Further, more staff would need to be hired at the dispatch center to coordinate calls into the dispatch center.
- **Increased number trained human resource in healthcare:** Through ramping up the number of students trained for the EMT courses (long-term, 2-year courses) Tebita Ambulance has the potential to increase the capacity for human resources in the healthcare sector in Ethiopia by churning out about 470 paramedic graduates annually that can be absorbed by other health facilities.
- **Creation of top-quality jobs in the senior management level:** As Tebita Ambulance grows its various business lines it will need to increase its management capacity to oversee its expansion and manage its different business lines.

CASE STUDY 05

WASHKing: Affordable and Eco-Friendly Sanitation Facilities (Ghana)

Company Ownership and History

WASHKing is a budding social enterprise based out in Accra, Ghana, providing environmentally-safe sanitation facilities for low-income households in the Greater Accra region. The enterprise constructs eco-friendly toilet facilities by collaborating with local municipal assemblies. WASHKing was founded by Dieudonne Kwame Agudah in 2016.

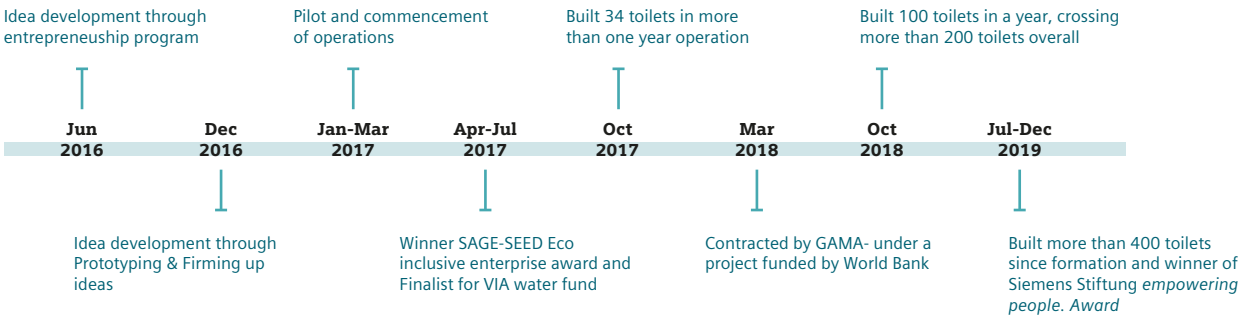

Figure 81:
WASHKing's Journey

WASHKing's value proposition to customers

WASHKing's key differentiation is that it provides a line of quality biodigester fitted toilet facilities, tailored to meet needs and wishes of low-income urban dwellers. Biodigesters are an eco-friendly alternative to conventional septic tanks/soak pits and have the key advantage of limited water usage.

Biodigesters use a bio-matrix to separate solid waste from liquid, with the solid waste further broken down by the bacteria in the bio-matrix. The separated liquid is further treated and leaches away in to the ground; the biodigester toilets also comes with micro-flush that uses only 500 ml water per flush. Unlike the conventional toilet, biodigester fitted toilets require less maintenance and are odor free. Further the biodigester fitted toilets are easy to maintain and they do not require waste removal through vehicles. Also, the toilets can be constructed in areas susceptible to water logging.

Analysis of WASHKing's product range

WASHKing's technology is an on-site toilet treatment technology made up of a substructure known as biodigester and a superstructure which can be built with different materials such as pre-cast slabs, bamboo and blocks. It separates flushed liquid and solid waste using a bio-filtration layer within the biodigester. With the addition of organic enzymes, the feces on the bio-filtration platform is reduced and broken down into manure. The liquid component is treated further and released into a soak-away or leach-field system, or recovered for further use.

