USAID
FROM THE AMERICAN PEOPLE

WaterSHED

CREATING VIABLE AND SUSTAINABLE SANITATION ENTERPRISES

Case Study: A Retrospective Analysis of Rural Sanitation Enterprises in Cambodia

MARCH 2020

This publication was produced for review by the United States Agency for International Development. It was prepared by Tetra Tech.

ACKNOWLEDGMENTS

This case study was prepared by FSG in partnership with WaterSHED. Rishi Agarwal led the analysis with essential participation from Subhash Chennuri, Anand Agarwal, Urmi Uppal, and Ishwar Gawande (FSG).

The authors would like to acknowledge the generous contribution and thought partnership of Geoff Revell, Kong Majel, and Chhoun Nareth (WaterSHED), Lyn McLennan and Janita Bartell (ex-WaterSHED), WASHPaLS Deputy Project Director Dr. Jeff Albert of Aquaya, and WASHPaLS Research Advisor Dr. Mimi Jenkins.

The following individuals reviewed this document and provided valuable input to ensure its comprehensiveness and accuracy: WASHPaLS Project Director Morris Israel (Tetra Tech), Elizabeth Jordan (USAID), and Jesse Shapiro (USAID).

The authors would like to thank Abhishek Khanna (FSG) for contributions to the case study and Kashmira Ranji (FSG) for her invaluable logistical and other support.

Authors: Rishi Agarwal, Subhash Chennuri, Anand Agarwal, and Urmi Uppal, FSG

Preferred citation: USAID, 2020. *Creating Viable and Sustainable Sanitation Enterprises. Case Study: Cambodia.* Washington, DC., USAID Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) Project.

Prepared for the United States Agency for International Development by the Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project under Task Order number AID-OAA-TO-16-00016 of the Water and Development Indefinite Delivery Indefinite Quantity Contract (WADI), contract number AID-OAA-I-14-00068.

Tetra Tech Contacts:

Morris Israel, Project Director
morris.israel@washpals.org

Jeff Albert, Deputy Project Director
jeff.albert@washpals.org

Lucia Henry, Project Manager
lucia.henry@tetratech.com

Tetra Tech
1320 N. Courthouse Road, Suite 600, Arlington VA 22201
Tel: 703-387-2100 | Fax: 703-414-5593
www.tetratech.com/intdev

CREATING VIABLE AND SUSTAINABLE SANITATION ENTERPRISES

Case Study: A Retrospective Analysis of Rural Sanitation Enterprises in Cambodia

March 2020

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

CC	Community Champions
COGS	Cost of Goods Sold
DA	Demand Activator
GMVA	Gross Margin Variance Analysis
GPPC	Gross Profit Per Customer
HP	High Profit
LP	Low Profit
MBS	Market-Based Sanitation
MFI	Microfinance Institution
NGO	Non-Government Organization
P&L	Profit and Loss
PVC	Polyvinyl Chloride
R&D	Research and Development
USAID	United States Agency for International Development
USD	United States Dollar
WASHPaLS	Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability
WaterSHED	Water, Sanitation, Hygiene, Enterprise Development

GLOSSARY OF TERMS

Term	Definition
Capital asset	Equipment (e.g., a truck or mold to cast concrete components) with a useful life spanning multiple years. Capital assets, unlike raw materials, are not "consumed" in the manufacturing and sale of each toilet; their useful life depends on their frequency of use, quality, and maintenance, and their value can depreciate (see definition below).
Cash net profit	The revenue earned from the sale of toilets in excess of all cash expenses incurred by an enterprise. Cash net profit is the amount available to the entrepreneur to take home as income and/or re-invest in the business. Cash net profit differs from the net profit as per conventional accounting norms, which include non-cash expenses such as depreciation (see definition below).
Cost of Goods Sold (COGS)	In the sanitation context, COGS consists of expenses incurred by an enterprise exclusively for the procurement of raw materials and manufacturing or assembly of a toilet or its constituent components. It includes the cost of raw materials (e.g., cement), components (e.g., pans), and labor costs for workers involved in manufacturing, assembly, and installation.
Customer	Member(s) of a household that purchase(s), use(s), and oversee(s) the construction, operation, and maintenance of a toilet.
Demand activation	Direct sales and marketing activities carried out to persuade customers to convert product awareness and interest into a purchasing decision. Demand activation is distinct from "demand generation," which drives increased awareness and interest in hygienic sanitation behaviors and improved sanitation products and services.
Depreciation	The decline in the value of the equipment (e.g., trucks and molds) due to routine wear and tear. A depreciating asset will eventually be replaced after its utility is exhausted. Depreciation is a non-cash expense; while the enterprise makes full payment to purchase the equipment, its cost is spread over its useful life of multiple years and recognized annually. Example: The total cost for a mold with a lifespan of four years is paid in full in Year 1; however, a portion of this cost will be recognized (as a non-cash expense) each year over the four-year period.
Expenses	The expenses incurred by sanitation enterprises comprise costs directly incurred on producing toilets and/ or related services, and other indirect costs not linked to the production of each toilet, but required to operate the business. These expenses include COGS, operational expenses, and other expenses.
Gross Margin Variance Analysis (GMVA)	An analytical method to compare gross profits of the same enterprise from two different periods or budget vs. actual gross profit and identify drivers of differences. In our context, the method has been adapted to compare the gross profits of two different sanitation enterprises and identify the significant drivers of differences in the gross profits. The five drivers analyzed in our context are: "number of customers", "price", "cost", "product mix", and "additional sanitation-related products". The graphical representation of a GMVA comparison is called a "GMVA bridge."
Gross profit	The difference between revenue from the sale of toilets and the Cost of Goods Sold (COGS). Gross profit is a metric of an enterprise's efficiency in converting raw material and labor expended into revenue from the sale of toilets. High gross profit implies that the enterprise is generating significantly more revenue over its costs.

Term	Definition
Market actor	In the sanitation context, an entity from the private, public, or non-profit sector that is not subsidized by donors or philanthropic entities, and participates directly or indirectly in the market by interacting or transacting with other market actors (e.g., sanitation enterprise, input supplier, financial service provider). Non-market actors include entities that are subsidized to play a specific role in the market (e.g., an NGO that implements programs to develop a sanitation market).
Net profit	The difference between an enterprise's total revenues and expenses (as defined above), including non-cash expenses (e.g., depreciation) expressed in absolute terms (e.g., USD). Net profit shows the amount that an enterprise has earned (or lost) over a definite period (typically a quarter or a year).
Non-market support	Financial or operational assistance provided to a sanitation enterprise by a non-market actor to help the enterprise function (e.g., providing a cash grant or supplying free molds to enterprises). Non-market support might impact the enterprise's profitability, viability, and sustainability (see below).
Operating expenses	Expenses on overheads that are required for the enterprise's functioning. Examples of operating expenses include expenses towards rent, utilities, commissions paid to sales agents for selling toilets, maintenance of equipment, etc.
Other expenses	Expenses on items that are unrelated to the core business of the sanitation enterprise. Example: interest payment on a loan taken for purposes not related to the products or services of a sanitation enterprise.
Profit	The difference between revenue and expenses. Profit is expressed in absolute terms (e.g., USD). A negative profit is termed a loss.
Profit and loss statement (P&L statement)	A statement providing a summary of the enterprise's revenues and expenses, to arrive at a profit (or loss) for the enterprise. A P&L statement summarizes an enterprise's financial performance over a definite period (typically a quarter or year).
Profitability	Profit relative to the revenue of an enterprise expressed as a percentage. Higher profitability indicates an enterprise is able to retain a higher share of revenue after accounting for expenses. Two enterprises with the same profits (e.g., USD 1,000 annually) may have different profitability relative to revenue. The one earning USD 1,000 as profit from sales of USD 10,000 is more profitable (generating a surplus of 1,000/10,000 = 10 percent) than the one earning USD 1,000 from sales of USD 50,000 (2 percent surplus)
Revenue	Revenue for sanitation enterprises is the money received by selling toilets and related services (e.g., installation) if offered and charged separately. Sanitation enterprises typically sell toilets as whole units (i.e., a package comprising the necessary components), individual toilet component(s) (e.g., cement rings, pit covers), or both. Enterprises typically provide two related services to customers—delivery and/or installation of toilets—and either charge separately or include them in the price of the toilet.
Subsidy program	In the sanitation context, an initiative run by a government or non-government entity to provide financial assistance to a customer by paying a part of or the entire price of the toilet purchased by them.
Sustainability	The likelihood that an enterprise remains viable over an extended period of time (i.e., multiple years) and continues operations without external, non-market support.
Viability	A subjective measure of profit relative to a variety of explicit or implicit factors considered by an entrepreneur (e.g., minimum income expected; income from other non-sanitation specific enterprises; time and effort; or financial investment and risk).
Working capital	The money required by a sanitation enterprise to finance its operational and other expenses. An enterprise needs working capital to meet immediate expenses such as raw materials, laborers, rent, and utilities.

PREFACE

The Water, Sanitation and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project is a 5-year task order implemented by Tetra Tech in collaboration with several non-governmental organizations and small-business partners— Aquaya Institute, Family Health International (FHI 360), FSG, and Iris Group—that contribute expertise in state-of-the-art WASH programming and research. Distinguished academics, practitioners, and policymakers from across the WASH sector regularly provide expert perspectives to the project through an internal research working group and an external WASHPaLS Advisory Board.

WASHPaLS supports the Agency's goal of reducing morbidity and mortality in children under five by ensuring USAID programming employs high-impact, evidence-based environmental health and WASH interventions. The project identifies and shares best practices for achieving sustainability, scale, and impact by generating evidence to support the reduction of open defecation and movement of communities up the sanitation ladder while also focusing on novel approaches for reducing feces exposure to infants and young children (IYC). Specifically, the project:

1. offers USAID missions and technical bureaus ready access to thought leaders and analytical expertise across a wide range of WASH themes in response to their needs (Component 1);

2. generates evidence through implementation research to increase the sector's understanding of and approaches to sustainable WASH services, the effectiveness of behavioral and market-oriented approaches to sanitation, and measures to disrupt pathways of fecal exposure to infants and young children (Component 2);

3. administers a small grants program on innovations in hygiene behavior change (Component 3); and

4. engages and partners with national and global stakeholders to promote the use and application of WASHPaLS-generated evidence and global best practices by practitioners and policymakers, tapping into broad coalitions and dynamic partnerships (Component 4).

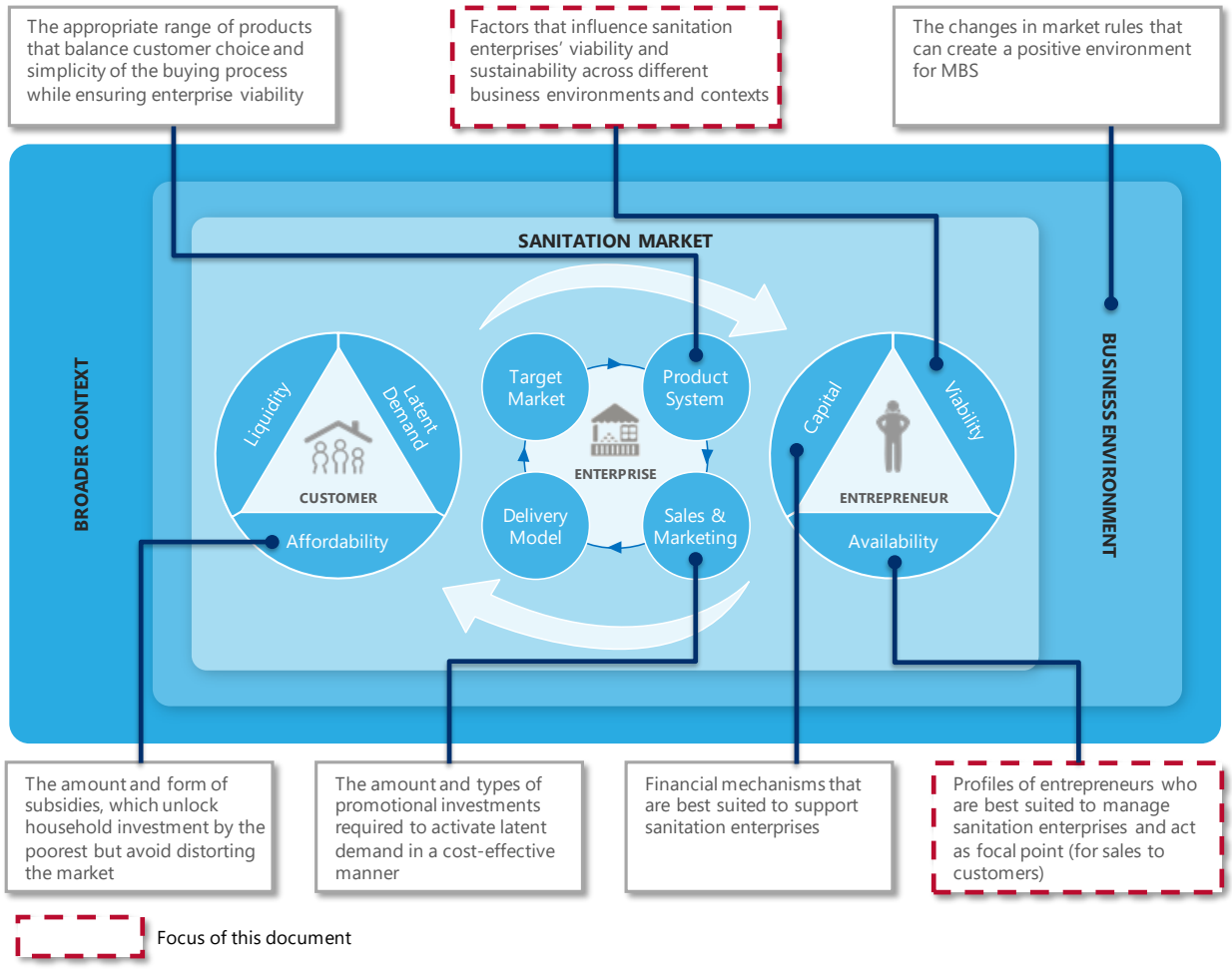
Among the first tasks of WASHPaLS was the production and dissemination of three in-depth desk reviews focusing on community-led total sanitation (CLTS), market-based approaches for sanitation, and hygienic environments for IYC. The desk reviews identified gaps in evidence-based implementation and provided a basis for identifying areas in need of further investigation and implementation research. This case study presents findings and recommendations on one of those areas of research undertaken to support market-based sanitation (MBS), namely, how to ensure the viability and sustainability of rural sanitation enterprises.

EXECUTIVE SUMMARY

Universal access to basic sanitation is a long-standing challenge despite decades of interventions by governments, donors and funders, and civil society. Even though the importance of the private sector for the supply of toilets was recognized as far back as the 1980s, few development programs applying market-based sanitation (MBS) approaches have scaled. The objective of the Water, Sanitation and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) project is to better understand the barriers to scaling MBS interventions and improve programming globally.

The USAID/WASHPaLS *Scaling Market-Based Sanitation: Desk Review on Market-Based Rural Sanitation Development Programs (2018)* highlighted the barriers sanitation markets face to scale, and identified some remedial interventions at the three levels of the sanitation market system—the core **sanitation market** itself, the **business environment**, and the **broader context**. The desk review identified multiple questions for further exploration of areas with inadequate evidence (Figure A). This case study provides carefully collected evidence to understand ***how sanitation enterprises can be made viable and sustainable?***

Figure A: Sanitation Market System and Barriers to scale



This research addresses the enterprise **viability**[1] and **sustainability**[2] questions, for which we conducted retrospective studies in partnership with three mature MBS programs in Cambodia, India (state of Bihar), and Nigeria. As part of the retrospective studies, we realized that few – if any – MBS programs were tracking the financial performance of sanitation enterprises. Therefore, the project team interviewed enterprises that had received technical support from MBS programs to build detailed financial statements. We then undertook comparative analyses to identify the contextual and strategic choices (factors) that drove differences in performance among enterprises within the same program. We also assessed how enterprise-specific support provided by a particular MBS program influenced enterprise viability and sustainability.

This case study examines the experiences of sanitation enterprises that were supported by the WaterSHED *Hands-Off Sanitation Marketing* intervention in Cambodia. We present research findings and make recommendations directed at MBS program implementers to help improve the viability and sustainability of the sanitation enterprises they support.

We did not observe many standalone sanitation businesses in Cambodia. Entrepreneurs more often operated their sanitation enterprise alongside another related business such as concrete products manufacturing or construction material retail, with which it shared such select costs as rent, utilities, or transport. An entrepreneur's strategic decisions made exclusively for the sanitation enterprise are reflected in its *gross profit*, a quantity dependent on the ***number of customers***, the ***price*** of the various products offered, the ***costs*** of manufacturing various products, the ***relative quantities*** of products (each with different profits) sold by the enterprise, and the ***additional sanitation-related products*** that it sells.

We utilized Gross Margin Variance Analysis (GMVA) to compare the gross profits of pairs of different sanitation enterprises to identify the significant drivers of differences in their respective gross profits. In the *Hands-Off* context in Cambodia, the key drivers used to increase gross profits were increasing *the share of customer's wallet* by selling them additional or more expensive products, *actively adding customers*, and *managing costs*. By offering customers more choice and the convenience of procuring all sanitation components from one place, enterprises increased revenue, and consequently, the profit earned per customer. Enterprises added customers through active marketing strategies such as direct engagement with customers and investing in sales agents and opportunistically partnered with subsidy programs to benefit from a temporary boost in sales. Offering credit also attracted those customers who could not pay the full price upfront. Successful enterprises also managed costs by employing casual labor supplemented with labor contributions from the entrepreneur and their family.

Our analyses also revealed that most sanitation enterprises in the *Hands Off* context were ***sustainable***, in part because of the *Hands-Off* commitment to avoid creating any financial or operational dependencies on non-market support. The program brokered linkages among different actors in the market system but encouraged direct interactions from the start. Enterprises with low profits, however, might find it difficult to finance the replacement of capital assets (i.e., molds and truck) because the share of the profit they need to set aside for this purpose significantly reduces their income. The challenge is higher for a small minority of low profit enterprises for which sanitation represents the primary source of income for the entrepreneur.

---

[1] Viability is a subjective measure, evaluating profit relative to a variety of explicit or implicit factors considered by an entrepreneur (e.g., minimum income expected, income from other non-sanitation specific enterprises, time and effort, or financial investment and risk).

[2] Sustainability is the likelihood that an enterprise remains viable over an extended period of time (i.e., multiple years) and continues operations without external, non-market-based support.

1. INTRODUCTION

1.1. CONTEXT FOR THE STUDY

Inadequate access to sanitation remains a significant problem globally. According to the UNICEF-WHO Joint Monitoring Programme,[3] 2 billion people still do not have access to basic sanitation facilities, while 673 million people still practice open defecation. Inadequate sanitation is linked to the transmission of numerous communicable diseases—particularly cholera, dysentery, hepatitis A, typhoid, and polio—with a disproportionally large effect on children. The scale of investment required to deliver sanitation services to hundreds of millions of people around the world that currently lack access is likely beyond the capacity of public finance alone.

Market-based sanitation (MBS)—through which private sector actors supply toilets and related services to individual households—is a promising approach to deliver onsite sanitation products and services to low-income populations that are not connected to centralized wastewater collection and conveyance systems. Successful MBS interventions in Southeast Asia and Bangladesh demonstrate the promise of this approach, but the consistent achievement of scale of such interventions has been a challenge. A USAID desk review[4] on MBS interventions identified a range of barriers to scaling sanitation market interventions, which included, among others, an inadequate supply base for toilets.

A central strategy of many MBS programs is to increase the participation of local entrepreneurs in the sanitation value chain, but fostering commercially viable and sustainable sanitation enterprises can be challenging. While the USAID desk review identified a range of tactics and factors that enabled enterprises to grow and thrive, more evidence on the key drivers of enterprise performance was needed. Furthermore, the review determined that implementers of MBS programs typically have a limited understanding of the viability and sustainability of the enterprises within their programs because most do not track the financial performance of enterprises. Monitoring enterprise performance is often limited to the number of toilets sold, which alone does not provide a complete picture; high sales volumes do not necessarily correspond to large profits and *vice versa*. Consider two hypothetical sanitation enterprises: *Acme* and *Best.* Both sell toilets, albeit at different prices, and in different numbers (Table a). Despite *Best* selling only a third of the toilets as *Acme*, it generates a higher *overall* profit because of significantly higher profit *(price less cost) per toilet*. Meanwhile, although both enterprises are, strictly speaking, profitable, they are not necessarily *viable or sustainable* (see Box 1).