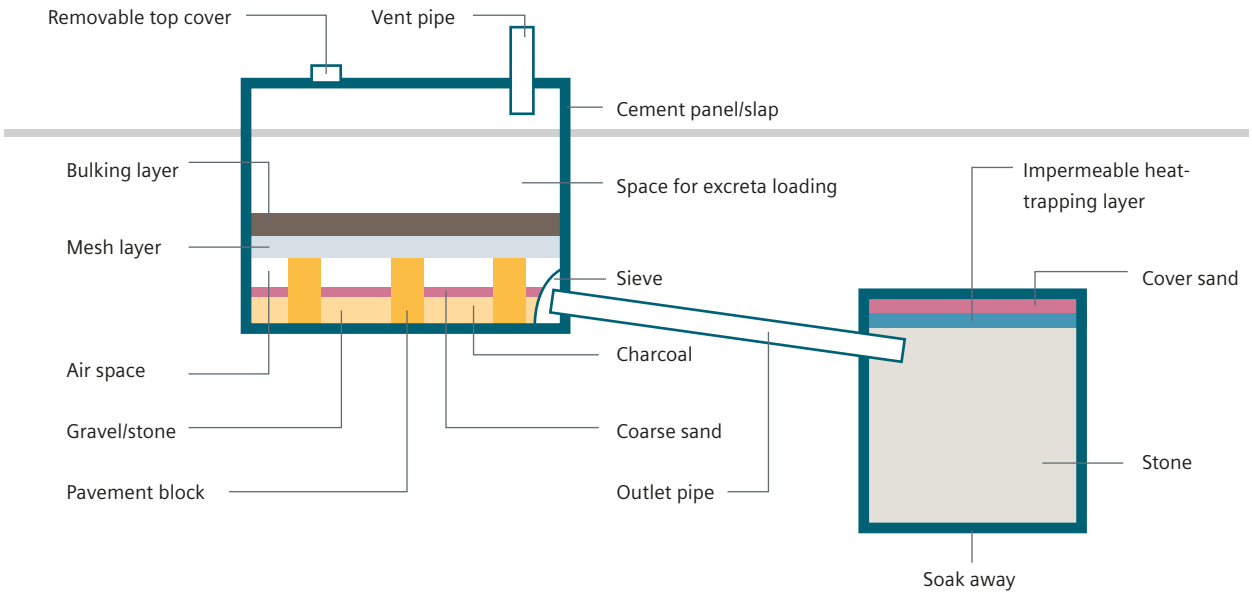

Figure 82:
Schematic representation of biodigester technology

The biodigester is the core technology underpinning WASHKing products. WASHKing has come up with different combinations of biodigesters and offers them both as standalone, core products or in addition to standalone toilets.

Customer Segments

In 2016, WASHKing conducted a primary survey and the outcome of this effort resulted in the identification of three customer segments for WASHKing.

- **Urban low-income households:** From a customer preference perspective, WASHKing has realized that this section of the customer segment is in need of either a biodigester facility or a stand-alone toilet, and they prefer reliable facilities with quality fixtures. It was also found that this customer section is willing to pay a premium if there is flexibility with respect to payment terms. This section can be best reached through direct marketing, door to door campaigns, and media campaigns via local radio, posters, etc.
- **Institutional customers (e.g., schools, churches, and hospitals):** Educational institutions, churches, and small hospitals are examples of institutional customers. These customers typically ordered in bulk to meet institutional needs for sanitation facilities. The institutional buyers are willing to pay a premium price for aesthetics and high quality. Furthermore, they can pay in advance for the construction. Institutional buyers are best reached through direct contact via door-to-door sales pitches.
- **Institutions serving the urban poor:** NGOs (local and international) and international foundations are the key players within this category. With key characteristics of these customers considered, this category of customer is also willing to pay a premium for quality and also purchase products in large quantities. Payments are usually made in installments based on completion of pre-agreed milestones.

Sales and distribution channels

WASHKing's presently relies on its own sales force and third parties such as independent distributors (e.g. sanitation sales agents and local builders), sanitation brokers, civil society organizations, etc. to reach its target customer market.

WASHKing has two modes of reaching out to its end consumers:

- **Direct approach:** In this approach, the WASHKing team directly reaches out to end consumers. There is a set of sales agents and existing customers who act as referral points in the community. Similarly, the WASHKing sales team goes to church assemblies and landlord and landlady associations to generate awareness about their products and service offerings.
- **Indirect approach:** In this approach, WASHKing relies on its partners to reach out to the end consumer. There is a government agency called Environmental Protection Agency- EPA, with which WASHKing has an informal partnership; EPA officers pass on leads to WASHKing in return for a token incentive amount. Similarly, WASHKing bids for work orders from NGOs which are working on sanitation.

WASHKing has constructed over 500 toilets since inception largely through its indirect approach. The majority of these toilets were funded through the ongoing World Bank-funded Greater Accra Metropolitan Area Water & Sanitation program, implemented by Ledzokuku-Krowor Municipal Assembly (LEKMA).

Competitive scenario

Specifically within the biodigester technology sector, WASHKing faces competition from companies like Biofil, Samalex and Ecosafe. In addition, there are public toilet operators and NGOs like People's Dialogue that have adopted different sanitation technologies. Although these competitors pose a challenge, WASHKing competes on crucial customer values such as cost, technology, marketing, reach, speed on delivery, aftercare, etc. For instance, competitors offering biodigester toilets do not offer flexible payment options, focus on the relatively well off, and are often unable to provide the needed maintenance services.

WASHKing's diversification plans

- **Enabling financing options for toilet construction:** The upfront capital commitment requirement as well as limited geographic coverage of subsidy programs limits affordability of customers to invest in constructing a toilet. To address this, WASHKing plans to set up an internal revolving fund to provide financing support to customers. This will be carried out as an activity separate from the marketing and customer relations function to ensure robust credit assessment, monitoring, and collections. WASHKing estimates that it would need capital in the range of 200,000 to 250,000 Ghanaian cedis (USD $34,000-$42,500) to conduct an experimental pilot and assess the viability of this model.
- **Build and deepen service offerings:** A large section of the population is interested in having a private toilet but cannot afford to provide 30% of the cost upfront. This customer segment continues to use public toilets by paying an amount of 50 pesuwas (USD 8.5 cents) per usage. WASHKing proposes to develop a pay-as-you-use model to cater to this customer segment. WASHKing plans to start offering pay-as-you-use toilet facilities with the use of a smart lock technology. WASHKing believes that this can be made to work as a toilet intended for the use of a close ended community. The community members can gain access to a dedicated toilet with the key advantage that no upfront investment is required from the customer. This model also has the benefit of creating additional jobs since there is a need to engage local youth as "sanipreneurs" for managing access to the facility as well as maintaining hygiene standards. This model aligns with the target customers' current behavioral patterns and, hence, there is a chance to scale it up. The key aspects of "pay-as-you-use" model are:
  - Smart Lock Technology: The Smart Lock technology has a scanner which scans a QR code that unlocks the door to access the toilet facilities. The technology is powered by AA batteries and it can also be operated remotely.

- Sanipreneur: These are semi-skilled and unskilled youth who will be hired to manage the pay-as-you-use facilities. The sanipreneurs will provide codes to access the facilities for a usage fee. WASHKing will have a revenue sharing arrangement with these entrepreneurs; the CEO has communicated that the sanipreneurs will receive about 15-20% of the usage fees collected.

The critical points for this service are the need to raise capital to fund the upfront cost of constructing a toilet/biodigester and deployment of Smart Lock technology in day-to-day operation of the facilities. A proposed grant from Siemens Stiftung will enable WASHKing to initiate pilot operations using the smart lock technology and field test the product developed. WASHKing aims to construct over 70 such toilets over the next 12-month period.

WASHKing's job creation impact

Currently, Dieudonne is supported by a small three-member management team: 1) an Operations & Project Executive 2) a Marketing & Customer Relations Executive; and 3) a Finance & HR Executive. Apart from the management team, WASHKing works with a number of skilled local sanitary artisans (masons, carpenters, steel benders, painters, tilers, and plumbers) who build toilets. WASHKing currently employs 13 sanitary artisans on its payroll. If there is a need for additional sanitary artisans to meet customer demand, WASHKing engages with casual laborers on a daily rate basis. WASHKing's business model has the potential to impact job creation in Ghana at three broad levels:

Executive management:

At the executive management level, WASHKing currently employs a three-member management team. WASHKing has recently brought an Operations executive on board to relieve the pressure of operational execution from the CEO's list of responsibilities. WASHKing intends to strengthen the operations team further by recruiting two additional junior team members. WASHKing also has plans to separate HR functions from Finance by recruiting a separate HR lead. From the job creation perspective, within the executive team, there is likely to be an additional three to five personnel by 2025 and, if the enterprise continues to grow at the projected levels, it has the potential to add another five personnel at the executive management level by 2030.

The CEO plans to focus completely on strategic direction, business development, and partnership building. This is a mark of a maturing organization wherein the founder builds institution capacity to ensure both business growth and continuity of operations. However, at the present moment, most of the decision making and institutional knowledge is concentrated with Dieudonne.

Sanitary artisans:

In May 2020, WASHKing converted the contractual relationship with its 13 sanitary artisans into a formal employment relationship. These 13 artisans include seven masons, two plumbers, two tilers, and two painters. WASHKing had, so far, engaged with these sanitary artisans on a daily rate basis and these employees were paid on average 60 Ghanaian Cedis (USD $10) per day. However, under a direct payroll structure, masons on average would be paid 1,500 Ghana Cedi (USD $255) per month.

In the short term, the objective of this is to gain greater control over execution and predictability of skilled labor availability. In the longer term, the objective is to build a more blended execution pool with lower cost trainee artisans working side by side with the more experienced sanitary artisans. WASHKing believes that trainee artisans would be paid less than 1,000 Ghana Cedi (USD $170) per month. At the projected levels of business growth, the enterprise is likely to add another 10 sanitary artisans by 2025 and, if the enterprise is successful in maintaining the growth levels, the enterprise has the potential to add another 15-20 sanitary artisans by 2030.

Sanipreneurs:
The bulk of the job creation impact of WASHKing is projected to occur by the creation of a new breed of "sanipreneurs". These sanipreneurs will be tasked with the responsibility of managing access control, maintenance, and revenue management of the pay-as-you-use toilets that WASH-King intends to deploy with support of Siemens Stiftung. The sanipreneurs will be contracted on a revenue sharing basis and the financial viability of the model will be tested in 2020-21.