Table a. Acme and Best enterprise summary

Metric	*Acme*	*Best*
Price per toilet (a)	*USD 50*	*USD 80*
Cost per toilet (b)	*USD 40*	*USD 40*
Profit per toilet (p=a-b)	**USD 10**	**USD 40**
# of toilets sold (q)	**30**	**10**
Total Profit (p * q)	**USD 300**	**USD 400**

[3] United Nations Children's Fund (UNICEF) and World Health Organization, (2019). Progress on household drinking water, sanitation and hygiene 2000-2017. Special focus on I\inequalities. New York: United Nations Children's Fund (UNICEF) and World Health Organization.

[4] USAID, (2018). *Scaling Market Based Sanitation: Desk review on market-based rural sanitation development programs,* Washington, D.C.: USAID Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS).

Box 1: Profit, profitability, viability, and sustainability

Profit is the revenue generated by an enterprise in excess of its costs, expressed in absolute terms (USD).

Profitability refers to profit relative to the scale of an enterprise, such as **profit margin—**the ratio between profit and sales expressed as a percentage. Two enterprises may have equal profits (say, USD 1,000 annually), but one earning USD 1,000 in profit against USD 10,000 in sales is more profitable (10% margin) than another one earning USD 1,000 against USD 50,000 in sales (2% margin).

Viability refers to profit *relative* to one or more of explicit or implicit factors considered by an entrepreneur (e.g., minimum income expected; income from other non-sanitation specific enterprises; time and effort; or financial investment and risk). Unlike profit, or profit margin, which are specific numerical quantities, viability is a subjective measure which varies from entrepreneur to entrepreneur: an enterprise that makes a profit might be considered viable by one entrepreneur but not by another. Improving viability is in large part a function of increasing profits.

Sustainability refers to the *likelihood* that an enterprise remains viable *over an extended period* of time (i.e., multiple years) and continues operations without external, non-market-based support.

To aid MBS program implementers gain a better, more nuanced understanding of the factors influencing the viability and sustainability of enterprises so that they can better tailor the technical support provided, we analyzed the performance of sanitation enterprises supported by MBS interventions in Cambodia, India (state of Bihar), and Nigeria. This case study analyzes the enterprises supported by WaterSHED's *Hands-Off Sanitation Marketing* intervention (hereafter, referred to as the *Hands-Off* intervention) in Cambodia and is organized as follows:

- Overview of the Hands-Off intervention and sanitation context in Cambodia
- Description of the methodology used to analyze the viability and sustainability of the enterprises
- Background on the three enterprises selected for this comparative case study
- Findings on the viability and sustainability of the three enterprises
- Recommendations

1.2. BACKGROUND OF THE HANDS-OFF PROGRAM

The *Hands-Off* program was conceived as a systems approach to developing and strengthening the rural sanitation market in Cambodia and is under implementation in eight provinces[5] of the country. The program sought to build a sustainable sanitation market that could function independently of aid, and it comprises interventions targeting different parts of the sanitation market system in Cambodia.

Design and planning for the program occurred in 2009-10, with pilot implementation in 2010-11 and scale-up officially commencing in 2012[6]. With the market facilitation-related aspects of the program ending in late 2017, the program has shifted its focus to sustainability and strengthening market systems in the eight provinces. We describe its constituent interventions below.[7]

[5] Province is the highest sub-national administrative unit in Cambodia.

[6] Pedi, D., et al. "Rural Consumer Sanitation Adoption Study: An analysis of rural consumers in the emerging sanitation market in Cambodia." WaterSHED Cambodia 2014.

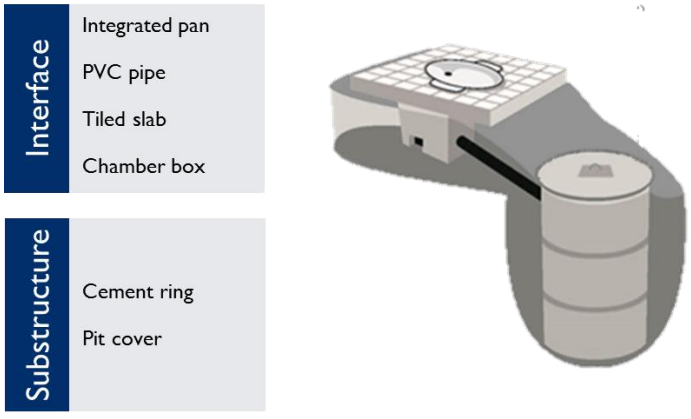
[7] This overview is based on the description of the *Hands-Off* program in Jenkins, M. W., et al. *Strengthening the Sanitation Market System: WaterSHED's Hands-Off Experience*. IRC, 2019.

- **Early-stage interventions:** In the early stages, the *Hands-Off* program focused on sanitation enterprises and customers via product package design, recruitment and training of entrepreneurs, and activating customer demand for toilets.

  - **Product package design:** a consortium (including WaterSHED) undertook research and development to create a desirable and affordable pour-flush toilet product system that would work for most households across rural Cambodia. This effort culminated with WaterSHED choosing an unbranded, open-source toilet package that aggregated existing components without any technological adaptations or customizations.

    The toilet package consisted of a pre-cast tiled slab with an inset ceramic pour-flush pan, a chamber box (on which to mount the slab with a pipe outlet), a PVC pipe (to connect the box to the pit), an offset pit (3 stacked cement rings, 1.5 m deep), and a pit cover (Figure 1). The bundled package could be self-installed by customers instead of relying on skilled labor, and it solved the challenge of aggregating different components from multiple suppliers. It also offered an additional benefit of upgrades—at the time of purchase or later—allowing customers to install deeper or additional pits, and/or an improved superstructure commensurate with their preference and budget. This core toilet package typically sold for USD 59 in 2018 (as compared to USD 35 in 2011), with delivery generally included in the price.

    Figure 1: Toilet package developed by WaterSHED and partner organizations



  - **Recruitment and training of entrepreneurs:** WaterSHED identified and supported existing product manufacturers to start sanitation enterprises alongside their existing business. These businesses typically sold pre-cast concrete items to households, such as cement rings to line wells, cement pillars, religious items, cement water storage jars, and some also sold retail construction materials. WaterSHED encouraged entrepreneurs to adopt a "one-stop-shop"[8] model to simplify the toilet purchasing process, offering customers all the components required to build a toilet (excluding the superstructure) at one location. WaterSHED also trained entrepreneurs in business management, including business fundamentals such as creating and tracking a monthly sales plan.

[8] Pedi, D., et al. *The "Hands-Off" Sanitation Marketing Model: Emerging Lessons from Rural Cambodia*. Briefing Paper 1145. Loughborough, UK: 35th WEDC International Conference, 2011.

- **Demand activation:** WaterSHED facilitated linkages between sanitation enterprises and demand activators (sales agents), many of whom were trained in sales and marketing by WaterSHED's district-based market facilitators. These demand activators (DAs) conducted village meetings and door-to-door sales to promote toilets sold by local sanitation enterprises. DAs employed WaterSHED-supplied marketing materials to pitch toilets to potential customers. DAs included local leaders such as commune councilors and village chiefs, and approximately 40 percent of the DAs were women. Enterprises typically paid DAs a commission for every toilet sold, which in 2018 was approximately USD 2.50 per toilet**.**

Box 2: Demand activators in Cambodia

A demand activator (DA) is an individual who independently markets and sells toilets on behalf of a sanitation enterprise, typically in exchange for a sales commission. In WaterSHED's intervention in Cambodia, we came across paid DAs (or "sales agents") and unpaid DAs. The latter, i.e., unpaid DAs were more likely individuals in local government, commune council, or were village leaders. They were motivated by non-monetary incentives such as a mandate to increase sanitation coverage, interest in community development, or improve their prospects in elections. Therefore, the term *demand activator* refers to both paid and unpaid individuals unless specified otherwise.

- **Mid-stage interventions:** The *Hands-Off* program was scaled up in 2012-14, followed by a "consolidation" stage in 2015-17.The program expanded coverage from four to 54 districts across the eight target provinces by the end of 2014. In the 2015-17 consolidation stage, it focused on strengthening local systems for market sustainability and iterating product design to target low-income customers.
  - **Sub-national and Local Government engagement:** WaterSHED engaged with the government at multiple levels to create an enabling ecosystem for MBS in Cambodia. It persuaded the provincial government to mandate that commune[9] officials and village leaders promote the purchase of toilets, leveraging the omnipresence of local governments and building upon their goal to increase rural sanitation coverage. Some local officials also worked as demand activators, typically unpaid, for local sanitation enterprises (see Box 2).
  - **Civic Champions program:** WaterSHED piloted its Civic Champions (CC) program in 2013 after it found that communes with greater customer engagement by local government officers had higher toilet sales. The pilot helped increase the monthly average toilet sales of partner enterprises by 400 percent over nine months, and since the consolidation phase in 2015-17, WaterSHED has continued training and facilitating market growth by scaling up the CC program to develop the capacity of local leaders and officials to grow the market independently.
  - **Women's empowerment**: From 2013 onwards, WaterSHED increased the program's focus on gender in rural WASH markets. It implemented an intervention called the **WEwork Collective** that offers women working in the rural sanitation value chain access to a peer network for training and mentoring. *The Hands-Off* program also developed a campaign to recruit female sales agents who could work with rural sanitation enterprises. As

[9] A commune is the third-level administrative division in Cambodia (after province and district). Communes can consist of as few as three or as many as 30 villages.

with other *Hands-Off* interventions, these initiatives were designed to avoid creating dependencies on non-market actors and aimed for long-term sustainability.

  - **Other interventions:** WaterSHED also addressed emerging product-related issues, as well as market-access-related challenges faced by low-income consumers, including continuous product refinement and testing, and experiments on subsidies and micro-lending.

- **Late-stage interventions:** WaterSHED had conceived of *Hands-Off* as a program that would end with the development of a sustainable rural sanitation market, and it has been working towards an exit since late 2016/early 2017. Interventions during this stage were designed to culminate in a full exit by the end of 2020. WaterSHED began to gradually withdraw from active market facilitation (e.g., facilitating linkages between sanitation enterprises and DAs, and helping enterprises create sales plans) beginning in late 2016. By the end of 2017, the program ended active market facilitation after verifying that the market had adjusted to its withdrawal and appeared to be functioning without disruption. *Hands-Off* continues to work towards an eventual exit by the end of 2020.

1.3. SANITATION CONTEXT IN CAMBODIA

In 2008, prior to the start of the intervention, 80 percent[10] of Cambodia's population lived in rural areas, with only 18 percent[11] of the rural population having access to improved sanitation. According to WaterSHED data, sanitation coverage stood at 29 percent in 2011[12] (when the expansion phase began) in the eight provinces in which WaterSHED operated.

In 2008, prior to WaterSHED's and other organizations' MBS interventions in Cambodia, it was argued that rural household toilet coverage was low because rural households would only accept an "ideal" but unaffordable pour-flush toilet and there were no good product options on the market that were both affordable and appealing[13]. Customers perceived low-cost dry pit toilet designs as being of poor quality and deferred purchase until they could secure cash for the more expensive pour-flush model with a permanent superstructure. Local supply chains were highly fragmented, with large and small retailers, concrete producers, and masons, each providing *some*, but rarely *all* of the components and services required for installing a toilet. Suppliers did not offer affordable options because low-cost toilet designs did not yet exist in the market; additionally, the value proposition of actively selling toilets was not attractive to existing businesses.

1.4. INTERVENTION PERFORMANCE SUMMARY

From 2012 to 2017, WaterSHED worked with 394 enterprises that cumulatively sold 147,662 toilets during this period. According to WaterSHED data, overall sanitation coverage increased from 29

[10] The World Bank. Rural population (% of total population). 7 August 2019. <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>.

[11] National Institute of Statistics, Ministry of Planning, Cambodia. "General Population Census of Cambodia 2008."

[12] FH Designs. *Evaluation Report: WaterSHED's Hands-Off Sanitation Marketing Program*. Cambodia: FH Designs, 2016.

[13] Water and Sanitation Program. *Sanitation Demand and Supply in Cambodia: Identifying Constraints to Increasing Sanitation Coverage*. Cambodia: Water and Sanitation Program, 2008.

percent in 2011[14] to 47 percent in June 2016[15] in the eight provinces where *Hands Off* operated.[16] An independent evaluation conducted for WaterSHED[17] found that during 2011-14, the cumulative number of active sanitation enterprises increased by more than 40 percent. In 2017, 78 percent of enterprises were reported to have sold at least one toilet during the year in WaterSHED's sales tracking database. The actual number of active enterprises is likely higher because reporting by some enterprises was inconsistent or discontinued.[18]

[14] FH Designs. *Evaluation Report: WaterSHED's Hands-Off Sanitation Marketing Program*. Cambodia: FH Designs, 2016.

[15] Open Development Cambodia. Sanitation coverage data in Cambodia. 7 August 2019. <https://opendevelopmentcambodia.net/dataset/?id=sanitation-coverage-in-cambodia&search_query=P3M9b3Blbi1kYXRhLWhhbmRib29rJnR5cGU9ZGF0YXNldA==>

[16] *ibid*

[17] FH Designs. *Evaluation Report: WaterSHED's Hands-Off Sanitation Marketing Program*. Cambodia: FH Designs, 2016.

[18] We classified enterprises as 'active' if they had reported selling at least one toilet in 2017 to WaterSHED. It should be noted that in WaterSHED's database of monthly sales, zero sales or blank values in the dataset could mean that the enterprise did not *report* any sales rather than that the enterprise had stopped selling during the period in question, with no way to distinguish the two situations.

2. METHODOLOGY

To help MBS programs improve the viability and sustainability of sanitation enterprises, we sought to understand the factors that differentiated enterprises at different levels of profit. We assume that viability and, by extension, sustainability, is largely a function of profit (see Box 1). We also recognized that contextual factors often favor or limit the ability of enterprises to implement business practices to improve their profits. Therefore, we studied enterprises in multiple *Hands-Off* provinces to ensure we accounted for variation in operating contexts.

We followed a three-step process:

- **Direct interviews:** We conducted detailed interviews with 27 active enterprises and seven inactive enterprises that were part of the *Hands-Off* program.
- **Viability Analysis:** We categorized enterprises based on their revenues and profit, and then undertook a comparative analysis of enterprises selected from each "revenue vs. profit" category to identify the business practices and contextual factors that drove differences in profits and thus impacted viability.
- **Sustainability Analysis:** Based on the viability analysis and our understanding of the *Hands-Off* program, we assessed enterprise sustainability.

We conclude with both general and specific recommendations for improving the viability and sustainability of sanitation enterprises, within the limitations posed by context.

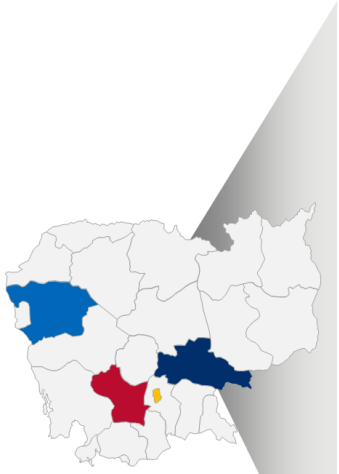
2.1. DIRECT INTERVIEWS

The primary data on which this study is based come from in-person interviews with entrepreneurs from 27 sanitation enterprises that reported toilets sales to WaterSHED. Interviews focused on understanding economics (i.e., revenue, costs, and profit), strategic choices, and challenges faced by sanitation enterprises. We also interviewed seven enterprises that were no longer active in sanitation operations[19] to understand the reasons behind their exit from the market, and other value chain players to understand the broader ecosystem for sanitation enterprises. Figure 2 presents the detailed interview schedule. The interviews were conducted in February and May 2018, with extensive field support from WaterSHED.

It is important to note that our final sampling approach differed from our initial plan. In preparation for the field research, we had initially aimed to interview a sample of enterprises with diverse contextual and performance characteristics, using data from WaterSHED's sales tracking database. To ensure diversity in enterprise context and performance in the sampling, we categorized both the markets where enterprises operated and the enterprises themselves based on such parameters as historical sales trends and the duration for which the enterprise had been operational. Our initial sample aimed to have a balanced mix of different enterprise categories across each market type (see Appendix 7.1.). However, we had to modify our proposed approach to selecting enterprises because of possible inconsistencies in enterprise reporting (e.g., active or inactive, sales volumes) to WaterSHED. Therefore, instead of grouping enterprises by sales trends (e.g., rising sales growth, mixed sales growth, etc.) derived from WaterSHED's database, we relied on WaterSHED's recommendations for enterprise selection across a range of sales results.

[19] We verified that these enterprises were no longer active in the sanitation business before interviewing the entrepreneur

Figure 2: Research locations and interviews conducted by actor



Provinces	Active enterprises	Inactive enterprises	Demand activators	Input suppliers	MFIs
Kampong Cham (and Tboung Khmum)	10	2	3	1	-
Kampong Speu	7	3	3	1	-
Battambang	10	2	2	1	-
Phnom Penh	-	-	-	-	1
Total	**27**	**7**	**8**	**3**	**1**

2.2. ANALYTICAL APPROACH

To understand the factors that improve viability, we undertook a comparative analysis among enterprises with different levels of revenue and profit. We also identified factors likely to affect the sustainability of enterprises in the *Hands-Off* context and assessed the performance of different enterprises with respect to these factors. Our methodology for each of these analyses is presented below.

2.2.1. ANALYSIS OF DRIVERS TO IMPROVE PROFIT

To evaluate the performance of enterprises, we needed data not only on sales volumes (collected by WaterSHED) but also on prices, costs, revenues, and profits. We collected these data in our interviews with the enterprises (as well as other value chain players) to prepare profit and loss (P&L) statements for the 27 enterprises (see Appendix 7.2. for definitions and additional details on P&L Statements). The primary metric we computed to assess profit was **cash net profits**[20], which can be understood as the "bottom line" of the businesses and which exclude non-cash expenses, such as asset depreciation. By contrast, the term **net profit** includes non-cash expenses. We opted to analyze the businesses based on **cash net profits** because these small rural sanitation enterprises typically understand profit in terms of cash and do not account for non-cash expense items. **Henceforth, we refer to cash net profits as "profits" unless mentioned otherwise.**

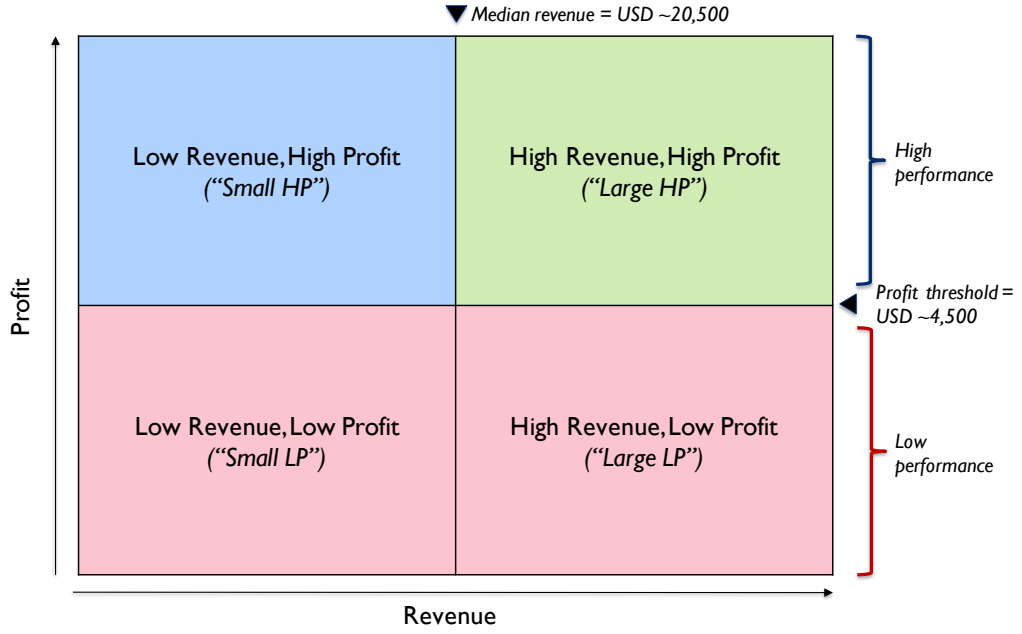
We then classified enterprises into four categories (see Figure 3) based on profit and revenue to study the differences between high-performance and low-performance enterprises.

[20] AccountingTools, Inc. How to calculate cash profit. 7 August 2019. <https://www.accountingtools.com/articles/how-to-calculate-cash-profit.html>

- **Profits:** we classified enterprises as either "high profit" or "low profit," using the threshold of USD[21] 4,500 (twice a typical construction worker's annual income[22] in Cambodia) to separate the two classes.
- **Revenues:** we classified enterprises as "high revenue" and "low revenue" using the median sales revenue (USD ~20,500) during 2017 as the threshold between the two classes. Revenue is an indicator of an enterprise's scale, and we hypothesized that enterprises adopt different profit-maximizing strategies at different scales. We chose the median as it is a neutral metric (i.e., it is not impacted by the presence of a few abnormally high or low values in the sample), and offered a reasonable approach to separating "high" and "low" revenue enterprises.