Sanipreneurs will be provided a 15-20% commission on each usage and this would provide productive part-time employment opportunities for youth in the community. WASHKing intends to construct 72 pay-as-you-use toilets every year by leveraging Siemens Stiftung's grant support and an estimated 72 youth will be benefitted by this line of business every year. The earning potential of each sanipreneur depends on the number of usages in a month. Assuming that each toilet is likely to serve about 5-8 families (of 4-6 members each) and a per-use revenue commission of 10 Pesuwas (USD 8.5 cents) a sanipreneur is likely to earn between 300 to 700 Ghana Cedi (USD $50 to $120) per month.

If WASHKing continues to establish 72 new pay-as-you-use facilities per year, then the enterprise can create 360 sanipreneur positions within its network. If WASHKing can prove the viability of this model, it can potentially raise more funding, in line with the Siemens Stiftung support, and it can create significantly more direct employment as well as indirect employment in the form of sanipreneurs.

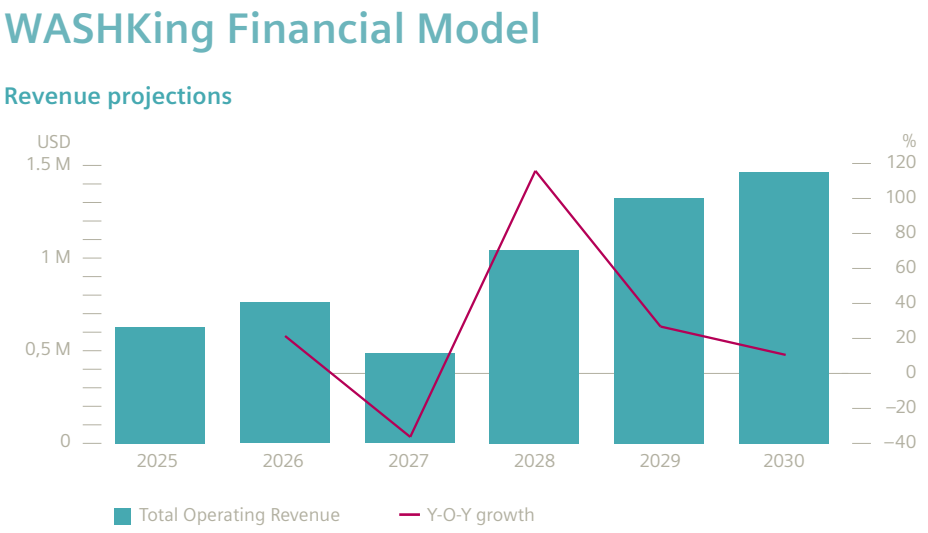

Figure 83:
WASHKing revenue trends (historical and projected)

WASHKing revenues during last three years have been overwhelmingly dependent on one source – partnering with the World Bank's GAMA program. WASHKing's revenue grew by 21% in FY-2018 since it bagged a number of toilet construction projects under the program. Similarly, revenue growth plummeted to -36% in FY-2019 as the GAMA program was in the process of winding down.

Since the GAMA program was extended until December 2020, WASHKing has been able to revive its growth. It has already completed about 100 toilets this year (until May 2020). WASHKing expects to construct an additional 140 toilets in the remaining seven months of 2020 under the GAMA program.

To build sustainability, WASHKing has tried out alternate models of financing and the prominent one among them is the pay-as-you-use model. WASHKing is in the advanced stages of negotiating a grant support initiative with Siemens Stiftung and will allocate a portion of the grant money to set up a revolving fund to construct pay-as-you-use toilets and build capacity to manage the new model.

To grow, WASHKing will also expand operations to six regions in close proximity to existing operations. In the longer term, the enterprise plans to extend operations to the Central and Eastern regions of Ghana.

Funding sources	Projected construction (toilet units)		
	2020	2021	2022
World Bank-GAMA	200	0	0
Philanthropic Foundation	120	380	0
Siemens Stiftung (Pay-as-you use model)	36	72	72
World Bank-Kumasi initiative	0	0	240
Other Programs	0	0	188
Total	**356**	**452**	**500**

Figure 84:
WASHKing projections- unit construction

Composition of WASHKing's expenses

Cost of goods sold: Among the four components of cost structure, direct material is the most significant element of the cost structure followed by labor costs.

- Historically, direct material costs account for about two thirds of revenue. However, in the projection period, WASHKing has altered the allocation of direct material costs to exclude contingencies and commissions. As a result, the share of direct material costs has dropped to just over half.
- Direct labor costs have also come down over time as WASHKing has been able to obtain operational efficiencies and utilize its labor force more effectively. WASHKing also intends to further optimize its cost structure by having a better mix of high-cost sanitary artisans and lower-cost sanitary workers.
- A key reason for the increase in "other expenses" is the indirect selling costs associated with mobilization of customers. As WASHKing is expected to venture more in to direct customer mobilization, there will be substantial indirect selling costs.