We chose to employ these thresholds, but we note that we could have used other techniques to define the business categories. These thresholds met our objectives of 1) being computationally straightforward and 2) coming up with categories that differed significantly in terms of performance to enable an analysis of differences.

Figure 3: Enterprise performance categories

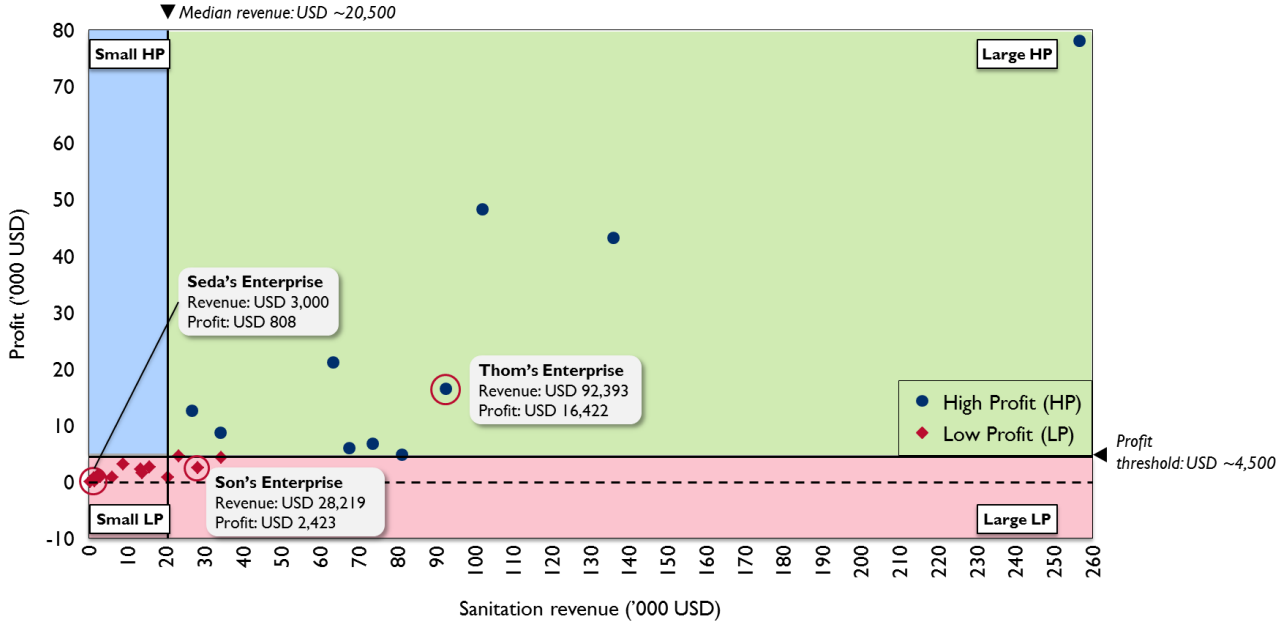


In Figure 4, we plot the position of the 27 active enterprise-sample from the *Hands-Off* program (covered in our research) relative to the four categories. Most are either in the low revenue, low profit ("Small LP") or high revenue, high profit ("Large HP") categories. We note that a single "Small LP" enterprise in our research sample generated losses in 2017. We have analyzed the enterprise in Appendix 7.4. to understand the factors that led to its losses.

[21] 1 USD = 4000 Cambodian Riel (KHR); used throughout this case study.

[22] Conservative estimate of a construction worker's income: KHR 25,000 (USD 6.25) per day X 30 days per month X 12 months of active labor.

Figure 4: Profit (USD) vs. revenue (USD) for sanitation enterprises supported by the *Hands-Off* program (2017) (n=27)[23]



To understand the strategic choices that drive enterprise performance, we selected one enterprise from each category for further analysis (circled in Figure 4; there was no enterprise in the "Small HP" category in our sample). Our analyses sought to identify a range of lessons on improving viability, on the premise that enterprises in different categories employed distinct business practices and/or operated under different business conditions.

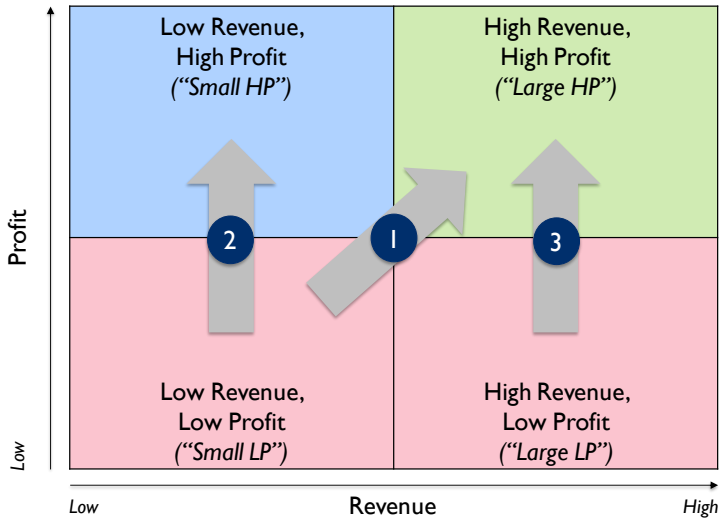
We compared *Seda's* and *Son's enterprises* to *Thom's enterprise* using a methodology called Gross Margin Variance Analysis (GMVA—see Appendix 7.3. for a detailed explanation). GMVA examines a measure of financial performance called **gross profits:** the difference between revenue from the sale of toilets and costs incurred exclusively for manufacturing the toilets sold (see Box 3). As GMVA can only be conducted between two enterprises at a time, we conducted the following comparisons:

- "Small LP" vs. "Large HP" (*Seda's enterprise* vs. *Thom's enterprise*)
- "Large LP" vs. "Large HP" (Son's enterprise vs. *Thom's enterprise*)

These comparisons reflect the different paths that enterprises can take to improve viability (see Figure 5). Herein, we have examined two paths to help enterprises improve viability: Path 1 and Path 3. Path 1 reflects strategies to grow a "Small LP" into "Large HP" enterprise, considering that the majority of enterprises studied belonged to these two categories. Path 3 presents an approach to growing "Large LP" enterprises into "Large HP" enterprises. We did not analyze Path 2—the path from "Small LP" to "Small HP"—because none of the enterprises we selected and interviewed from WaterSHED's database fell in this "Small HP" category.

[23] Figures in the chart have been rounded to the nearest whole number. We have changed the name of the entrepreneurs to protect their identity.

Figure 5: Potential path(s) to improve the viability of sanitation enterprises



We note that this analysis relies on cash net profits to **categorize** enterprises but on gross profits to **compare** the drivers of their performance; see Box 3 for an explanation of why this is so. GMVA decomposes the difference in gross profits between two enterprises into its constituent components, or drivers. The five drivers are the following:

- The *number of customers* that bought different products from the enterprises
- The *prices* of the different products sold
- The *costs* of manufacturing different products
- The relative quantities of the common, sanitation-related products (i.e., substructure and interface components) sold by enterprises (also known as *common product mix*)
- The *additional, sanitation-related products* (such as superstructure components) sold by one enterprise but not by the other

Our application of GMVA, in which we compare two different enterprises, is novel; the conventional application of GMVA is for a single business to compare budgeted profits to actual profits or to compare profits from different accounting periods, in order to identify the drivers that explain the differences. While we are enthusiastic about the utility of GMVA to understand profit drivers of different businesses, we offer the following limitations of the method.

First, GMVA does not account explicitly for the role of market conditions (e.g., customer preferences or availability of raw materials) in influencing viability, as they are not quantified or directly attributed to any of the five drivers. To overcome this limitation, we complemented GMVA with a qualitative analysis of the market conditions of each enterprise, and describe their role throughout the Findings and Recommendations sections.

Second, the results from the GMVA may vary depending on the enterprises selected for analysis. GMVA can only be conducted between two enterprises at a time, and different pairs of enterprises may reveal different differences in profit drivers. While our selection of enterprises for this case study was aimed at highlighting the impact of a range of drivers, we also conducted GMVA on a few other enterprise pairs to improve the external validity of our findings and arrive at broad-based recommendations in the *Hands-Off* context. Recommendations for a specific enterprise could, however, vary based on the GMVA results from comparison with another enterprise. Appendix 7.3. provides a detailed explanation of GMVA and Appendix 7.4. illustrates additional GMVA analyses.

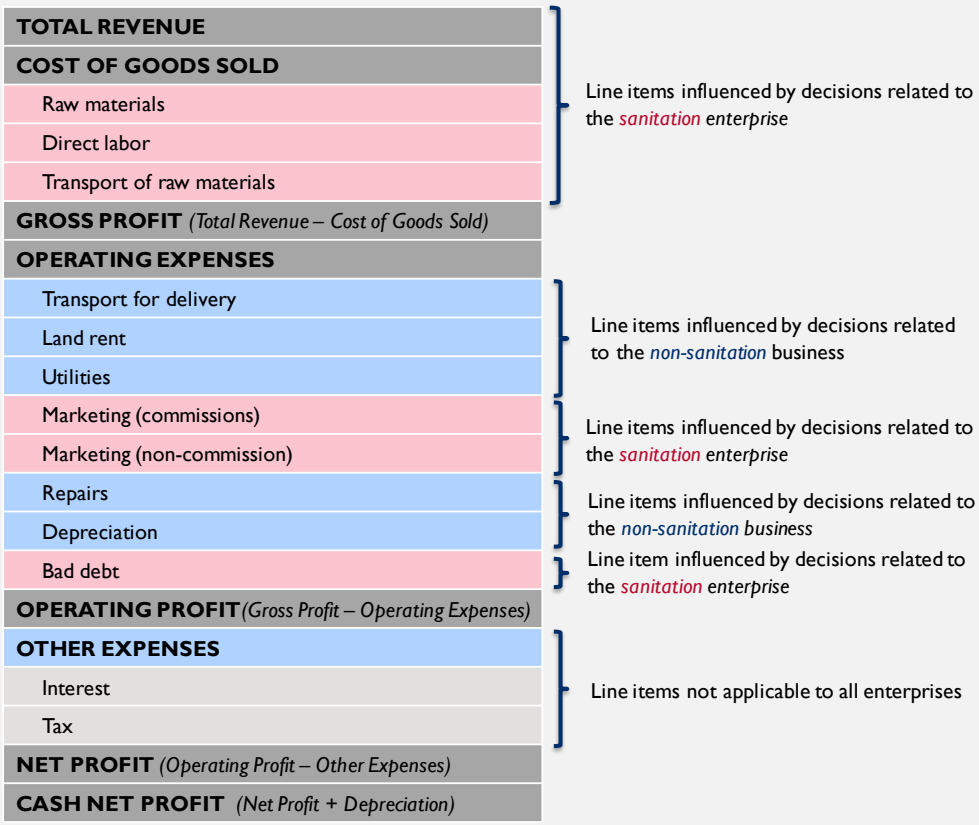
Box 3: Why use one financial measure (cash net profit) to categorize enterprises and a different one (gross profits) to compare them?

Sanitation enterprises are generally not stand-alone businesses; they function as one of multiple business lines operated by an entrepreneur. To understand how effectively a sanitation enterprise is contributing to an entrepreneur's overall financial success, cash net profits are ideal because they represent the "bottom line": profits realized after accounting for all cash expenses. The higher the cash net profit of a sanitation enterprise, the more likely an entrepreneur will deem it "viable", that is worthy of the time, investment, and opportunity cost.

Gross profits, on the other hand, are better for understanding the differences in financial performance of sanitation enterprises (as one of multiple businesses) because the measure focuses on the two most basic financial line items: revenue, and the cost of goods sold (COGS)—the costs of manufacturing toilets (see Figure 6 for a list of line items of a Profit & Loss statement). *An important difference between gross profits and cash net profits is that gross profits exclude expenses that are influenced primarily by the entrepreneurs' other non-sanitation related business (or businesses), such as rent and utilities*. Entrepreneurs are unlikely to make decisions on factors such as location of the workshop or investment in transport vehicles solely for the sanitation enterprise, as they will also consider the requirements of their other business (or businesses). Cash net profits also include other expenses such as interest payments and taxes, which are not comparable across enterprises since access to finance and compliance with tax codes vary widely considering the informal nature of most rural sanitation enterprises in developing countries.

It is also worth noting that COGS typically constitute the majority of total costs for sanitation enterprises (87 percent of total costs at the median level for the 27 sampled enterprises in the *Hands-Off* program). The potential to improve cash net profits, therefore, is primarily driven by the potential to improve gross profit.

Figure 6: Line items of a Profit & Loss Statement of a typical sanitation enterprise



2.2.2. SUSTAINABILITY ANALYSIS

The sustainability of sanitation enterprises depends on their ability to finance and operate their businesses without ongoing non-market support. We analyzed the enterprises' financial and operational independence to develop a broad view of their sustainability:

- **Financial independence:** we estimated an enterprise's ability to pay for all recurring expenses (i.e., day-to-day operations) and re-investments (i.e., long-term capital expenditure such as equipment) in the absence of external non-market support provided by MBS programs. To assess the ability to pay for recurring expenses, we examined if an enterprise was dependent on WaterSHED for any such expense, and assessed the impact on its profit if this support were withdrawn. We estimated an enterprise's ability to replace its capital assets by identifying these assets and calculating the proportion of annual profit that would need to be set aside every year so that the enterprise had sufficient capital to replace the asset when needed. Given that the enterprises had only two types of capital assets – a truck and various molds used for casting toilet components (e.g., molds for cement rings and pit covers), we considered only these items when assessing re-investment capacity. If a truck was shared with another business, we apportioned its value to the sanitation enterprise in the same ratio as the share of the entrepreneur's total revenue attributable to the sanitation enterprise. Mold costs were completely apportioned to the sanitation enterprise as they were not used in other businesses of the entrepreneurs. For each enterprise, the truck price, the number of molds, and the average price for each mold was based on our interview with the respective entrepreneur. We derived the average remaining useful life of trucks and molds as well as their prices, to compute the replacement period and replacement cost. We also assumed that the enterprise profits, as well as the prices of the truck and molds, would remain constant going forward and that the entrepreneur had not put aside any money towards replacing these assets so far, implying that the full amount required to replace the asset would have to be mobilized over the remaining useful life of the assets. Based on these assumptions, we calculated the share of the enterprise's profit needed to be set aside for funding these replacements. Because two of the three enterprises we study here derived a sizeable share of profit from sales to NGO subsidy programs, we also calculated the share of annual profit only from unsubsidized sales that needed to be set aside, for replacing capital assets.
- **Operational independence**: This was assessed based on any ongoing (non-financial) support that enterprises received from non-market actors, or else the presence of alternate market actors to provide the same support after non-market actors exit the market. We identified whether any enterprise was receiving any such support from the *Hands-Off* program, the manner in which they would address the withdrawal of this support, and the likely impact of such actions on their profits.

3. ENTERPRISE BACKGROUND

Thom, *Seda*, and *Son* are entrepreneurs[24] running sanitation enterprises in Cambodia who also partnered with the *Hands-Off* program. Revenue and profit vary considerably among the three, both in absolute terms and as ratios. In 2017, *Thom's enterprise*[25] earned the maximum profit among the three, whereas *Son's enterprise* reached the largest number of customers without high profits. *Seda's* had the lowest sales and profits of the three.

This section provides a brief background of each entrepreneur and their sanitation enterprise.

3.1. THOM

Thom is a rice farmer-turned-entrepreneur who has been active in the sanitation market since 2002. He lives in the Tboung Khmum Province of Cambodia. *Thom* switched from farming to start a business in 1999 because financial returns from rice cultivation were insufficient to meet his family's needs. He used his savings to start a business that manufactures and sells cement products (e.g., columns, pillars, shrines), and trades in construction materials (e.g., cement and bricks).

Thom had been running this business for three years when a government official visiting the commune chanced upon his shop. The officer was looking to increase sanitation coverage in the commune and encouraged *Thom* to start manufacturing and selling toilet packages[26]. *Thom* was quick to recognize the potential of diversifying into a new but related line of business and took up the officer's offer of a small loan to help set up his sanitation enterprise. *Thom's enterprise* began manufacturing and selling toilet packages and additional, sanitation-related products (such as toilet doors) in 2002.

Thom joined the *Hands-Off* program in 2012, as WaterSHED representatives told him the partnership would help increase toilet sales. WaterSHED connected him to trained demand activators (both paid and unpaid) and offered him training on business management, which he found very useful. WaterSHED also provided promotional material such as posters that he displayed in his shop.

Thom's enterprise is a family business, just like his construction material and cement products business. *Thom* procures raw material, hires workers, oversees product marketing, manages customers, and conducts bookkeeping and enterprise finance. His son is responsible for the delivery of toilets to customers, and his wife supervises the casting of components such as cement rings and pit covers, as well as managing the retail shop occasionally.

Thom's enterprise has proven to be a successful venture and has grown into an important income source, contributing almost 30 percent of the family's total revenue in 2017. That year, the enterprise generated revenue in excess of USD 92,000, with a profit of over USD 16,000. The construction and cement products business generated nearly all of the family's other inflows, with a small portion coming from the rent of their plot of agricultural land.

---

[24] We have changed the name of the entrepreneurs to protect their identity.

[25] For ease of reading, the enterprise and entrepreneur name have often been used interchangeably through the text. It is assumed the subject would be clear from the context.

[26] In this case study, the terms 'toilet package' and 'toilet' have been used interchangeably, and denote the package shown in Figure 1, comprising substructure and interface components: cement rings lining underground pits, a pit cover, a chamber box, a pan, a slab, PVC pipes to release smell and to connect the pan and pits, and ceramic tiles used for flooring. The phrase 'additional, sanitation-related products' refers to any superstructure component sold separately from the package. Such items include toilet door, toilet roof, ventilator, and construction material such as bricks, gravel and cement, etc.

Thom's enterprise currently sells its toilet packages and additional, sanitation-related products in three communes. While *Thom* believes that the sanitation market has good demand for his offerings, he faces intense competition from seven other enterprises[27]. *Thom* does not foresee toilet sales increasing substantially into the future, given the increasing sanitation coverage and the intense competition. He wants to expand his construction material business but needs capital. His expansion plans are currently on hold as he is not willing to borrow money to invest in growing his business.

3.2. SEDA

Seda lives in the Battambang province of Cambodia and runs a sanitation enterprise with her husband. The idea of starting the enterprise was proposed by *Seda's* husband, who used to work with his father's construction material business before the two got married. They started the sanitation enterprise in 2010, as a complementary business to *Seda's* existing concrete products business, and run it together. *Seda* takes care of casting, bookkeeping, and customer management, while her husband is responsible for the delivery of packages to customers. The couple does not spend much time or effort on product marketing.

Seda's enterprise began with casting and selling cement rings, and expanded into sales of complete toilet packages after joining the *Hands-Off* program in 2012, as WaterSHED advised that this might help increase sales. Apart from guidance on putting together the toilet package, WaterSHED also provided support in terms of connections with sales agents, and *Seda's enterprise* saw toilet sales increase. However, the enterprise has witnessed declining sales over the past few years, and commission-based sales have completely stopped. In 2017, the enterprise sold only 60 toilets, bringing in USD 3,000 in revenue and generating barely USD 800 in profit. The sanitation enterprise generates about 70 percent of the annual revenue earned by the couple, with the rest coming from the related concrete products business.

Seda does not think toilet sales will grow as she believes there is very high competition among sanitation enterprises. She does not plan to expand beyond the six communes where she now sells toilets. She continues to run the sanitation enterprise because of limited alternate opportunities.

3.3. SON

Son is an entrepreneur living in the Battambang province, close to the border with Thailand. *Son's enterprise* has been in existence since 2011, and this is his second foray into the sanitation market. He first started an enterprise in 1994 but shut down the venture in 2000 because sales volumes were very low, and he was not able to generate revenue to cover the cost of raw material and labor, let alone make a profit. *Son* switched to rice farming for eleven years until he chanced upon WaterSHED in 2011.

WaterSHED was looking for entrepreneurs with experience in the sanitation market, and the commune councilor directed them to *Son*. *Son* decided to make a second attempt at starting a sanitation enterprise after listening to WaterSHED. He was enthused by their perspective of the high sales potential for the business and was reassured by their promise of support with training, business development, product development, and activating demand. He believes that associating with WaterSHED is good for business, and advertises this association prominently.

[27] The number of competing enterprises is based on WaterSHED data and is most likely a low estimate because competition includes enterprises not part of or tracked by the WaterSHED program.

Sanitation is *Son's* only source of income. In 2017, the enterprise generated revenues of over USD 28,000 for a profit of over USD 2,400.

Son wants to diversify into more businesses as he feels the sanitation enterprise has limited growth potential. He wants to expand into producing concrete columns and chairs, which, he believes, would offer opportunities to leverage his experience and skill in working with construction material. He plans to raise capital from a microfinance institution (MFI) that will help him with this venture. He is confident of securing a loan as he has borrowed small amounts in the past, and has a good repayment track record.

4. FINDINGS

The three enterprises differed significantly in their performance, even though all three received support from WaterSHED. Given this context, we explore two key questions:

- What were the business practices and local market conditions that differentiated the sales and profit performance of the three sanitation enterprises?
- Would the three enterprises be sustainable without WaterSHED in the market?

4.1. ANALYSIS OF DRIVERS TO IMPROVE PROFIT

We employed GMVA to understand the potential viability paths introduced in Figure 5, comparing:

- *Seda's "Small LP" enterprise* with *Thom's "Large HP" enterprise; and*
- *Son's "Large LP" enterprise* with *Thom's "Large HP" enterprise.*

All three enterprises offered toilet packages consisting of substructure and interface components to customers. *Seda* and *Son* sold largely similar, standard packages (see Figure 1) comprised of three rings, a pit cover, a slab, a chamber box, a pan, and PVC pipes to ventilate the pit (eliminating odors) and to connect the pan and pit. The only difference was that *Son's enterprise* did not include ceramic floor tiles in the package. *Thom's enterprise,* on the other hand, customized its packages as per customer needs, allowing them to decide the types and number of substructure and interface components. In addition, it also sold components and construction material used for building the toilet superstructure.

To conduct GMVA between *Thom's enterprise* and the other two enterprises, we had to confront *Thom's* unique, customizable product offering and make reasonable assumptions about the number of toilets sold and the average composition of components in each package. Our assumptions were based on the sales volumes of each specific toilet component that *Thom* recorded, given the high degree of customization offered to customers. By contrast, *Seda* and *Son* tracked sales and prices at a package level. From our interview with *Thom,* we determined he had 335 customers (assuming three rings sold per customer, *on average*). The other components sold by the enterprise in 2017 are detailed in Table 1. Using these data, we determined that the average toilet package sold by *Thom's enterprise* consisted of three rings, one pit cover, and one chamber box. In addition, the average package included 0.6 pans and 0.3 slabs, indicating that some of Thom's customers did not purchase these toilet components. We considered any substructure and interface components left over after accounting for the 335 packages to be a part of the common product mix for the GMVA analysis. Finally, we treated the superstructure components sold by the enterprise as additional sanitation-related products since the other two enterprises did not sell any of these items.

The potential drivers of differences in gross profit between the enterprise pairs thus were:

- the number of customers who bought these products;
- the average prices of these products;
- the average costs of manufacturing and selling these products;
- the proportion of the average number of units of common products (i.e., the pit covers and chamber boxes remaining after accounting for all the average packages sold by *Thom's enterprise*) sold per customer, known as the *common products mix;* and
- the average number of units of additional, sanitation-related products (i.e., the superstructure components) sold per customer by *Thom's enterprise*.

Table 1: Number of substructure, interface and superstructure components sold by Thom's enterprise in 2017

COMPONENT	QUANTITY SOLD
Substructure components	
Cement rings	1,005 units
Pit covers	705 units
Interface components	
Chamber boxes	810 units
Pans	204 units
Slabs	102 units
PVC pipe to release smell	588 meters
PVC pipe to connect pan to pit	69 meters
Ceramic floor tiles	615 boxes
Superstructure components	
Ventilators	6,210 units
Doors	30 units
Ceramic tiles for the walls	84 boxes
Bricks	45,000 units
Cement	1,740 bags
Sand	1,962 cubic meters
Gravel	1,962 cubic meters

The diagrams in Figure 7 and Figure 8 are known as GMVA "bridges." The left-most bar indicates the annual gross profits generated by one enterprise, and the right-most bar indicates those generated by the comparison enterprise. Box 4 provides guidance on interpreting these GMVA bridges.

Box 4: Interpreting GMVA bridges

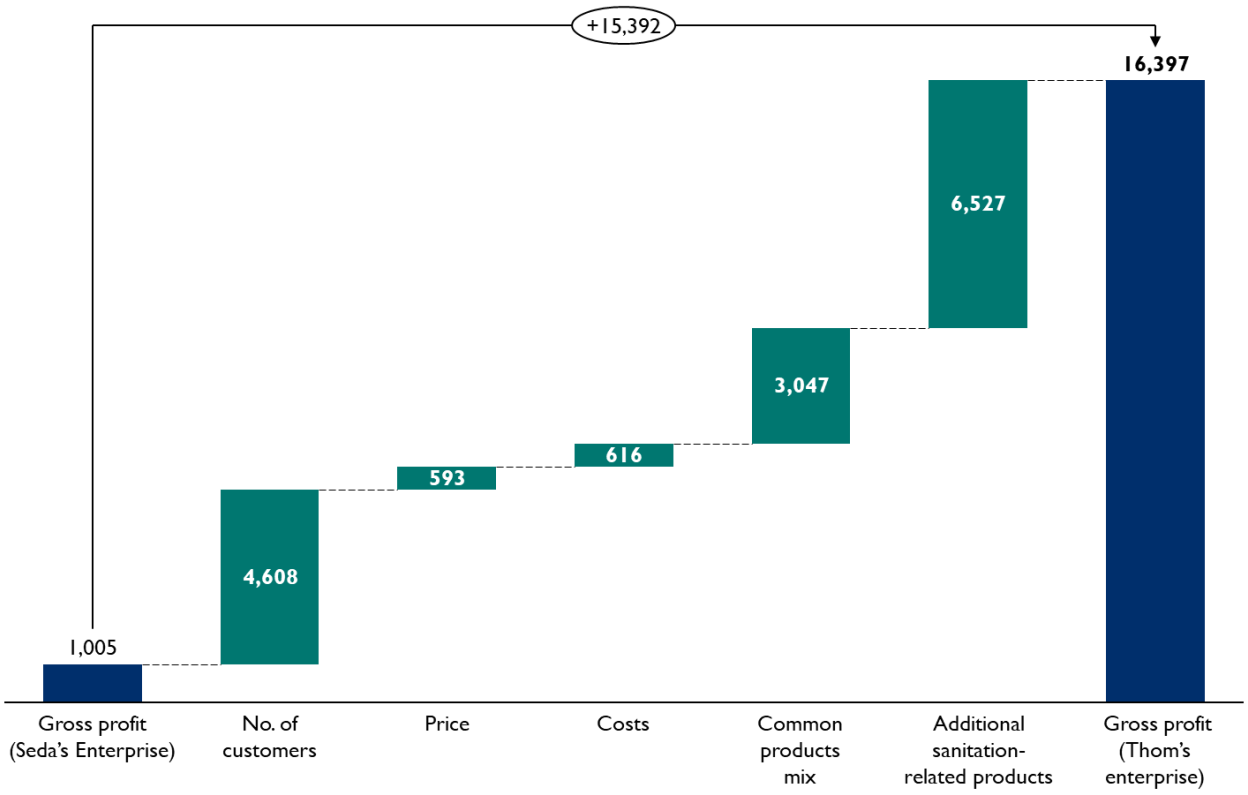
The GMVA "bridge" between two enterprises decomposes the overall difference in their gross profits (represented by the first and the last *blue* bars) into their constituent "drivers." The drivers are represented by the "floating" bars between the blue gross profit bars of the two enterprise on each end of the diagram and consist of the following:

- the **number of customers** to whom they sold;
- the **prices** charged by the two enterprises for the same product(s);
- the **costs** incurred by the two enterprises to manufacture the same product(s);
- the proportion of the average number of units of common products sold per customer (known as the **common products mix**); and
- the **additional, sanitation-related products** sold by one enterprise and not the other; in this case study, the superstructure components satisfy the criterion.

The height of each bar signifies the impact of the corresponding driver on the gross profit difference between the two enterprises.

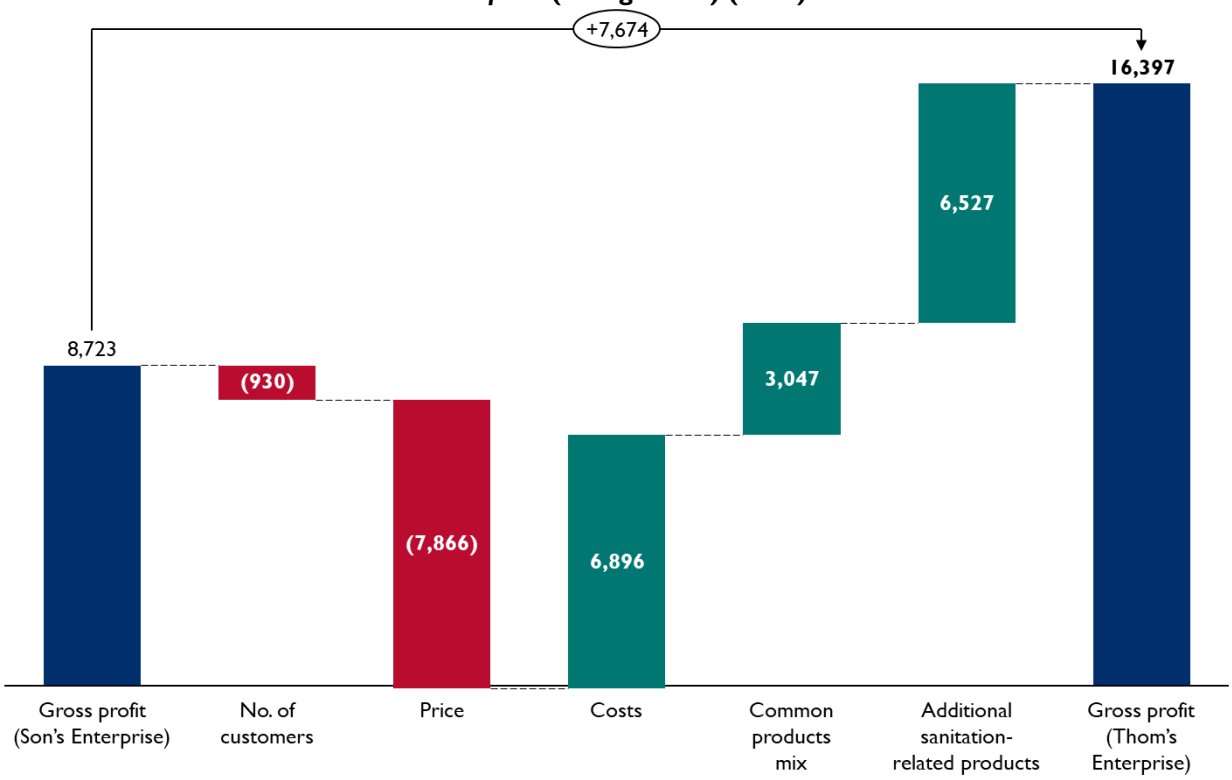
The *green* and *red colors* of each bar indicate whether the effect on gross profit difference is *positive* or *negative* with respect to the enterprise on the right. For example, if the enterprise on the right enjoys *higher prices* or *lower costs* than the enterprise on the left, the corresponding bars will appear *green* because they represent a gross profit advantage to the enterprise on the right. Conversely, if the enterprise on the right suffers *lower prices* or *higher costs* than the enterprise on the left, the corresponding bars will be red because they represent a gross profit disadvantage.

Figure 7: Gross Margin Variance Analysis (USD) between *Seda's enterprise* ("Small LP") and *Thom's enterprise* ("Large HP") (2017)



The GMVA bridge in Figure 7 indicates that *Thom's enterprise* earned nearly USD 15,400 higher gross profits than *Seda's enterprise* in 2017 by selling roughly USD 6,500 in additional sanitation-related products (i.e., superstructure components, see Section 4.1.5) as well as by varying its product mix (see Section 4.1.4), resulting in a USD 3,000 advantage over *Seda's enterprise*. *Thom's enterprise* also benefited from much higher toilet sales than *Seda's enterprise* (see Section 4.1.1), selling more than five times as many toilets. *Thom's* profits increased further as his enterprise realized a slightly higher average price per toilet package (see Section 4.1.2), and as its average cost per package was somewhat lower than *Seda's enterprise (see* Section 4.1.3), together constituting a nearly USD 1,200 gross profit advantage.

Figure 8: Gross Margin Variance Analysis (USD) between *Son's enterprise* ("Large LP") and *Thom's enterprise* ("Large HP") (2017)



Thom's enterprise earned nearly USD 7,700 higher gross profits than *Son's enterprise* in 2017 (see Figure 8), primarily by lowering its costs, varying its product mix, and selling additional sanitation-related products (see Section 4.1.3, Section 4.1.4, and Section 4.1.5, respectively). *Thom's* average cost per package was substantially lower than *Son's* costs, primarily due to the high labor costs borne by the latter (see Section 4.1.3). *Son's enterprise* was able to narrow the difference in gross profits by selling at a substantially higher average price and in slightly higher numbers than *Thom* (see Section 4.1.1 and Section 4.1.2).

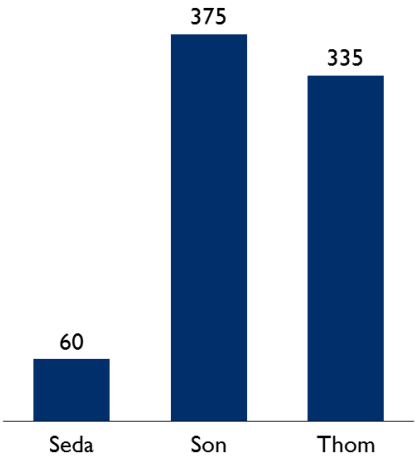
These two GMVA bridges make it clear that any of the five drivers—the number of customers, prices, costs, common product mix, and additional, sanitation-related products—can play an important role in the gross profit differences between sanitation enterprises.

4.1.1. NUMBER OF CUSTOMERS

Among the three, *Son's* and *Thom's enterprises* sold to more than five times as many customers as *Seda's enterprise* in 2017 (Figure 9). The first two enterprises partnered with NGOs that subsidized toilet purchases by economically weaker households, which led to a substantial increase in their sales in 2017.

Both enterprises actively marketed their products using multiple channels, including direct engagement with customers and through demand activators (paid and unpaid). In addition, *Son's enterprise* also offered credit to address some customers' liquidity challenge of paying upfront for a toilet[28]. By contrast, *Seda's enterprise* did not have any NGO partnerships and did not expend much effort in product marketing. It largely relied upon demand activators and on walk-in customers to sell toilets, while also leveraging the opportunity to "cross-sell" sanitation products to customers of *Seda's* construction-related business, in a manner similar to *Thom's enterprise*.

Figure 9: Toilet sales by enterprise (2017)



> *"NGOs only ask for the latrine core package, which is the lowest priced toilet"* – Thom

Partnering with NGO subsidy programs also helped *Thom's* and *Son's enterprises* boost sales (Figure 10), increasing both revenues and gross profits (Figure 11). However, while subsidy programs contributed almost 44 percent of overall toilet sales for *Thom's enterprise,* their contribution to enterprise revenue and gross profit was much lower, at eight percent and 18 percent, respectively. This is because *Thom's enterprise* derived a substantial share of its revenue and gross profit from the sale of additional sanitation-related products (see Section 4.1.5). Subsidy programs had a relatively more important role in increasing the revenue and gross profit of *Son's enterprise*, which only sold toilets (Figure 11). We caution, however, that the role of subsidy programs in toilet sales may not be as significant as it appears, as our analysis assumes that the toilets sold for the same price across subsidized and unsubsidized customers, for lack of disaggregated data[29].

Son's and *Thom's enterprises* were two of only three enterprises in our sample that partnered with such subsidy programs in 2017. However, during the period 2012-17, 13 of the 27 enterprises participated in such programs for at least one year. The median such partnership lasted for two years, and generated

[28] Rural customers often have an unstable or seasonal income that prevents them from making the full payment upfront. Such customers might find it difficult to purchase a toilet in the absence of liquidity support that can help solve the timing mismatch between resource availability and planned expenditure. Please see *USAID, 2018. Scaling Market Based Sanitation: Desk review on market-based rural sanitation development programs. Washington, DC., USAID Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS) Project* for a detailed discussion on the importance of addressing liquidity challenges faced by customers.

[29] The actual number of toilet sales via subsidy programs could be lower than stated in this case study, as we have extrapolated these numbers based on the share of sales to subsidy programs as reported to WaterSHED. Toilet sales recorded in the database were lower than the sales provided in research interviews, which were more accurate. We applied the share of sales from the WaterSHED database to the total sales provided by entrepreneur in interviews. Since the entrepreneur provided sales figures are higher, the extrapolation may overstate the number of toilets sold via subsidy programs.

16 percent of the enterprise's annual sales on average,[30] indicating that subsidy programs, while sporadic, are an important source of revenue and hence profits for those enterprises that take advantage of the opportunity.

NGOs typically engaged larger enterprises in a commune (which could explain why *Seda* did not have any NGO sales) and directed identified beneficiaries to these enterprises. The enterprises supplied toilet packages to the customers and were paid in full or in part by the NGOs, depending upon the amount of subsidy offered, with the customer paying the balance.

Figure 10: Toilets sales to subsidy programs (absolute and share of total sales) by enterprise (2012-17)[31, 32]

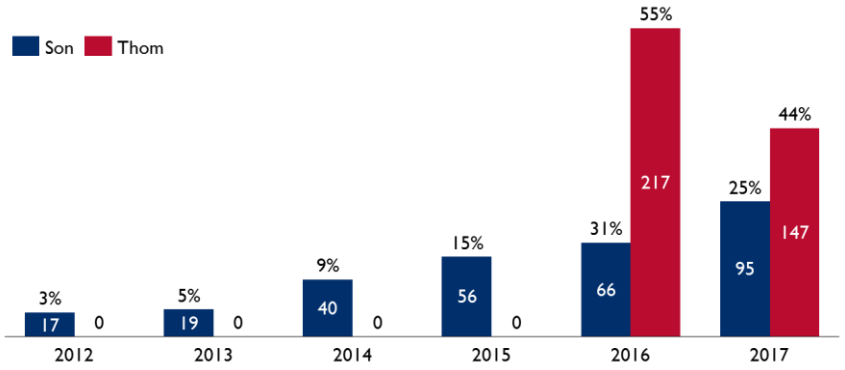
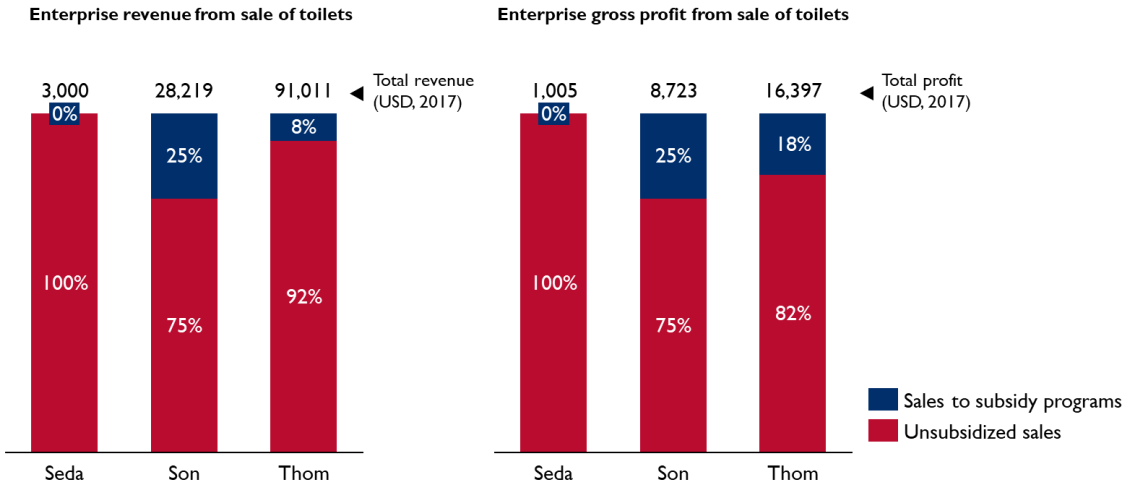


Figure 11: Contribution of subsidized and unsubsidized sales to enterprise revenue and gross profit for the year 2017[33, 34]



[30] WaterSHED database of monthly sales.

[31] *Seda's enterprise* did not report any sales to subsidy programs.

[32] For 2012-17, the percentage shares in the chart are from the WaterSHED database, which records data reported by enterprises. The absolute sales numbers for 2012-16 are also from the same database. For 2017, the absolute number of sales to subsidy programs is calculated using the percentages from the WaterSHED database and applied to the total toilet sales provided in interviews. Figures in the chart have been rounded to the nearest whole number.

[33] Total enterprise revenues include revenue from product sales only. Revenues from other sources such as delivery and installation services are not included as these receipts do not contribute to the gross profits of an enterprise.

[34] Figures in the chart have been rounded to the nearest whole number.