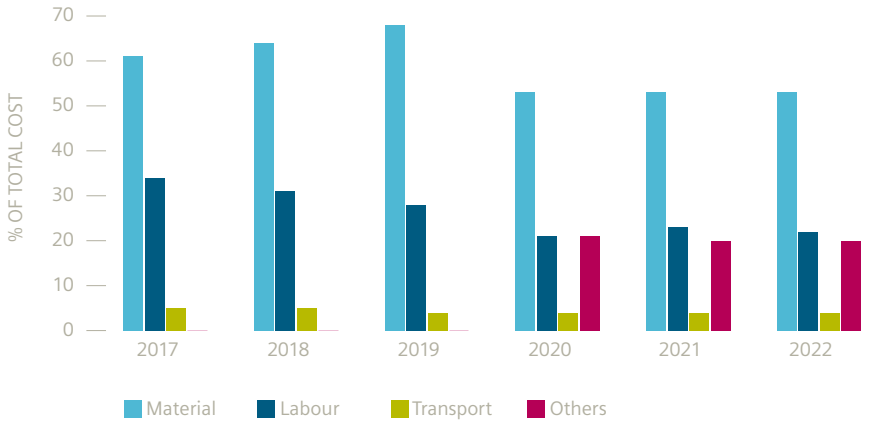

Figure 85:
WASHKing Cost structure trends (% of total cost)

Gross Profit

It is noteworthy that, in spite of a significant fall in revenues in 2019, gross margins have increased substantially to 40%. Two factors contributed to this:

- **Variable nature of cost structure:** In 2019, both direct material and direct labor costs were completely variable. As a result, the operating leverage inherent in the business model restricted the downward pressure on gross margins.
- **One-off advisory revenue:** Recognizing the slowdown in the core business as well as the need to cover the administrative overhead costs, the CEO of WASHKing, Dieudonne, took up consulting assignments that contributed to as much as 11% of the total revenues. This consulting revenue had a direct impact on the profitability as there was no additional operational cost associated with it.

Gross profit margins have steadily improved over the years and are in a healthy range of 25-30%. The gross margins are projected to be in the same range for the next couple of years.

Figure 86:
Gross profit margins (% of revenue)

Capital Structure

WASHKing's business model has been working-capital intensive as, in the GAMA program, only 30% of the construction cost is released upfront. The remaining amount is released in installments post construction. During 2018, WASHKing received a loan of 10,000 Ghanaian Cedis (USD $1,700) from Fidelity Bank, enabled through a Dutch program on water and sanitation. On the basis of a successful repayment history, the credit line from Fidelity Bank has steadily increased over time providing much needed capital support to the business.

The capital requirement of WASHKing has also been sufficiently supported by grants since 2019. In 2019, WASHKing received a grant of €10,000 (65,000 Ghana Cedi) from Siemens Stiftung. Apart from this, WASHKing has also tied up a Ghana Cedi 75,000 grant from Fidelity bank in 2020. This access to debt and grant capital combined with a positive bottom line has resulted in no need for equity dilution to date.

Shareholders equity	2018 (GHS)	2019 (GHS)	2020 (GHS)	2021 (GHS)	2022 (GHS)
Paid up equity	5,000	5,000	5,000	5,000	5,000
Loan from Directors	13,378	37,042	–	–	–
Retained earnings	37,468	99,433	250,889	308,137	463,106
Total	**55,846**	**141,475**	**255,889**	**313,137**	**468,106**

Figure 87:
WASHKing capital structure in Ghana Cedi (GHS)

Impact of COVID-19 Pandemic

The Government of Ghana had only implemented a partial shutdown since the beginning of March 2020 and had made provisions to allow essential services to continue at all times. Maintenance of sanitation facilities and construction of new toilets were classified under essential services and hence they weren't restricted during the partial lockdown. This has resulted in WASHKing being able to deploy 20 toilets a month under the GAMA project in the first five months of the year.

However WASHKing did face operational challenges in terms of:

- **Provision of personal protective equipment:** Sanitary artisans are required to work with protective clothing and sanitizers, which impacted productivity to some extent.
- **Increase in transportation expenses:** Ghana had implemented social distancing norms in public and private transport throughout the country. Because of this, passenger carrying capacity of transport vehicles was reduced to one third, and transport operators increased prices three fold to overcome this burden. This made the daily commute of sanitary artisans from their homes to project sites expensive. WASHKing accommodated this additional cost and eased the burden of the workers.

From a future market outlook perspective, WASHKing may experience a tail wind due to COVID-19. Due to the airborne mode of transmission of COVID-19, the sanitation sector in Ghana is expecting a positive change in consumer behavior. People would be more concerned about personal safety while using public toilets and this safety concern is expected to increase the demand for private toilet construction.