In addition to benefiting from the opportunity offered by the subsidy programs, both *Son* and *Thom* devoted their own time and effort towards generating sales leads and converting these leads into purchases by customers. They attended village meetings and regularly met with commune councilors, often planning these visits alongside the delivery of toilets to customers. During such interactions, they would discuss the level of demand for toilets in the commune and specific leads, if any. They visited potential customers and would try to persuade them to buy a toilet. The two entrepreneurs also went door-to-door to identify households without a toilet, gauge their interest in buying one, and make a sales pitch. They emphasized the quality of their toilets by explaining how they used more materials to strengthen the toilet and also promised prompt delivery to win an order. Such messaging was consistent with the approach taken by most high-profit enterprises among our interviewees.

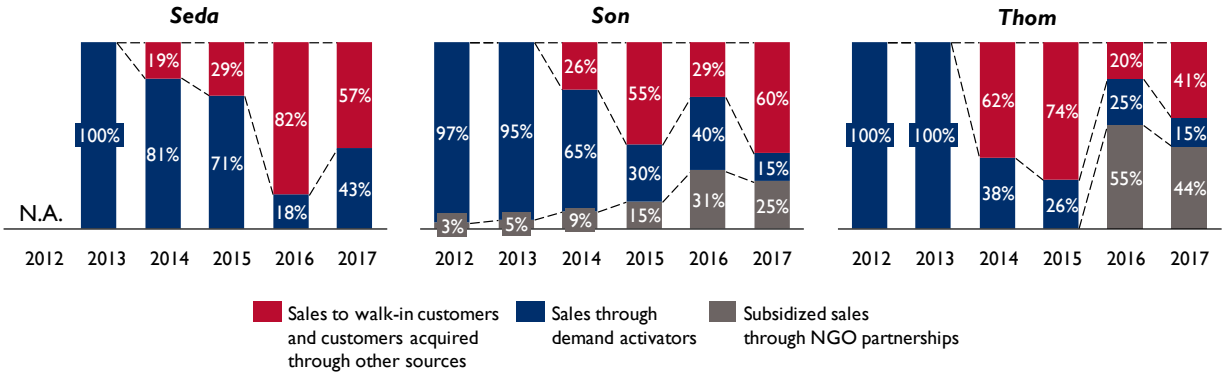
Son and *Thom* complemented their efforts by working with independent demand activators such as village chiefs or commune council members, who predominantly did not have financial considerations for promoting toilet sales. *Seda's enterprise* also benefitted from the association with demand activators. However, this is likely due to longstanding relationships, as the entrepreneurs (*Seda* and her husband) said they did not spend much time and effort trying to increase sales.

The three enterprises do not appear to have relied much on paid sales agents for sales in 2017 for which we collected data. Commissions comprised 0.5 percent of the year's revenues for *Son's enterprise* and 0.01 percent for *Thom's enterprise*, while *Seda's enterprise* did not pay commissions[35].

> *"All my sales came from agents when I started, but I sold very few toilets via sales agents in 2017. I rarely work with them now."* – Thom

Historically, demand activators were an important source of sales for sanitation enterprises. However, from all the three entrepreneurs' perspective, the contribution of this channel has declined over time. The enterprises with high sales (i.e., *Thom's* and *Son's enterprises*), recorded a low share of unsubsidized toilet sales[36] via demand activators in 2017, compared to customers sourced through their own efforts or those who approached the enterprise (*i.e.*, walk-in customers). The low share of the independent demand activator channel is the continuation of a longer-term declining trend depicted in Figure 12.

Figure 12: Share of toilet sales by source and enterprise (2012-17)[37]



[35] FSG research interviews with entrepreneurs.

[36] Unsubsidized sales refer to sales made directly to customers via the market, rather than through an NGO subsidy program channel.

[37] Based on sales data reported by enterprises to WaterSHED. Figures in the chart have been rounded to the nearest whole number.

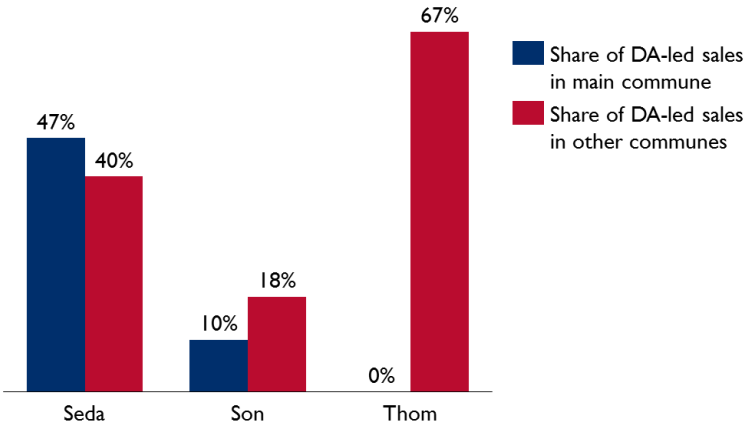
Interviews with entrepreneurs and WaterSHED staff suggest a variety of reasons for the declining share of sales via the demand activator channel. Entrepreneurs believed that with increasing sanitation coverage in their sanitation markets, customers' awareness of toilets as well as of local enterprises where they could purchase them has increased. This perception is corroborated by WaterSHED's Rural Consumer Sanitation Adoption Study (RCSAS)[38], which found that many customers approached local enterprises and purchased toilets after observing their neighbors install toilets. As a result, enterprises benefited, in some part, from word-of-mouth publicity and reduced their reliance on intermediaries such as demand activators.

> *"Customer awareness has increased. Neighbors have toilets, so the remaining people also want toilets"* – Seda

The decline in the importance of demand activators was not uniform across all communes of an enterprise. Demand activators (paid and unpaid) continued to be important in markets where enterprises were not as well-known as in their "main commune." In such markets, demand activators helped overcome customers' lack of awareness of the enterprise, and as a result, demand activators were relatively more important for sales. Figure 13 shows that the enterprises with high sales (i.e., *Son's* and *Thom's enterprises*) generated a larger proportion of sales through demand activators in their secondary communes (i.e., markets other than their "main commune").

> *"My sales from agents have reduced substantially. They are more useful in communes where fewer people know about my enterprise."* – Son

Figure 13: Demand activator-led sales as a percentage of total sales in the main commune and other communes by enterprise (2017)[39]



WaterSHED staff suggested that entrepreneurs were potentially underestimating the share of total sales attributed to demand activators because of an information gap. Entrepreneurs may be unaware if customers were directed to the enterprise by a demand activator who did not seek a commission in return—a likely case considering many demand activators were local elected leaders (e.g., a commune

[38] Pedi, D., et al. Rural Consumer Sanitation Adoption Study: An analysis of rural consumers in the emerging sanitation market in Cambodia. 2014.

[39] Figures in the chart have been rounded to the nearest whole number.

councilor) or officials who may be incentivized more by increasing sanitation coverage than by receiving commissions. In such cases, the enterprises would record the sale as one made directly to a customer.

Thom was also able to increase his toilet sales through cross-selling, *i.e.,* selling sanitation products to customers of his construction material business (and *vice-versa*), an approach adopted by *Seda* as well. Both entrepreneurs estimated that approximately 20 percent of the total customers (i.e., customers of the sanitation enterprise and the other business combined) purchased both sanitation and non-sanitation related products. *Son* operated the sanitation enterprise as a stand-alone business, which is an outlier in this study. Approximately 90 percent (24 of 27) of the sanitation enterprises we studied were operated alongside entrepreneurs' other businesses, and cross-selling was a well-established practice.

Enterprises also attracted customers by offering credit solutions to help tide over the liquidity challenge—the inability to pay for the toilet upfront due to unstable or seasonal cash flow. Approximately ten percent of *Son's* sales were made on installments and most completed payment within two to three months. *Thom* offered the installment option in the past but discontinued the practice after some customers defaulted on payments. *Seda* felt that offering credit to customers was risky and had never tried this approach. Whereas *Son's enterprise* was the only one to offer credit to customers among the three enterprises profiled in this case study, the practice was more common among the sanitation enterprises covered in our research, with 78 percent (or 21 of the 27 enterprises covered) of the enterprises offering payment in installments.

While such contextual factors as poverty of the customer base and/or the number of markets served by an enterprise also influence toilet sales, we didn't detect a relationship between these factors and toilet sales for the three case study enterprises, but contextual factors were clearly discernible over the full research sample of 27 enterprises. Those with higher sales were more likely to sell in markets with a lower poverty rate and target more markets. The median proportion of poor households[40] in the main commune for "Large HP" enterprises was 57 percent compared to 81 percent for the "Small LP" enterprises. Similarly, the median number of communes served by a "Large HP" enterprise was nine, whereas it was only two for "Small LP" enterprises, indicating an inverse relationship between poverty and sales, and a positive one between geographical coverage and sales. We did not find a relationship between competition and toilet sales, either for the three enterprises covered in the case study or the full sample of 27 enterprises.

Non-quantifiable factors such as reputation and familiarity are also important contextual factors that are likely to have influenced toilet sales. *Thom*, for instance, was very well-known in the community, and his construction products business was operating since 1999, and his sanitation enterprise had been operational since 2002. This is likely to have positively impacted the number of walk-in customers for his sanitation enterprise.

4.1.2. PRICES

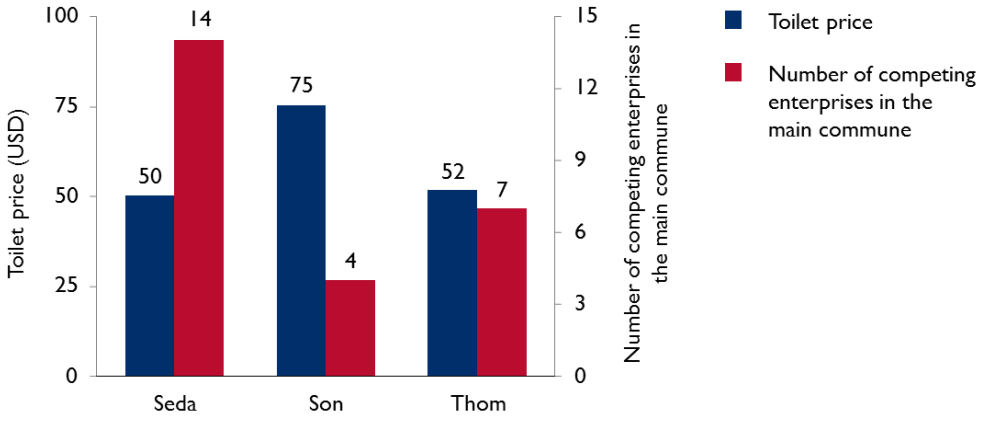
The average prices charged by the three enterprises were influenced by the cost they incurred on manufacturing toilet packages as well as by the competition that they faced from other players in the market. *Son's enterprise* charged the highest price for its toilet package, plausibly due to the substantially

[40] Since latest official estimates on poverty rates were not available, we developed a measure to estimate the prevalence of poverty in the communes served by the sanitation enterprises. The poverty level in a commune was estimated using data on the roof types of buildings. Households living in buildings with temporary roofs made of thatch or zinc-fibro material were considered poor, and those in buildings with permanent roofs made of tiles or concrete material were not considered poor. Data sources: National Institute of Statistics, Ministry of Planning, Cambodia. "General Population Census of Cambodia 2008."; National Institute of Statistics, Ministry of Planning, Cambodia. "Cambodia Socio-Economic Survey 2015."; and Pedi, D., et al. *The "Hands-Off" Sanitation Marketing Model: Emerging Lessons from Rural Cambodia*. Briefing Paper 1145. Loughborough, UK: 35th WEDC International Conference, 2011.

higher costs, as compared to the other two enterprises. The three enterprises' respective cost structures are discussed in Section 4.1.3.

High competition appears to have constrained the pricing power of *Seda's enterprise.* As Figure 14 shows, it had to compete with more enterprises than *Son* and *Thom*[41]. As a result of the intense competition, *Seda's enterprise* had the lowest gross margin (price *minus* cost) per toilet among the three. *Seda's enterprise* had an average gross margin of USD 17 per package, compared to USD 23 for *Son* (who faced the least competition) and USD 21 for *Thom*.

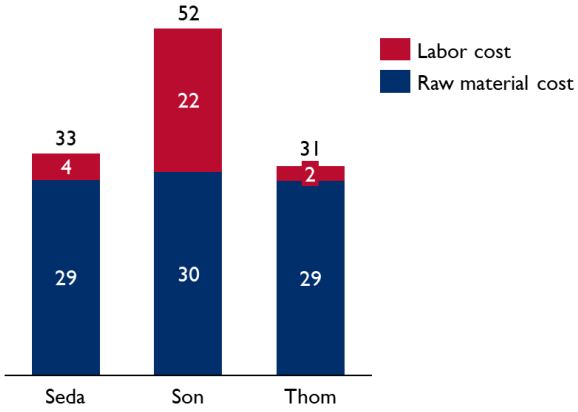
Figure 14: Average toilet prices (USD, 2017) and competition in the main commune by enterprise[42]



4.1.3. COSTS

Among the three enterprises, *Son's enterprise* incurred the highest cost per toilet package, driven primarily by high labor costs (Figure 15). *Son* also spent a marginally higher amount on the raw materials used in his toilet packages.

Figure 15: Composition of the average cost per toilet package by enterprise (USD, 2017)[43]



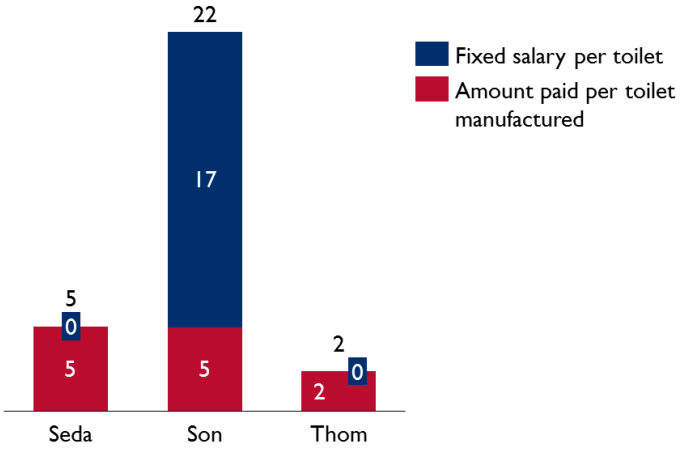
[41] The number of competing enterprises is based on WaterSHED data and is most likely the minimum because competition includes enterprises not part of or tracked by the WaterSHED program.

[42] Package prices are the actual price charged by Seda and Son, and the average package price for Thom, who did not sell a single, standardized package but customized it to customer preferences. Figures have been rounded to the nearest whole number.

[43] Figures in the chart have been rounded to the nearest whole number.

Son's enterprise employed more workers and had a different compensation structure to address the perceived risk of workers leaving for better opportunities in neighboring Thailand. *Son* employed three full-time salaried workers who performed multiple functions, including deliveries. In addition, the enterprise also periodically employed casual labor who were paid a fixed rate for each component they manufactured (e.g., cement ring, pit cover). Both *Seda's* and *Thom's enterprises* employed only one worker each and paid them a fixed rate per toilet component produced, with the entrepreneurs and their families also contributing labor (for casting and delivery). The casual labor employed by *Son* was paid at par with *Seda's enterprise* but more than twice the rate paid by *Thom's enterprise (*Figure 16). As a result, the combined fixed wages and casual labor wages raised costs significantly for *Son's enterprise*. The enterprise was located in a province in neighboring Thailand, and *Son* felt that workers were likely to seek better opportunities across the border if they were not well-compensated.

Figure 16: Composition of average labor cost per toilet package by enterprise (USD, 2017)[44]



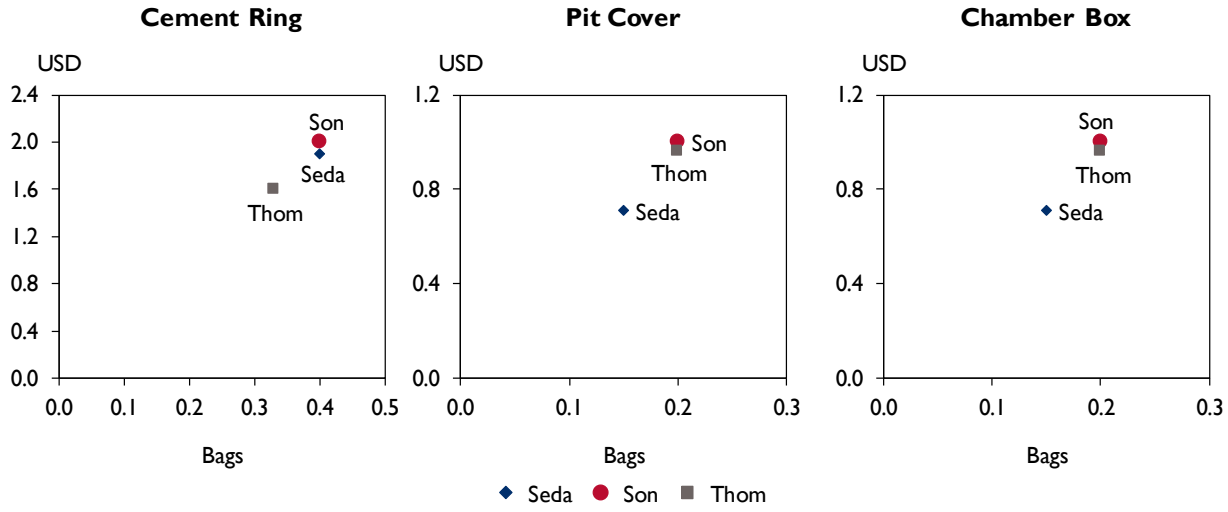
In addition to high labor costs, *Son's enterprise* also had marginally higher raw material costs than the other two enterprises. *Son* spent more on cement and iron rods (per package), but the exclusion of floor tiles from *Son's* package and lower procurement costs for other materials (e.g., pan and PVC pipes) offset the higher cost of cement and iron rods.

Among the three enterprises, *Son's enterprise* used a higher quantity of cement and a significantly higher quantity of iron rods in order to market (perceived) higher quality products to customers (Figure 17 and Figure 18). *Son's* higher usage of these raw materials could be due to his enterprise's location in a hilly region with poor roads, increasing the cement and iron rod content to strengthen components and minimize damage during transport.

Thom's and Son's enterprises used similar quantities of cement in their pit covers and chamber boxes, and higher quantities than used by *Seda* in manufacturing these components, but *Thom's enterprise* used less cement to make rings than *Son's* and *Seda's enterprises*. *Son's enterprise* used significantly higher quantities of iron rods in all manufactured components, including the chamber box—a practice not followed by the other enterprises (Figure 18). Since the raw material unit procurement costs differed only marginally among the three, the higher quantity of iron rods, in particular, increased the cost of these raw materials significantly for *Son's enterprise* relative to the other two enterprises. The cost of other important raw materials (i.e., sand and gravel) differed only marginally across the three enterprises.

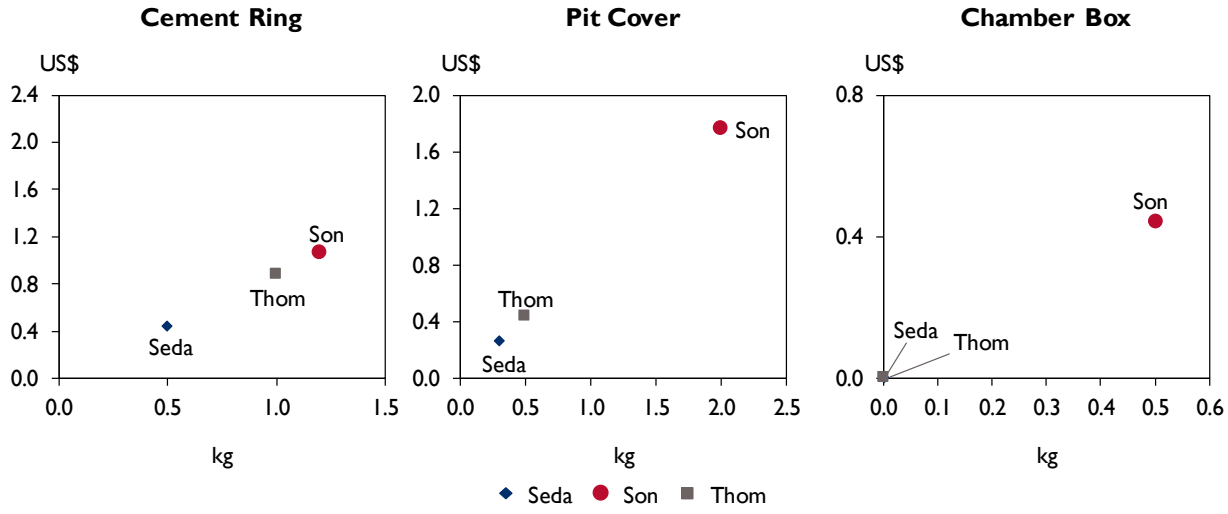
[44] Figures in the chart have been rounded to the nearest whole number.

Figure 17: Cement quantity used (bags) and cost (USD) per component by enterprise (2017)



Note: Axes scales are not the same due to difference in material usage across components

Figure 18: Iron rod use (kg) and cost (USD) per component by enterprise (2017)



Note: Axes scales are not the same due to difference in material usage across components

Minor alterations to the toilet package and lower procurement costs for some traded components helped *Son's enterprise* partially offset its higher cement and iron rod costs. Unlike the other two enterprises, *Son's enterprise* did not include ceramic floor tiles in its package, which reduced costs by USD 2.6 per toilet package. It was also able to procure PVC pipes, used to connect the pan to pit and to release smell from the off-set pit, at lower rates compared to the other two enterprises, which helped further reduce the cost difference with the other two enterprises

4.1.4. COMMON PRODUCTS MIX

The "common products mix" in the GMVA bridge quantifies how differences in the proportion of substructure and interface components in total sales impact the differential gross profits of an enterprise pair. *Thom's* decision to offer customized toilet packages helped increase the enterprise's share of the

customer's wallet[45], and by implication, its revenues and profits. By contrast, *Seda* and *Son* chose to sell only a standard package, which reduced their gross profit per customer. As a result of varying the product mix, *Thom's enterprise*, on average, generated additional revenue of USD 13 per customer, and additional gross profit of USD 9 per customer, thus increasing its gross profit per customer by almost 45 percent compared to a scenario in which it sold only the standard toilet package.

> *"I sell whatever my customers need. They are free to choose the number of rings, covers etc. in the toilet package and pay accordingly"* – Thom

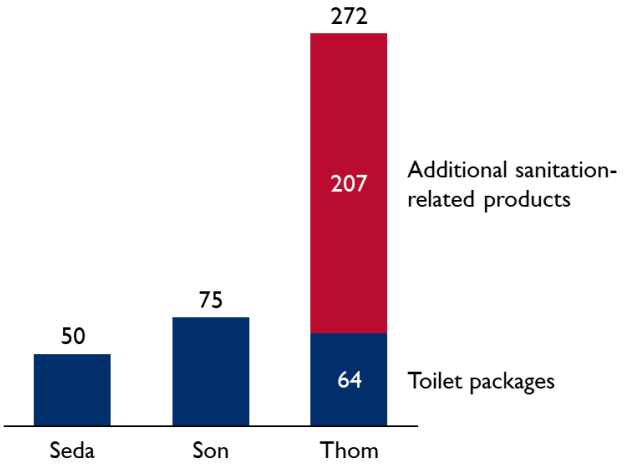
4.1.5. ADDITIONAL, SANITATION-RELATED PRODUCTS

Thom's enterprise was the only one that sold additional sanitation-related products (i.e., superstructure components such as toilet doors and construction material used to build the superstructure—see Table 1 for the complete list) among the three enterprises we profiled. The approach of increasing its share of the customer's wallet helped *Thom's enterprise* increase both its revenues and gross profits.

Sale of such products as toilet doors and such materials as cement and bricks offered *Thom's* customers the convenience of buying the majority of components required for constructing a toilet, including the superstructure from one place. As a result, the enterprise's average revenue per customer quadrupled to USD 272 (Figure 19), and its average gross profit per customer increased 1.7-fold to USD 49 (Figure 20), compared to the scenario in which it sold only toilet packages (i.e., substructure and interface components, including the standard package as well as components included in the product mix).

> *"I sell all construction products, including toilets, so that the customers buy all materials from me instead of going to different shops for different items."* – Thom

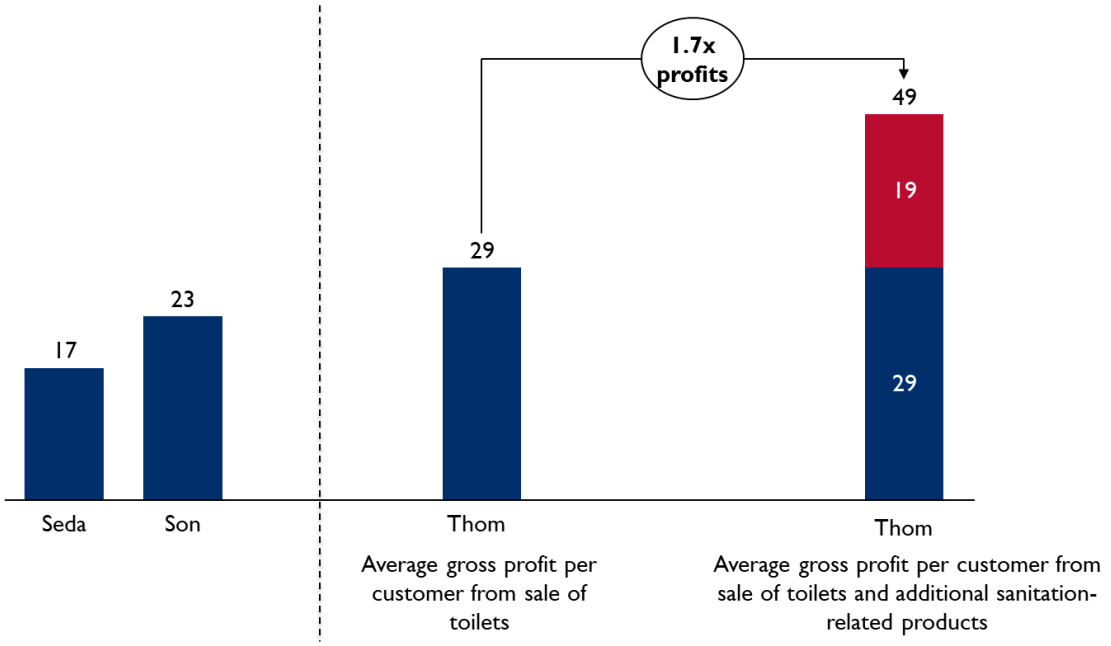
Figure 19: Average revenue per customer from the sale of toilets and additional sanitation-related products by enterprise (USD, 2017)[46]



[45] "Wallet" refers to the total amount spent by the customer to purchase or construct a full, functional toilet including the superstructure.

[46] Thom's "toilet package" revenue includes revenue from the sale of the standard package and product mix components. Figures in the chart have been rounded to the nearest whole number.

Figure 20: Average gross profit per customer from the sale of toilets and additional, sanitation-related products by enterprise (USD, 2017)[47]



Thom's strategy of selling products over and above the toilet package helped him earn the highest average revenue and gross profit per customer among the three enterprises in this case study. As a result, despite *Thom's enterprise* selling toilets to fewer customers than *Son* (335 vs. 375), and at a 30 percent lower average price for the average standard package (at USD 52 vs. USD 75), it earned almost double the gross profit (USD 16,397 vs. USD 8,723).

> *"I plan to start selling other sanitation products and construction material soon. More products should help increase my sales substantially as customers often ask me why I don't sell material used for toilet construction"* – Son

Son realized the benefits of selling additional, sanitation-related products and was trying to arrange funds for the additional working capital to purchase and stock such products. *Seda,* however, was averse to taking the risk and planned to continue selling only toilet packages.

4.1.6. SUMMARY OF VIABILITY ANALYSIS

Thom's enterprise leveraged different drivers to achieve 16 times and 1.9 times the gross profits of *Seda's* and *Son's* enterprises, respectively. *Son's enterprise* had the highest sales but the lowest gross profit per customer, while *Seda's enterprise* took a few steps to increase sales but remained small and unviable.

Thom's enterprise earned higher profits primarily because of its strategy of increasing the share of the customer's wallet (leveraging the 'common products mix' and the 'additional, sanitation-related products' drivers of the GMVA bridge). He offered packages customized to customer preferences and simplified the purchasing process by offering more products so that customers did not need to shop from multiple suppliers when constructing a toilet. Its higher average revenue per customer enabled

[47] Figures in the chart have been rounded to the nearest whole number.

Thom's enterprise to increase its average profit per customer substantially. By contrast, *Son's* and *Seda's enterprises* sold only standardized toilet packages (i.e., substructure and interface components), limiting their ability to earn higher revenue and profit via offering greater choice, as well as missing the opportunity to sell components for the superstructure.

Thom also focused on increasing the number of customers to whom his enterprise sold toilets and sanitation products. His partnership with subsidy programs contributed to an estimated 44 percent of his toilet sales in 2017. He also invested his time and effort in customer acquisition, including door-to-door marketing and engaging with local actors such as commune councilors for sales leads (the 'number of customers' driver of the GMVA bridge). Active engagement provided *Thom* (and *Son*) not only with sales leads but also improved his understanding of the customer (such as the preference for quick delivery and markers used to assess quality. Additionally, *Thom* leveraged his other business of construction materials to cross-sell toilets (and *vice-versa*). *Seda's enterprise* also adopted cross-selling as an approach to increase sales but benefited to a lesser extent, as her two businesses served far fewer customers overall than *Thom's* businesses.

Son's enterprise followed a customer acquisition strategy resulting in the highest number of toilet sales among the three enterprises covered in this case study. *Son* expended considerable effort in acquiring more customers, and he too had a good understanding of the market and customer expectations, which he employed in his marketing messages. *Son* also generated a significant part of his sales through subsidy programs. In addition, *Son's* was the only one among the three enterprises to offer its customers credit so that they were not constrained from buying a toilet due to limited liquidity (i.e., irregular or seasonal cash flow preventing paying the amount upfront). Despite selling more toilets and pricing its toilets nearly 44 percent higher compared to the average price charged by *Thom's enterprise*, it earned substantially lower revenues and profits because it only sold toilets, and therefore earned much less from each customer on average. Its profit was also impacted by high costs, a substantial proportion of which was due to the high compensation paid to workers—an outcome of the perceived difficulty in hiring and retaining workers because of lucrative opportunities available to laborers across the border in Thailand.

Seda's enterprise sold the fewest number of toilets of the three and made a gross profit of just over USD 1,000. It largely adopted a passive approach to sales by relying on demand activators and walk-in customers to generate sales, but unlike *Thom* and *Son*, *Seda* did not undertake any enterprise-led marketing effort. While *Seda* tried to cross-sell toilets to customers who came to purchase non-sanitation concrete products (and vice-versa), her small customer base limited the potential of this approach. *Seda* also cited the role of intense competition in limiting her enterprise's sales and profit margin.

4.2. ASSESSING SUSTAINABILITY

The previous section highlighted the different factors that can influence sanitation enterprise viability via a close analysis of three specific examples. These examples considered business performance for a given year. What can we conclude about enterprise *sustainability (*long-term *viability)*?

In the *Hands-Off* context, sustainability is driven by the enterprises' ability to finance and operate their business without ongoing non-market support from WaterSHED.

4.2.1. FINANCIAL INDEPENDENCE

The financial independence of the three enterprises depends on their ability to pay for all recurring expenses (*i.e.,* day to day operations) and re-investments (*i.e.,* long-term capital expenditure such as equipment) without non-market support typically provided by MBS programs.

The three sanitation enterprises, like others supported by the *Hands-Off* program, are and will be financially independent after the *Hands-Off* program ends. During the active facilitation phase of the program, sanitation enterprises did *not* receive direct or indirect financial support for recurring expenses or investment-related needs from WaterSHED; operational and capital expenditure was funded entirely from the enterprises' resources. However, two of the three enterprises derived a significant share of sales in 2017 (and consequently profits) from non-WaterSHED subsidy programs, which have limited duration. For this reason, our analysis of enterprise sustainability also assesses financial independence by considering only non-subsidized toilet sales.

Our research indicates that sanitation enterprises in Cambodia, including the three profiled in this case study, tend to own a limited number of assets—all possess a truck used for delivery of toilets and molds used to cast cement rings, chamber boxes, and pit covers (refer to Table 2 for an overview of the assets owned by the three enterprises). In *Seda* and *Thom's* cases, the truck is shared with their other businesses, further reducing the asset's cost to their respective sanitation enterprises.[48]

Table 2: Capital assets owned by the three sanitation enterprises (2017)[49]

ASSET DETAILS	SANITATION ENTERPRISE					
	Seda's enterprise		***Son's enterprise***		***Thom's enterprise***	
Asset name	Truck	Molds	Truck	Molds	Truck	Molds
Number	1	5	1	4	1	5
Average unit cost (USD)	3,000	104	3,300	231	9,000	140
% of cost apportioned to sanitation	70%	100%	100%	100%	30%	100%
Remaining useful life of asset (years)	7	3	7	3	7	3

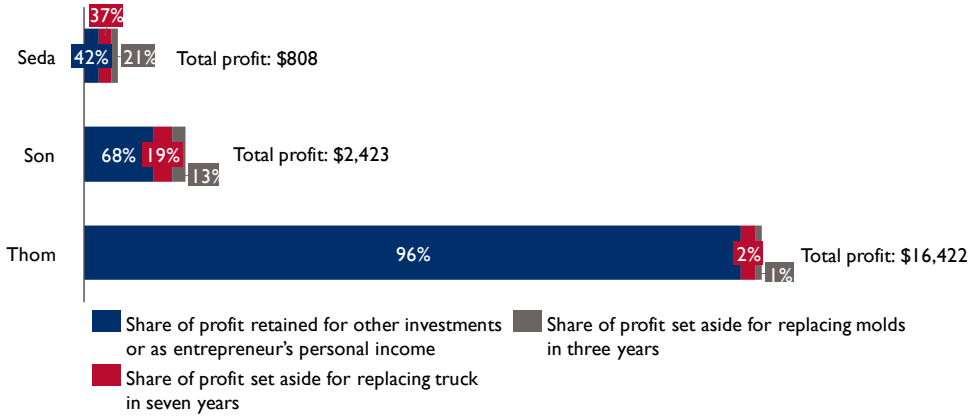
With an average remaining life of seven years for trucks and three years for molds[50], *Thom* would need to set aside only four percent (USD 657) of his profit of USD 16,422 to replace these assets. *Son* would need to set aside a larger share of 32 percent (USD 775) because his profit (USD 2,423) is lower. *Seda*, however, is likely to find sustainability a challenge because she would need to set aside almost 60 percent (USD 485) of her profit of USD 808 (Figure 21), which is already low, to replace assets.

[48] In P&L statements for sanitation enterprises, the total cost of assets spread over their useful life (i.e., depreciation) is apportioned to the sanitation enterprise in proportion to its contribution to the entrepreneur's total revenues. For example, if the sanitation enterprise contributes 70 percent of total revenues and concrete products the remaining 30 percent of an entrepreneur's revenue, 70 percent of the annual depreciation of the shared asset (e.g., truck) is included in the sanitation enterprise's P&L statement. Alternate methods to apportion asset costs such as utilization instead of revenue, while apt, were not possible in our research because entrepreneurs neither tracked nor could they provide a reasonable estimate of asset utilization across businesses.

[49] FSG research interview with the entrepreneurs.

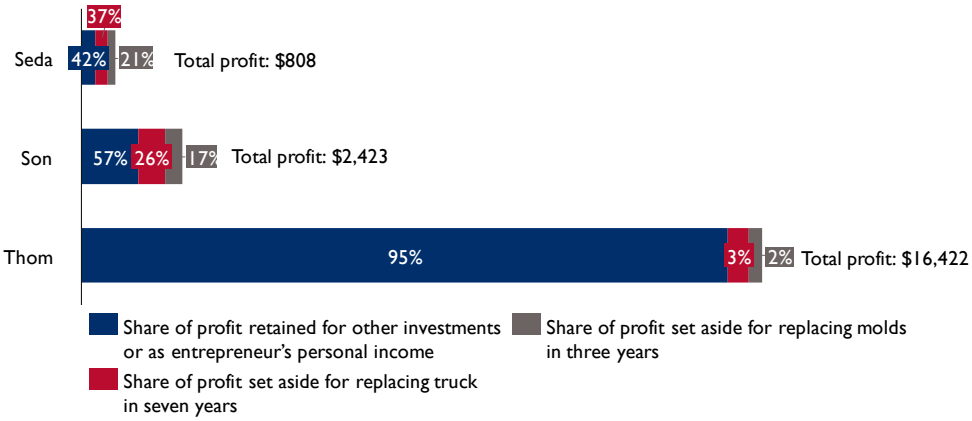
[50] The analysis assumes that the entrepreneur has not already set aside any amount to replace the asset when needed, and will need to save the entire amount required for asset replacement over its remaining life.

Figure 21: Share of 2017 cash net profit from sanitation needed to be set aside by each enterprise for investing in a truck in seven years and molds in three years[51]



If subsidies are unavailable, the profits of *Thom's* and *Son's* enterprises see a sizeable decline by 18 percent (USD 2,999) and 25 percent (USD 614), respectively. *Seda's* enterprise did not have any subsidized sales. With this change in cash net profits in mind, *Son's enterprise* could be unsustainable, whereas *Thom's enterprise* is likely to remain sustainable. Excluding subsidized sales would require *Son's* enterprise to set aside 43 percent of its cash net profit from non-subsidized sales, lowering its retained income to USD 1,031—for context, the typical annual income for construction workers in Cambodia is USD 2,250. By contrast, *Thom's* enterprise would need to set aside 5 percent instead of 4 percent of cash net profit, which is unlikely to impact its sustainability.

Figure 22: Share of 2017 cash net profit from unsubsidized sanitation sales needed to be set aside by each enterprise for investing in a truck in seven years and molds in three years[52]



4.2.2. OPERATIONAL INDEPENDENCE

The operational independence of the three enterprises depends on any ongoing non-financial support that they receive from non-market actors such as MBS programs, as well the presence of alternative market actors who can provide the same support after non-market actors exit the market.

[51] Figures in the chart have been rounded to the nearest whole number. Percentages might not add to 100 percent due to rounding errors.

[52] Figures in the chart have been rounded to the nearest whole number. Percentages might not add to 100 percent due to rounding errors.

The three sanitation enterprises, as well as others supported by the program, are well-positioned to continue independently operating and interacting with other market actors. Even during the active market facilitation phase, the *Hands-Off* program did not provide recurring operational support to sanitation enterprises. WaterSHED instead brokered links between enterprises, demand activators (DAs), and MFI agents initially, but thereafter, the actors interacted directly, without any form of intermediation by WaterSHED. WaterSHED's approach of developing local capabilities through initiatives such as Civic Champions—which leveraged local officials as unpaid DAs, among other roles—benefited sanitation enterprises without making them dependent on WaterSHED. As noted in Section 4.1.1, unpaid DAs likely play a more important role in driving toilet sales than sanitation enterprises recognize. Unpaid DAs are, however, not the only actors promoting toilet sales. Sanitation enterprises also engage with local *paid* DAs (many of them trained by WaterSHED) and negotiate sales commissions directly. Enterprises can continue to leverage paid DAs if, for some reason, the unpaid DAs stopped selling toilets. Similarly, sanitation enterprises (not profiled in this case study) have in the past, partnered with local MFI agents, and paid commissions in exchange for the latter attending sales pitch meetings and processing sanitation loans for interested customers[53].

Other interactions, such as those with raw material suppliers, existed before the program began, as most entrepreneurs recruited by WaterSHED were already procuring supplies to manufacture concrete products. Entrepreneurs utilized the existing supply chain to procure raw materials for the sanitation enterprise.

4.2.3. SUMMARY OF SUSTAINABILITY ANALYSIS

Sustainability would be most challenging for *Seda's enterprise*, whereas *Thom's enterprise* is likely to continue operating viably over time. *Son's enterprise* is likely to find sustainability a challenge if it cannot increase its sales or find other sources of revenue to compensate for the loss of subsidized sales.

All three enterprises have benefited from WaterSHED's approach of incorporating sustainability considerations at the inception stage of the *Hands-Off* program, as a result of which they did not need to depend on any direct financial or operational support from WaterSHED. WaterSHED focused instead on building the ecosystem to support MBS in Cambodia, with a high level of engagement with government and market actors. WaterSHED's withdrawal or change in focus is, therefore, unlikely to impact the sustainability of these sanitation enterprises.

Enterprise sustainability will, however, be impacted by firm-level factors, and *Seda's enterprise* might find sustainability a challenge given its owner's high dependence on sanitation, intense competition from other sanitation enterprises in its main commune, as well as the low profits generated by the enterprise. Even *Son's enterprise* might find sustainability a challenge if toilets sales do not increase adequately to compensate for the absence of NGO subsidy programs. Such programs contributed a quarter of *Son's* sales in 2017, and without this support, his income would decline by a similar proportion. This, in turn, will limit his ability to save enough to replace critical assets when needed. While none of the three entrepreneurs is optimistic about future growth for their sanitation enterprises, only *Seda* does not have plans to reduce her dependence on the sanitation enterprise, which is her primary source of income.