WASHKing's growth opportunities and factors that will drive employment

Factors that will drive revenue and employment growth:

- **Philanthropic capital:** WASHKing's major revenue line has been with projects funded by DFIs. The subsidy provided makes toilet construction affordable for low-income customers. Though the enterprise is piloting alternative models to subsidized toilet construction, the subsidy-driven model will continue to be the major growth driver in the upcoming years. Hence access to philanthropic capital will continue to be a major factor in aiding business growth and employment creation at WASHKing. The company will also depend on grant support to pilot, establish, and scale alternate business models.
- **Consumer behavior change:** The provision of sanitation services is as much a behavioral challenge as it is an infrastructure problem. Consumers of WASHKing are not readily convinced about the need to invest in toilet construction and toilets are not a top priority for them. WASHKing cannot afford to invest in behavior change communication activities. Initiatives to drive behavior change will generate demand for WASHKing products and play a critical role in its business growth and job creation.

Constraints that need to be alleviated to support growth:

- **Working capital:** Since subsidy payments for toilet construction is linked to completion milestones, WASHKing has substantial working capital needs. Interest rates in Ghana are high (~30%) and commercial banks are reluctant to finance small enterprises like WASHKing. Hence, access to working capital support is a critical factor that will aid business growth and job creation in WASHKing.

– **Access to skilled employees:** Apart from the availability of working capital, another critical factor that determines WASHKing's ability to simultaneously execute multiple projects is the availability of sanitary artisans. Expert sanitary artisans command a price premium and there is no readily-available trained pool of sanitary workers. Extensive training will be needed to ensure that a new pool of workers is available to execute construction activities.

Similarly, the success of the pay-as-you-use model is dependent on the availability of entrepreneurial youth who can leverage the earnings from managing toilet facilities to supplement other revenue streams. These sanipreneurs will also need training to manage customers, handle finances, and do basic trouble shooting in case of any technical problems with the solution. Thus, access to skilled and motivated employees will play a critical role in determining business growth and employment creation at WASHKing.

WASHKing's SWOT analysis

Based on our analysis of WASHKing's business model, an analysis of the company's strengths, weaknesses, opportunities, and threats that influence job creation opportunities is summarized below.

Strengths	Weaknesses
• Eco friendly & cost-effective products, customized to customer needs. • A healthy partnership with Local Government Assemblies (LEKMA) enables WASHKing to effectively tap opportunities on the ground. • WASHKing's workforce comprises of a lean senior management team and an experienced execution team. The execution team has been bolstered by the transition of 13 contract-based sanitary artisans into an employment-based relationship. • WASHKing's sanipreneur model has a potential to create part time employment for youths in the community by providing training under experienced sanitary artisans.	• The current business model has a high dependency on subsidies; more than 95% of the toilets built by WASHKing were funded under subsidy schemes and donor support. • WASHKing has to shore up its management and execution capability to scale operations from an average of 20 toilets per month to about 40 toilets per month. Many key HR functions are currently managed by either the CEO or Operations head. • The organization does not have a strategy for employee development and/or employee retention.
Opportunities	**Threats**
• The Government of Ghana is also keen on enforcing sanitation policies to enable landlords/landladies to build toilets. The provision of financing to consumers for toilet construction may spur toilet adoption. The COVID-19 pandemic is also expected to increase the demand for private toilet construction in Ghana. • With the introduction of Smart Lock technology and the availability of pilot funding from Siemens Stiftung, there is potential to implement the innovative pay-as-you-use model that can provide long-term economic sustenance to a new range of sanipreneurs. • The Government of Ghana has plans to fund the Skill Development Fund (SDF). SDF is currently funded by Danish International Development Agency and SDF supports industry-focused, competency-based training programs.	• The Smart Lock technology and pay-as-you-use model have yet to be tested in the market. WASHKing will have to set up robust processes to handle sanipreneurs, monitor operations at scale, and plug revenue leakages. • Well-established competitors like Biofil and emerging smaller ones. • Inadequate availability of sanitary artisans to hire as contract workers. • WASHKing will need to attract affordable-skilled employees for WASHKing's executive team to build management and operational oversight capability.

Figure 88:
SWOT analysis of WASHKing's Business Model

WASHKing's growth model & path to sustainability

WASHKing is a budding social enterprise which is in the process of establishing a sustainable business model. The enterprise is trying out multiple business models of biodigester toilet construction to arrive at a sustainable model. The organization has, so far, relied largely upon subsidies from government sanitation program to construct biodigester toilets, though there is a monetary contribution (30%) from individual households; however, the larger reliance is upon the subsidies (70%).