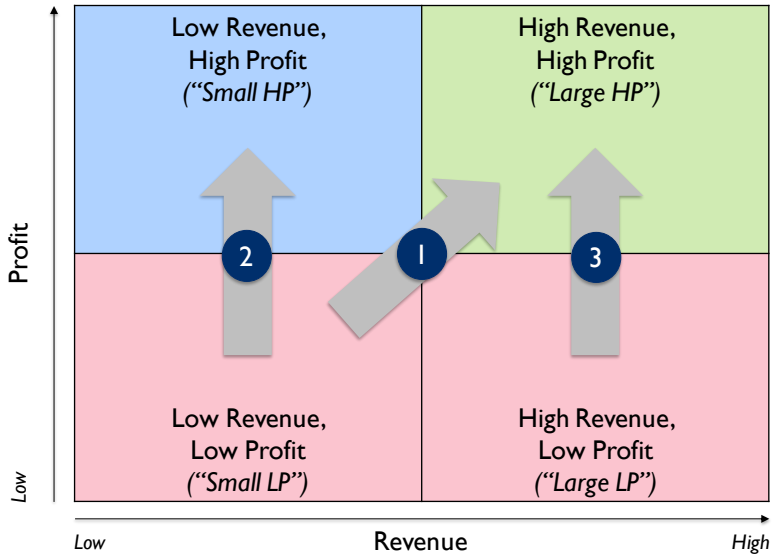
[53] Sanitation enterprises believed that MFIs would discontinue financing toilet purchases going forward, as the government had capped the interest rates that they could charge, which made very small loan amounts unfeasible for the MFIs.

5. RECOMMENDATIONS

5.1. RECOMMENDATIONS TO IMPROVE VIABILITY

Based on the findings from the viability analysis in the previous section, we offer recommendations on the potential paths (i.e., Path 1 and Path 3) that enterprises in the *Hands-Off* context can take to improve their profits (see Figure 23), and hence, improve their viability. The strategies are based on the profit drivers (identified through GMVA) and underlying business practices leveraged by the four enterprises we studied. We also explore options available to implementers to support these strategies.

Figure 23: Potential path(s) to improve the viability of sanitation enterprises



The analysis of the three enterprises reveals four key drivers of gross profit differences—the sale of additional, sanitation-related products, the common product mix, costs, and the number of customers—that can be targeted to improve enterprise viability in the *Hands-Off* context.

To leverage these drivers, enterprises can employ three distinct strategies:

- increasing the enterprise's share of the customer's wallet,
- cost reduction, and
- customer acquisition

The applicability of the three strategies depends on local market conditions and the capacity of specific entrepreneurs running the enterprises. These strategies are explained in further detail below.

5.1.1. INCREASING THE ENTERPRISE'S SHARE OF THE CUSTOMER'S WALLET

Enterprises can increase their share of the customer wallet by offering additional, sanitation-related products (i.e., superstructure components) and/or altering their product mix to offer customization options to customers, consequently increasing their total revenue and profit.

Selling superstructure components will offer customers the added convenience of purchasing all their toilet-related needs from a single supplier and translate into higher average revenue and profit per

customer. Similarly, varying the product mix will help the enterprise increase its average gross profit per customer, as seen from Thom's experience (see Section 4.1.5 and Section 4.1.4).

A "Small LP" such as *Seda's enterprise,* which already pursues some customer acquisition (i.e., working with demand activators and cross-selling), might find it challenging to increase sales significantly, due to market conditions and the entrepreneur's reluctance to expend time and effort in marketing the toilet package. It could instead focus on increasing its share of the customer's wallet to improve its profit. *Seda's enterprise* already sells in six communes and derives over 40 percent of its sales from demand activators. It could vary its product mix and sell additional, sanitation-related products to some of its customers. Assuming it could leverage this strategy to increase its average gross profit per customer by the same multiple (2.4x) as achieved by *Thom's enterprise*[54], *Seda's enterprise* could increase its income substantially from this approach. If 25 percent of its customers opted to purchase more expensive packages and/or additional, sanitation-related products, *Seda's enterprise* would increase its gross profit by 1.3x. If half of its customers purchased such products, gross profits would increase by 1.7x (see Table 3 for further details and more scenarios).

Table 3: Impact of varying the product mix and selling additional sanitation-related products on gross profits earned by *Seda's enterprise*

Number of customers	60				
Base case gross profit (USD)	1,005				
Gross profit multiplier	2.4				
% of customers spending more	15%	20%	25%	40%	50%
Total gross profit (USD)	1,215	1,284	1,354	1,564	1,704
Times increase from base case gross profit	1.21	1.28	1.35	1.56	1.70

The strategy is likely to be even more attractive for a "Large LP" such as *Son's enterprise,* which sold substantially more toilets than both *Seda's* and *Thom's enterprises. Son's enterprise* will experience a higher absolute increase in profit under the various scenarios, as it had much higher dollar profits than *Seda's enterprise* (Table 4).

Table 4: Impact of varying the product mix and selling additional sanitation-related products on gross profits earned by *Son's enterprise*

Number of customers	375				
Base case gross profit (USD)	8,723				
Gross profit multiplier	2.4				
% of customers spending more	15%	20%	25%	40%	50%
Total gross profit (USD)	10,542	11,148	11,755	13,574	14,787
Times increase from base case gross profit	1.21	1.28	1.35	1.56	1.70

[54] Thom's enterprise earned an average gross profit of USD 20.4 if it only sold toilet packages. It earned an additional per customer average gross profit of USD 28.6 by varying its product mix and also selling additional sanitation-related products, thus taking the total average gross profit per customer to USD 49. Its average per customer gross profit thus increased by 2.4 times when it varied the product mix and also sold additional products besides toilet packages.

The choice of either or both of these approaches to increase a sanitation enterprise's share of the customer's wallet will depend on the characteristics of the market as well as the investment capacity of the entrepreneur. Both strategies would require enterprises to vary their product inventory. The extent to which enterprises should consider stocking and selling additional products (i.e., superstructure components), or a different mix of products (i.e., substructure and interface components), or both, is heavily dependent on the customer buying preferences and affluence. In case of additional sanitation-related products, the customer has to be: (a) willing to buy these products from one shop alone, and (b) find the products affordable. In markets where customers are inclined to shop for components from different suppliers in a bid to lower total costs or procure specific components from a familiar supplier (e.g., hardware store), the opportunity to increase the share of customer wallet will be limited. Moreover, customers' limited budgets may be inadequate to cover the cost of both the toilet and the superstructure. Similarly, there must be sufficient customer demand for customizable toilet packages, as well as the willingness to pay for the additional components for an enterprise to benefit from changing its product mix.

Enterprises' financial capacity or access to credit is another important factor because both these strategies will need them to maintain larger stocks, with the strategy of selling additional sanitation-related products requiring a larger investment. Stocking the components to fulfill orders would require additional working capital, and might be a significant deterrent for entrepreneurs like *Seda* who lack the resources to invest in expanding her product offerings, and are also averse to taking credit-related risks. However, taking a broader view, other sanitation enterprises are far more open to taking a loan to expand their business; of the 27 enterprises covered in our research, over half, comprising both low and high profit enterprises, had taken out a business loan. MBS programs can assist such enterprises by advising them on customers' preference and demand for additional, sanitation-related products based on formative research as well as broker introductions with business credit sources such as MFIs.

5.1.2. COST REDUCTION

"Large LP" enterprises can improve their viability by reducing their costs, which will help them earn higher profits at the same revenue. Our research indicates that the "Large HP" enterprises are more cost-efficient than the "Large LP" ones. Whereas the median cost of goods sold (COGS—total raw material and labor costs incurred exclusively on producing the toilet package and any other sanitation-related products that the enterprise might be selling) for "Large HP" enterprises in our sample of 27 was 71 percent of their revenue from the sale of sanitation products, it was 86 percent of the revenue for "Large LP" enterprises. "Large LP" enterprises can thus look to increase profits by cutting costs of raw materials or labor, or both.

Enterprises can reduce raw material costs by ensuring that toilet components are not over-engineered for their local market context. We found that some enterprises used raw materials such as iron rods and cement in larger amounts than their peers, increasing their costs. Enterprises often use higher quantities of raw material in an attempt to signal better product quality. Local factors such as the nature of the terrain, poor road quality, or poor quality of other important raw materials such as sand and gravel could also dictate cement and iron rod usage to minimize breakage during transportation or installation.

Son's "Large LP" *enterprise*, for instance, used higher quantities of cement, and particularly iron rods in all components. Unlike the other two enterprises, it used iron rods even in manufacturing chamber boxes. Its usage of cement and iron rods was dictated by a combination of factors related to quality signaling and the need to protect products during transportation in a hilly region with poor quality roads. *Son* could consider optimizing the use of iron rods, in particular, so costs can be reduced without

compromising on quality. Considering a possibly extreme scenario, if *Son's enterprise* could use a similar quantity of cement and iron rods in its toilet components as *Thom's enterprise,* and continue selling toilets at USD 75, its annual gross profit would increase by nearly USD 2,200 (a 25 percent increase over its current profit of USD 8,723).

Enterprises can also reduce costs by optimizing their labor expenses. This can be achieved by the entrepreneurs supplementing their existing labor capacity. In our case study, both *Seda* and *Thom* (and their family members) attended to several aspects of the business: toilet delivery, supervision of casting work, etc. *Son's enterprise*, by contrast, was more dependent on hired workers and consequently had a much higher labor cost (Figure 15). If *Son's enterprise* could cut its labor costs by half (still paying almost six times as much as *Thom's enterprise*), and continue selling toilets at the average price of USD 75, its gross profit would increase by more than USD 4,000 or over 46 percent of its current gross profit, and will cross USD 12,700 per year. The resulting increase in the enterprise's profits would be sufficient to move it into the "Large HP" category. Even a 25 percent reduction in labor costs would generate almost USD 2,000 in additional gross profits for the enterprise. However, entrepreneurs' contribution to labor depends on their physical ability and willingness to undertake manual labor and incur the opportunity costs, especially if they have other businesses or activities to attend.

MBS programs could help enterprises manage their raw material and labor costs by conducting periodic assessments and guiding them on optimal quantities of raw material, and the composition of labor, again subject to factors specific to their local contexts.

Of course, a sanitation enterprise would not be able to follow this cost reduction strategy if its local context does not permit any meaningful reduction in either raw material or labor costs. As outlined above, enterprises operating in hilly terrains or regions with poor roads, enterprises that are forced to work with poor quality raw material such as sand and gravel, or enterprises working in markets with scarce or expensive labor might have limited flexibility to reduce their costs and will not be able to follow this strategy to increase their profit. In such scenarios, it would have to focus on increasing its revenues.

5.1.3. NEW CUSTOMER ACQUISITION

"Small LP" enterprises can improve their revenue and the consequent profit by increasing the number of customers who buy toilet packages. Enterprises can adopt an active sales strategy combining their own efforts with those of demand activators, expand into new markets, and participate as suppliers in market-compatible subsidy programs to temporarily increase sales whenever the opportunity arises. Each of these tactics might entail tradeoffs or may not be feasible due to contextual factors or enterprise's constraints, and MBS programs should be cognizant of such an enterprise's operating limits when making recommendations on strategies to assist enterprises in increasing their profit.

As discussed in Section 4.1.1, *Thom* and *Son* invested considerable effort and time in sales and closely engaged with customers as well as members of local government with knowledge of the market. As the additional GMVA bridge in Appendix 7.4. shows, another "Large HP," *Chito's enterprise*, similarly benefited from focusing on increasing the number of customers (refer to Figure 29 in Appendix 7.4.). Like *Son* and *Thom*, *Chito* also adopted an active sales strategy, as well as covering a large market (selling toilets in nine communes). This level of time and effort investment might not be feasible for all entrepreneurs, however. Those with other businesses might prefer to pay more attention to their primary businesses. Women entrepreneurs who prefer roles such as managing inbound customers and operations (that enable staying at the shop while also attending to their home and family—like *Seda* in our case study) might be unwilling to travel extensively or constrained by gendered norms from doing so.

Even if entrepreneurs are unable or unwilling to invest their own time and effort, they can consider expanding to more markets and engaging demand activators as a complementary or alternative mechanism to increase sales, particularly in their secondary markets. In our research, the median number of communes served by a "Large HP" enterprise was nine, whereas it was only two for "Small LP" enterprises, suggesting that the latter group can benefit from expanding to more communes. Leveraging demand activators in secondary markets could be a cost-effective approach to expansion, and enterprises could emulate *Thom's* example, who frequently interacted with such local demand activators as commune councilors and benefited from their connections.

Geographic expansion may be dependent on a range of factors beyond the entrepreneur's control. Accessibility of new markets to fulfill demand is dependent on the road network to transport products efficiently and without damage. The intensity of competition from existing local sanitation enterprises may limit new customer acquisition and the ability to price at a level that compensates for increased costs due to logistics. Notably, this strategy is unlikely to require significant additional investment in assets or working capital. Most sanitation enterprises already own a truck that they use to deliver toilets and molds used for casting, and would therefore not require to make any new investments for serving more markets. Enterprises might need to invest in additional space to stock additional raw material and inventory if their current facilities are inadequate.

Finally, enterprises can opportunistically increase sales temporarily by partnering as suppliers to market-compatible subsidy programs, where they can target customers who would otherwise find products unaffordable at market prices. Such partnerships typically require minimal effort from sanitation enterprises since the onus to identify and direct customers to suppliers rest with subsidy programs. While subsidy programs supplement conventional sales and can become crucial in markets with a large share of unserved customers belonging to poor households, they are often limited in both duration and geographic scope. Unless subsidy programs are ubiquitous (e.g., government programs), they cannot be recommended as a reliable tactic to acquire customers. MBS programs can, however, identify such opportunities and facilitate partnerships to ensure that by design, subsidy programs are properly targeted, encourage beneficiaries to exercise choice, fulfill the demand by local sanitation enterprises (e.g., use of vouchers redeemable from local enterprises) and do not negatively impact non-subsidized demand. Indeed, MBS programs should engage directly with subsidy programs, given the multiple design and implementation challenges that may distort sanitation markets[55]. Greater engagement of MBS programs would increase the likelihood of the aforementioned flaws being identified and addressed early.

5.2. RECOMMENDATIONS TO IMPROVE SUSTAINABILITY

WaterSHED's *Hands-Off* intervention worked towards enabling a long-term sustainable MBS system in Cambodia right from the outset and offers lessons for other MBS programs aspiring to similar goals. We have highlighted select features of the *Hands-Off* program that helped ensure sustainability, for MBS programs to draw upon and incorporate in their program design:

- *Hands-Off* did not provide any recurring support that would make enterprises dependent on the program. It instead provided one-off support that covered product design, developing and testing marketing messages, training demand activators, and piloting customer credit mechanisms in partnership with MFIs. Moreover, right from the inception stage, *Hands-Off* stepped back after

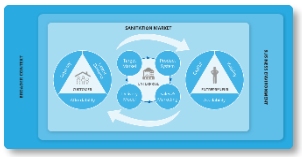
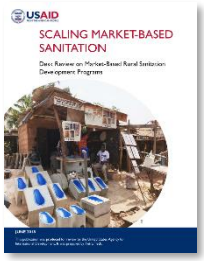
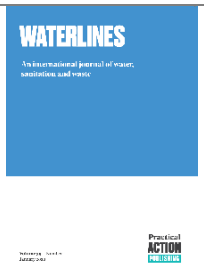
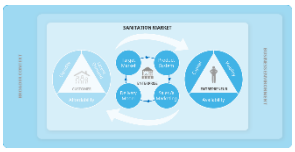
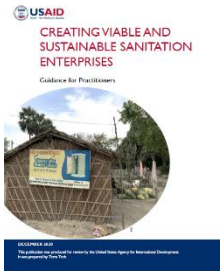
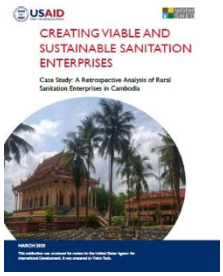
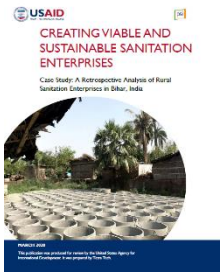
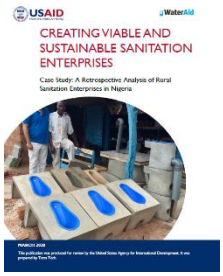
[55] USAID, (2018). *Scaling Market Based Sanitation: Desk review on market-based rural sanitation development programs,* Washington, D.C.: USAID Water, Sanitation, and Hygiene Partnerships and Learning for Sustainability (WASHPaLS).

facilitating linkages, and all interactions and transactions between the entrepreneurs and other market actors were governed by mutually-agreed terms.

- *Hands-Off* localized the sanitation market system by leveraging local actors in the system (i.e., entrepreneurs with existing complementary businesses, and local government leaders). This was done to ensure that local actors got accustomed to performing various market functions (e.g., manufacturing, demand activation) and interacting with each other directly without depending on the program. Thus, the approach increased the likelihood of sustainable enterprises and markets taking root in the geographies where the program was implemented.
  - By choosing to work with entrepreneurs who had an existing construction or concrete products business, the program increased the chances of their continuing in the sanitation business, which might not be attractive on its own but could complement the entrepreneur's income source while leveraging their existing skills, supply chains, and customers.
  - The program recognized early the critical role of community leaders in driving sanitation behavior change along with demand activation through commissioned community-based sales agents in increasing sanitation coverage and therefore transitioned demand promotion efforts to focus on well-positioned system actors, like local government leaders motivated by non-monetary incentives to promote improved sanitation[56]. This helped ensure that demand activation was not exclusively dependent on paid sales agents, whose participation and performance could vary across enterprises and market contexts.

[56] Refer to the webpage at http://watershedasia.org/research/?tag=civic-champions for resources on WaterSHED's Civic Champions program.

6. APPENDIX: USAID/WASHPALS MBS RESOURCES

Domain	Resources
 **Sanitation Market System**	 [Desk Review: *Scaling Sanitation Markets*]	 [Article: *Global Assessment of grant-funded, MBS projects*]
 **Sanitation Enterprise & Entrepreneur**	 **Report**: [*Creating Viable and Sustainable Sanitation Enterprise—Guidance for Practitioners*] **Country Case Studies**  [*Cambodia*]  [*Bihar (India)*]  [*Nigeria*]  [**Training Tool: *Designing Viable Sanitation Enterprises***]  **Toolkits**: ***Enterprise Recruitment & Viability and Sustainability Diagnostic*** (forthcoming)

7. APPENDIX: DETAILED METHODOLOGY

7.1. INITIAL SAMPLING PLAN

Our initial sampling plan aimed to interview a sample of enterprises with diverse contextual and performance characteristics. The sampling of enterprises was based on the types of markets in which they operated and their historical sales performance (as per WaterSHED data).

Market types were defined by ranking the districts[57] in which the enterprises operated as 'high' or 'low' on the following two metrics:

- **Ease of market capture:** 'Ease of market capture' indicated the ease of running a sanitation enterprise in a district. It was a composite measure of:
  - **Terrain**: Terrain in a district was classified as 'hilly' or 'plain' using Google Maps. A hilly terrain was considered to make 'ease of market capture' more difficult since transportation (either for procurement of raw materials or delivery of toilets) in hilly terrains was challenging.
  - **Flood occurrence**: Districts were classified based on the likelihood of flood occurrence58. High likelihood of flood occurrence was considered to make 'ease of market capture' more difficult since it is challenging to run any retail business during the floods.
  - **Road network**: Road networks in a district were assessed as 'poor' or 'good' based on the district center's proximity to roads and highways. Good connection to roads was considered to improve 'ease of market capture' as it made transportation (either for procurement of raw materials or delivery of toilets) easier.
- **Attractiveness of the market:** 'Attractiveness of the market' indicated the potential market opportunity for a sanitation enterprise in a district. It was a composite measure of:
  - **Base sanitation coverage:** Base sanitation coverage was measured using the percentage of households in the district without a toilet at the beginning of the intervention (in 2008)[59]. Less than 10 percent coverage was considered an unattractive market as the coverage was so low that demand for toilets may potentially not exist. Above 70 percent coverage was also considered unattractive as it indicated a saturated market. Coverage between 10 percent and 70 percent were considered attractive as it indicated a potentially untapped market for toilets.
  - **Population density**[15]: High population density in a district was considered to improve the 'attractiveness of the market' since a greater number of households could be targeted for selling toilets.
  - **Affluence:** Affluence was measured using the percentage of strong and permanent households in a district[15] as a proxy since strong and permanent households were more

[57] District is the second-level administrative unit in Cambodia (after province).