	SHORT TERM → Achieve product-market fit	MEDIUM TERM → Scale up viable models	LONG TERM → Geographic expansion
WASHKing's business growth model	WASHKing's immediate focus is to align its operations with the needs of the market and funders • Leverage subsidy programs for construction of biodigester toilets • Explore multiple revenue based models like pay-as-you use model to move towards revenue sustainability	WASHKing, in the medium term, could focus on optimizing and scaling viable models • Construct and operate more "pay-as-you-use" models in Accra by standardizing smart lock technology and monitoring of sanipreneurs • Scale up operations of revolving fund • Expansion outside Accra region to acquire access to subsidy programs	• In the the long term, WASHKing can explore leveraging its technology and operational experience by relying on a franchisee network outside Accra & Kumasi • WASHKing provides the technology and design • WASHKing will also provide strategy, marketing and operational advisory support • Franchisee will bring in capital, field monitoring capacity and experience of operating in local context • WASHKing can expand deeper into Ghana on its own strength
Inputs that will aid business growth	• Linkages to sanitation subsidy schemes – Government and development funding institutions • Grant capital from philanthropy for experimenting with non-subsidy models and working capital • Consumer behaviour change for increased demand for safe toilets • Supply of skilled sanitary artisans	• Trained/skilled human resources: executives, sanitary artisans and sanipreneurs • Business development initiatives with NGOs, association of schools, churches and private offices • Patient capital to support scale up of non-subsidy models	• Increased management capacity • Augmented partnerships to facilitate geographic expansion • Legal advice for intellectual property rights protection • HR advisory support to set up right organizational structure • Risk capital- low cost debt to fund working capital requirement
Job creation outcomes	• Generation of revenue sharing job opportunities like sanipreneurs (1 sanipreneur per 'pay-as-you use' toilet) • Generation of seven person days of direct employment for each new toilet constructed	• Addition of 5-10 executives with the commencement of smart lock and revolving fund system • Increase in number of sanipreneurs and increase in sanitary artisans	• Indirect job creation through franchisee model • Increase in number of management executives within WASHKing • Increase in number of sanipreneurs & sanitary
Social & Environmental impact outcomes	• Improvement in access to environmentally & socially safe sanitation and • Improvement in overall health of individuals		

Figure 89:
Summary of WASHKing's growth model

Short-, mid-, and long-term growth objectives

– **Sustenance on subsidy-driven model, exploration of non-subsidy model:** In the immediate term, WASHKing's goal is to leverage the availability of subsidies from a range of governmental and non-governmental organizations to deepen toilet availability in Ghana. Simultaneously, the social enterprise intends to experiment with models that do not rely on subsidies to chart a path to sustainability. However, WASHKing will need support from philanthropic risk capital to successfully carry out its experimentation without running out of capital. One of the potential non-subsidy models is the pay-as-you-use toilet model for which the company has developed a remote lock technology. The company aims to pilot and move towards standardization of this model in the near future.

- **Increased focus on non-subsidy model:** In the medium term, depending upon the availability of subsidy programs in Ghana, WASHKing will continue to rely on subsidy programs to construct biodigester toilets for individual households in regions other than Accra and Kumasi. At the same time, the company will increase its focus on streamlining non-subsidy models by attracting more funds to set up revolving facilities where the fund capital can be used to set up new toilets with returns from the pay-as-you-use operations, funding the construction of new toilets and thus facilitating increased scale of the enterprise.
- **Geographic scale up of non-subsidy model:** In the longer term, WASHKing will reduce its dependency on subsidy programs. The enterprise may spread its operations to other geographies by making use of the technology and operational expertise developed in the Ghanaian context. The franchisee network can help optimal utilization of both capital and management bandwidth.

Inputs that will aid business growth:

- **Philanthropic capital:** To pilot and establish non-subsidy models, WASHKing is in need of grant capital to pilot; especially in the case of the pay-as-you-use model, philanthropic capital will aid in setting up of an internally-revolving fund to finance construction of pay-as-you-use facilities. WASHKing had already secured grant capital funding from Siemens Stiftung to aid this initiative.
- **Working capital:** In the short to medium term, WASHKing will continue to operate based on the subsidy-driven construction of toilets and since payment is provided in a staggered manner after toilet construction, there is a need of working capital financing. Similarly, in the long term, working capital needs will be needed to scale up the pay-as-you-use models as well as facilitate geographic expansion. Since commercial debt interest rates can be as high as 30% in Ghana, WASHKing faces a need for low-cost, accessible funds to fund its working capital requirements.
- **Consumer behavior change:** Many low-income households in Ghana do not perceive the need for having access to a safe toilet to be high in their list of priorities. Mass awareness campaigns and development of targeted behavior change models can aid in changing this state of affairs and spur demand for WASHKing's product(s).
- **Availability of trained/skilled human resources:** The human resource needs of WASHKing are twofold – managerial and operational. As WASHKing's operations become extensive and diverse, there will be a need for instituting an organizational structure that is independent and thus WASHKing will need to attract executives with differentiated skill sets. From an operational perspective, availability of sanitary artisans at different levels of pay scales will be critical to ensure that new construction can proceed apace with a manageable impact on business finances. Apart from the availability of skilled manpower, WASHKing requires HR advisory to support the CEO in organizational polices, structure, and recruitment.

Job creation outcomes:

- **Executives to manage business operations:** As the scale of operations and the diversity of operations increase, WASHKing requires executives to handle additional toilet construction projects and manage new business models. In the medium and long term, the requirement of additional executives to manage different parts of operations ranging from business development, technology development, finance and control, operations management, HR, etc. will be needed.
- **Engagement of sanitary artisans:** WASHKing recently transitioned 13 highly-skilled sanitary artisans from a contractual relationship to an employment agreement. In the longer term, the objective is to leverage this trusted skilled pool to build a more blended execution pool with lower-cost trainee artisans working alongside the more experienced sanitary artisans.
- **Creation of jobs on a revenue sharing basis:** The driving force behind the pay-as-you-use model would be the establishment of sanipreneurs, who will be engaged on a part-time basis and will have a revenue sharing model. In the short term, WASHKing intends to construct 72 pay-as-you-use toilets on an annual basis and thus an estimated 72 youth will benefit from this line of business every year.

IV.

References

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Imprint

AUTHORS OF THIS STUDY

Open Capital Advidors, Kenya
Open Capital Advisors (OCA) is a management consulting and financial advisory firm that drives growth, enables investment, and builds markets across Africa. We help businesses, investors, development partners, and the public sector identify opportunities and deliver unique, impactful solutions. Since 2010, we have completed more than 600 engagements across 20 countries in Sub-Saharan Africa and for global clients focused on Africa. Our locally based team of over 120 offers experience from the world's top consultancies, private equity firms, investment banks, and development organizations including Boston Consulting Group, Citigroup, Credit Suisse, IFC, McKinsey, and The World Bank.

Emily Barran
Millie Maina
Martin Slawek
Irene Hu
Lisa Kuhunya-Maina
Veronica Omondi
Rodney Carew

Intellecap/Aavishkaar Group, Kenya
Intellecap, a part of the Aavishkaar Group, is a pioneer in building enabling ecosystems and channeling capital to create and nurture a sustainable & equitable society. Founded in 2002, Intellecap works across critical sectors like Agriculture, Livelihoods, Climate Change, Clean Energy, Financial Services, Gender & Inclusion, Healthcare, Water and Sanitation, and has delivered over 500 global engagements across 40+ countries and syndicated investments of over $500 Million USD in Capital. Our common action platform, Sankalp Forum, one of the largest global inclusive development platforms, brings together the ecosystem to shape the way markets work for delivering the SDGs 2030. Intellecap through its presence in India and Africa, provides a broad range of Consulting, Research and Investment Banking Services, to Multilateral Agencies, Development Finance Institutions, Social Enterprises, Corporations, Investors, Policy Makers and Donors.

Mercy Mangeni
Vivekanandhan T
Mukund Prasad
Christine Gachui
Karnika Yadav

Studio Nima
Studio Nima accelerates the growth and emergence of social innovations that sustainably address the world's most pressing issues. We plan, incubate, grow and advise social business models in the fields of circular economy, plastic waste recycling, sustainable fashion, future of food, social financing, education and many more. We develop projects across the globe with corporates, foundations, universities and many other stakeholders to advance progress on the Sustainable Development Goals.

Dr. Aline Laucke
Leonhard Nima

Project Management
Carola Schwank
Development Cooperation
Siemens Stiftung

About Siemens Stiftung

As a non-profit foundation, Siemens Stiftung promotes sustainable social development, which is crucially dependent on access to basic services, high-quality education, and an understanding of culture. To this effect, the foundation's project work supports people in taking the initiative to responsibly address current challenges. Together with partners, Siemens Stiftung develops and implements solutions and programs to support this effort, with technological and social innovation playing a central role. The actions of Siemens Stiftung are impact-oriented and conducted in a transparent manner. The foundation's empowering people. Network connects inventors and entrepreneurs who have developed simple technical solutions, and helps to expand their social impact in developing regions. By initiating new forms of collaboration and technology transfer, it supports its members on their way to scale, replicate and expand.
www.siemens-stiftung.org

Liable for the content
Siemens Stiftung
Rolf Huber, Managing Director
Kaiserstraße 16
80801 Munich
Phone: +49 89 / 54 04 87-0
info@siemens-stiftung.org
www.siemens-stiftung.org

Editing
Dr. Aline Laucke, Studio Nima
Leonhard Nima, Studio Nima
Carola Schwank, Siemens Stiftung

Design
hesh.design
Goebenstraße 19
65195 Wiesbaden
Timm Fleckenstein
Melina Schmidt
Daniel Herbert

Siemens Stiftung

Kaiserstraße 16
80801 Munich
Germany

Info@siemens-stiftung.org
www.siemens-stiftung.org