[58] Open Development Cambodia. "Cambodian Aqueduct Atlas." <https://opendevelopmentcambodia.net/wp-content/uploads/sites/2/2016/01/floodoccurance.jpeg>

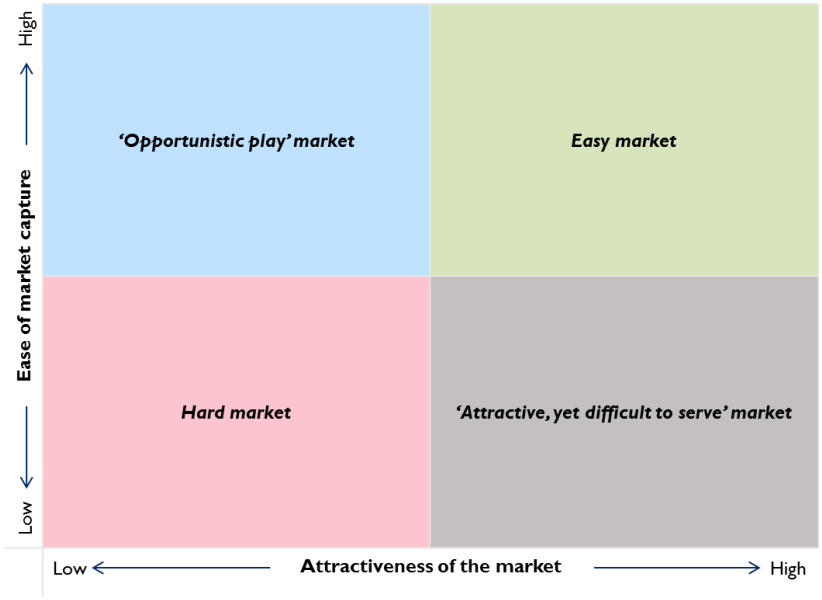
[59] National Institute of Statistics, Ministry of Planning, Cambodia. "General Population Census of Cambodia 2008."

expensive to construct than temporary structures. High affluence in a district was considered to improve 'attractiveness of the market' since more people could afford to buy toilets.

This ranking methodology led to defining four types of the market where enterprises operated (Figure 24):

- **Hard market:** Challenging to operate a sanitation enterprise and a low market opportunity for sanitation
- **'Opportunistic play' market:** Low market opportunity for sanitation, but a potential opportunity to capture the market due to the ease of operating a sanitation enterprise
- **'Attractive, yet difficult to serve' market:** Large market opportunity for sanitation, but difficult to capture the market due to challenges of operating a sanitation enterprise
- **Easy market:** Easy to operate sanitation enterprise and a large market opportunity for sanitation

Figure 24: Types of markets for sampling



Once the market types were defined, 253 out of the 394 enterprises[60] with which WaterSHED had worked were categorized into different groups using a combination of the following two sales data metrics, obtained from WaterSHED's sales database from 2012-17[61]:

- **Sales volumes:** Enterprises were grouped into three categories based on their average sales volumes[62]:

[60] The remaining 141 enterprises were not analyzed since they had entered the market in 2016 or 2017 per reporting of sales to WaterSHED. This study assumed that they were too new in the market to gather meaningful insights.

[61] WaterSHED's database records reported data, and zero sales or blanks in the dataset might imply that the enterprise did not report any sales. It does not necessarily imply that the enterprise did not sell any toilet during the period in question.

[62] Average sales volumes were calculated by dividing the total sales volumes of an enterprise with the total months of operation. A month of operation is defined as a month where the enterprise sold at least one toilet.

  - **High sales:** More than 14 toilets sold per month on average (top 25 percent of the sample)
  - **Moderate sales:** 5-14 toilets sold per month on average (middle 50 percent of the sample)
  - **Low sales:** Less than five toilets sold per month on average (bottom 25 percent of the sample)
- **Sales trends:** Enterprises were grouped into five categories based on their sales trends:
  - **Rising sales growth:** Recorded increasing sales volumes for every year of operation
  - **Mixed sales growth:** Recorded at least one year of increasing sales volumes and one year of decreasing sales volumes
  - **Falling sales growth:** Recorded decreasing sales volumes for every year of operation
  - **Exited:** Recorded zero sales for at least 12 months of operation and did not sell toilets subsequently[61]
  - **Re-entered:** Recorded zero sales for at least 12 months of operation but sold toilets subsequently[61]

The above categorization led to identifying six enterprise groups[63] for the sampling:

- Top performers: Enterprises with 'high sales,' and 'rising sales growth' or 'mixed sales growth'
- Moderate performers: Enterprises with 'moderate sales,' and 'rising sales growth' or 'mixed sales growth'
- Low performers: Enterprises with 'low sales'
- Exited – low sales: Enterprises with 'low sales' that 'exited'
- Exited – moderate sales: Enterprises with 'moderate sales' that 'exited'
- Unstable, despite high sales: Enterprises with 'high sales' that either 'exited' or 're-entered'

Sampling was done to ensure the representation of the six enterprise groups across the four market types (Figure 5).

[63] The analysis of enterprises' historical sales performance generated 10 enterprise groups. Only 6 were prioritized for the sampling plan.

Figure 25: Enterprise groups and market types for sampling

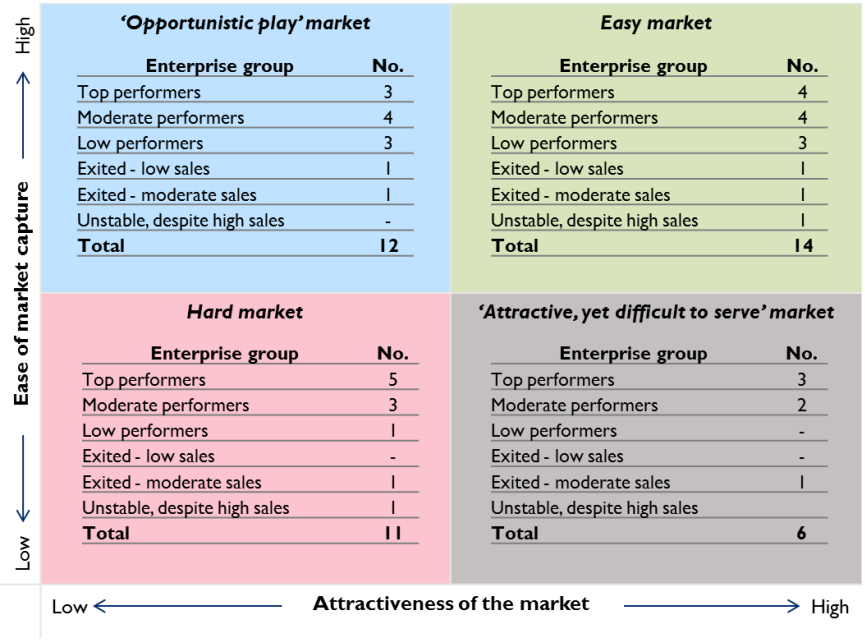


Figure 25 shows the resultant sampling plan of 43 enterprises. This was our initial sampling plan, which was replaced by the approach described in the main text's 'Methodology' section.

7.2. PROFIT & LOSS STATEMENTS

A Profit and Loss Statement (P&L) is a financial statement that shows an entity's revenues and expenses during a particular period (e.g., quarter, year). It quantifies the net profit earned or lost during the period. It also enables a comparison of performance across time periods and by component. The components of a typical P&L statement for a sanitation enterprise are described in Table 5. Our computation of the P&L statement for enterprises in the *Hands-Off* program was for the year 2017.

Table 5: Line items for a P&L statement of a typical sanitation enterprise

REVENUE	**Revenue generated by selling toilets, toilet components, delivery, or installation services**
(-) COST OF GOODS SOLD	Costs incurred that are directly attributed to the production of toilets
Raw Material Costs	Costs of procuring raw materials such as cement, sand, pans, pipes, etc. In most cases, this includes delivery cost from input supplier to the enterprise
Direct Labor Costs	Cost of labor for casting, delivery, pit digging, installation
Transport (raw material procurement costs)	Cost of transporting raw material from input supplier to the enterprise, if not included in raw material cost
(=) GROSS PROFIT	
(-) OPERATING EXPENSES	Non-production costs incurred in the day-to-day operations of the business
Transport (transport costs to customer/ channel)	Delivery cost incurred in delivering toilets to customers. This could be the transport rent in the case of rented transport or cost of fuel in the case of owned transport
Marketing (commissions)	Commissions paid to demand activators for sale of toilets
Marketing (non-commissions)	Non-commissions expenses such as marketing collateral or meeting expenses incurred
Repairs	Repairs of assets, such as molds, etc.
Land Rent	Rent paid for operating the business from a location, apportioned by share of sanitation in overall business revenue

Utilities	Costs of electricity, water, apportioned by share of sanitation in overall business revenue
Depreciation	Non-cash expense of allocating cost of an asset, such as molds or trucks over its useful life, apportioned as per the share of sanitation in overall business revenue
Bad Debt	Credit offered to a customer of the toilet business that cannot be recovered
(=) OPERATING PROFIT	**Other costs incurred in the day-to-day running of a business**
(-) INTEREST EXPENSE	Interest on loans taken by the business, apportioned by share of sanitation in overall business revenue
(-) TAX	Tax paid on profit generated in the business
(=) NET PROFIT	
(+) DEPRECIATION	
(=) CASH NET PROFIT	**Cash income earned (or lost) by the enterprise in the period**

7.3. GROSS MARGIN VARIANCE ANALYSIS

Gross Margin Variance Analysis (GMVA) is a business tool used to identify drivers of the difference between gross profits. The tool is typically used by a commercial entity to analyze the differences in performances between two time periods or between planned/budgeted and actual performance. The tool can help prioritize drivers that contribute to differences in gross profit and guide subsequent actions. For instance, if customer acquisition is the largest driver, then a business can analyze activities that influence and bolster customer acquisition.

To illustrate the process and interpretation of the GMVA, we present an example.

Consider two widget manufacturers, company 1 and 2. Assume that company 1 sells widget A and widget B, and that company 2 sells widget A, widget B, and widget C (not sold by company 1). Now consider the following set of assumptions:

Table 6: Assumptions of GMVA example

	COMPANY 1	COMPANY 2
	CUSTOMERS	
	100	200
	VOLUMES SOLD PER CUSTOMER	
Widget A	5	10
Widget B	1	2
Widget C	-	2
	PRICE PER PIECE	
Widget A	5	6
Widget B	4	4
Widget C	-	4
	GROSS MARGIN (%)	
Widget A	24%	20%
Widget B	25%	20%
Widget C	-	30%
	COST PER PIECE (USD)	
Widget A	3.8	4.8

	COMPANY 1	COMPANY 2
Widget B	3.0	3.2
Widget C	-	2.8
Total gross profit (USD)[64]	**700**	**3,200**

Based on the above example, we find that company 1 makes a gross profit of USD 700, while company 2 makes a gross profit of USD 3,200. The GMVA helps us dissect and quantify the sources of difference in gross profits between the two enterprises (refer to Table 7 for the list of variables used for the subsequent equations).

First, we consider the difference caused by the difference in the customer base. This calculation entails increasing only the number of customers acquired. Thus, if company 1 sold widget A and B to 200 customers instead of 100, at its current prices, costs, and volumes sold to each customer, the company would make an additional USD 700 in gross profit.

Mathematically,

(1) $Variance\ (customers) = (\boldsymbol{customers_2} - \boldsymbol{customers_1})\text{x}\ GPPC_1$

where $GPPC_1$ is gross profit per customer of company 1.

With the adjusted number of customers for company 1, the next source of gross profit difference is the difference in prices charged by company 2 for the two products, i.e., if company 1 sold widget A for USD 6 (instead of 5) and widget B for USD 4 (same price as currently charged, so no impact for widget B) to 200 customers (the customer base of company B), at its current volumes sold per customer. This results in a USD 1,000 impact.

Mathematically,

(2) $Variance\ (price) = [(\boldsymbol{price_{2A}} - \boldsymbol{price_{1A}})\ \text{x}\ customers_2\ \text{x}\ volume_{1A}] + [(\boldsymbol{price_{2B}} - \boldsymbol{price_{1B}})\ \text{x}\ customers_2\ \text{x}\ volume_{1B}]$

Similarly, the differences in the cost of production would lead to a difference in gross profits too. The signs are reversed (compared to the price equation) as higher costs reduce gross profit, whereas higher prices increase gross profit. The impact is computed by multiplying the difference in cost of goods sold for each product with company 1's number of volumes sold per customer to the adjusted customer base, i.e., the same number of customers as company 2. In this example, company 2 has higher costs than company 1; hence the impact (USD 1,040) will be negative, i.e., the higher costs reduce company 2's gross profits relative to company 1.

Mathematically,

(3) $Variance\ (cost) = [(\boldsymbol{cost_{1A}} - \boldsymbol{cost_{2A}})\ \text{x}\ customers_2\ \text{x}\ volume_{1A}] + [(\boldsymbol{cost_{1B}} - \boldsymbol{cost_{2B}})\ \text{x}\ customers_2\ \text{x}\ volume_{1B}]$

The three equations above consider company 1's volumes sold per customer. We also have to consider the difference in volumes sold per customer of widget A and B (the common products sold by both enterprises), referred to as the 'common product mix' effect. Thus, this effect would assume that

[64] Calculated as the sum of (Price per piece – Cost per piece) x (Units sold per customer) x (Number of customers) for each widget.

company 1 sells 10 and 2 units of widget A and B respectively, instead of 5 and 1 units, to the adjusted customer base of company 2 at company 2's prices and costs. This results in a USD 1,360 impact.

Mathematically,

(4) $Variance\ (common\ products\ mix) = [(\boldsymbol{volume_{2A}} - \boldsymbol{volume_{1A}})\ \text{x}\ (customers_2)\ \text{x}\ (price_{2A} - cost_{2A})] + [(\boldsymbol{volume_{2B}} - \boldsymbol{volume_{1B}})\ \text{x}\ (customers_2)\ \text{x}\ (price_{2B} - cost_{2B})]$

Finally, there is also a change in gross profit attributed to the sale of widget C, an additional product sold only by company 2. This results in a USD 480 impact.

Mathematically,

(5) $Variance\ (additional\ products) = customers_2\ x\ volume_{2C}\ x\ (price_{2C} - cost_{2C})$

The GMVA bridge for this example is given in Figure 26.

Figure 26: GMVA bridge of company 1 and company 2

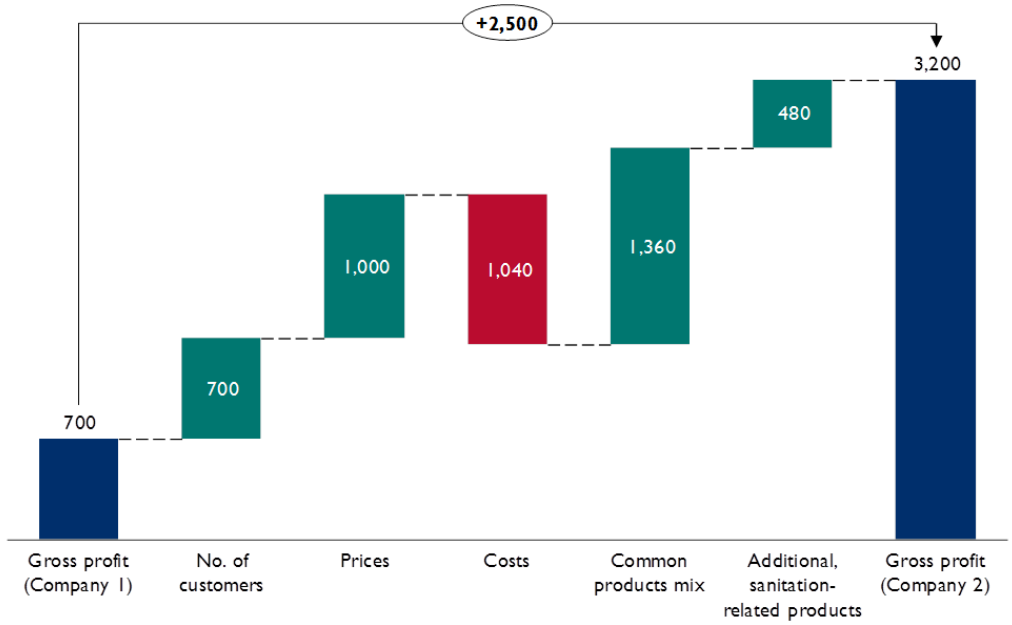


Table 7: Definition of variables used in the GMVA example

VARIABLE	DEFINITION
$customers_1$	Number of customers of Company 1
$customers_2$	Number of customers of Company 2
$GPPC_1$	Gross profit per customer of Company 1
$GPPC_2$	Gross profit per customer of Company 2
$volume_{1A}$	Product (widget A) volumes sold per customer of Company 1
$volume_{2A}$	Product (widget A) volumes sold per customer of Company 2
$volume_{1B}$	Product (widget B) volumes sold per customer of Company 1
$volume_{2B}$	Product (widget B) volumes sold per customer of Company 2
$volume_{2C}$	Product (widget C) volumes sold per customer of Company 2
$price_{1A}$	Unit price for widget A product of Company 1
$price_{2A}$	Unit price for widget A product of Company 2
$price_{1B}$	Unit price for widget B product of Company 1

VARIABLE	DEFINITION
price$_{2B}$	Unit price for widget B product of Company 2
price$_{2C}$	Unit price for widget C product of Company 2
cost$_{1A}$	Unit cost of goods sold for widget A for Company 1
cost$_{2A}$	Unit cost of goods sold for widget A for Company 2
cost$_{1B}$	Unit cost of goods sold for widget B for Company 1
cost$_{2B}$	Unit cost of goods sold for widget B for Company 2
cost$_{2C}$	Unit cost of goods sold for widget C for Company 2

7.4. ADDITIONAL GMVA BRIDGES

In addition to the three enterprises presented in this case study, we also prepared the GMVA bridges for two more enterprise pairs, for which we selected three additional enterprises (circled in red in Figure 27). We included a "Small LP" enterprise (*Jim's enterprise*) that was making losses (negative cash net profits) to understand the reasons that led to these losses. We also included an additional pair of enterprises—the "Small LP" enterprise (*Po's enterprise*) and "Large HP" enterprise (*Chito's enterprise*)—to identify any other factors that influenced viability.

We compared *Jim's enterprise* to the "Large HP" *Thom's enterprise* to understand the factors that led to *Jim* making losses. In addition, we compared *Po's enterprise* to *Chito's enterprise*.

Figure 27: Additional enterprises selected for GMVA

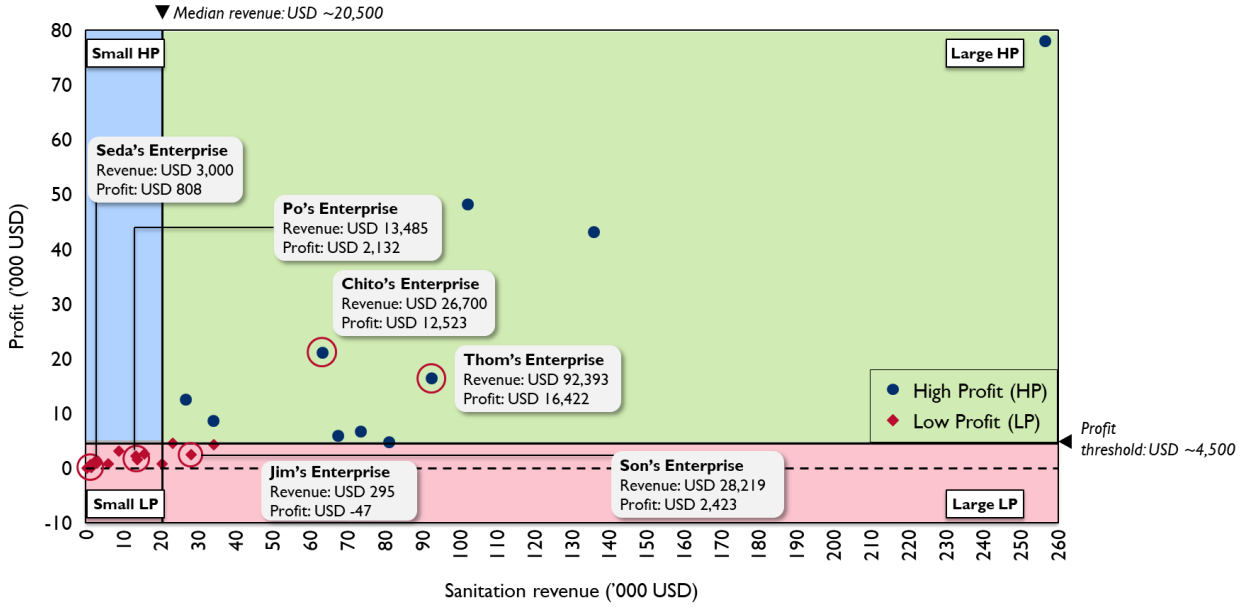


Figure 28: GMVA bridge (USD) between *Jim's enterprise* ("Small LP") and *Thom's enterprise* ("Large HP") (2017)

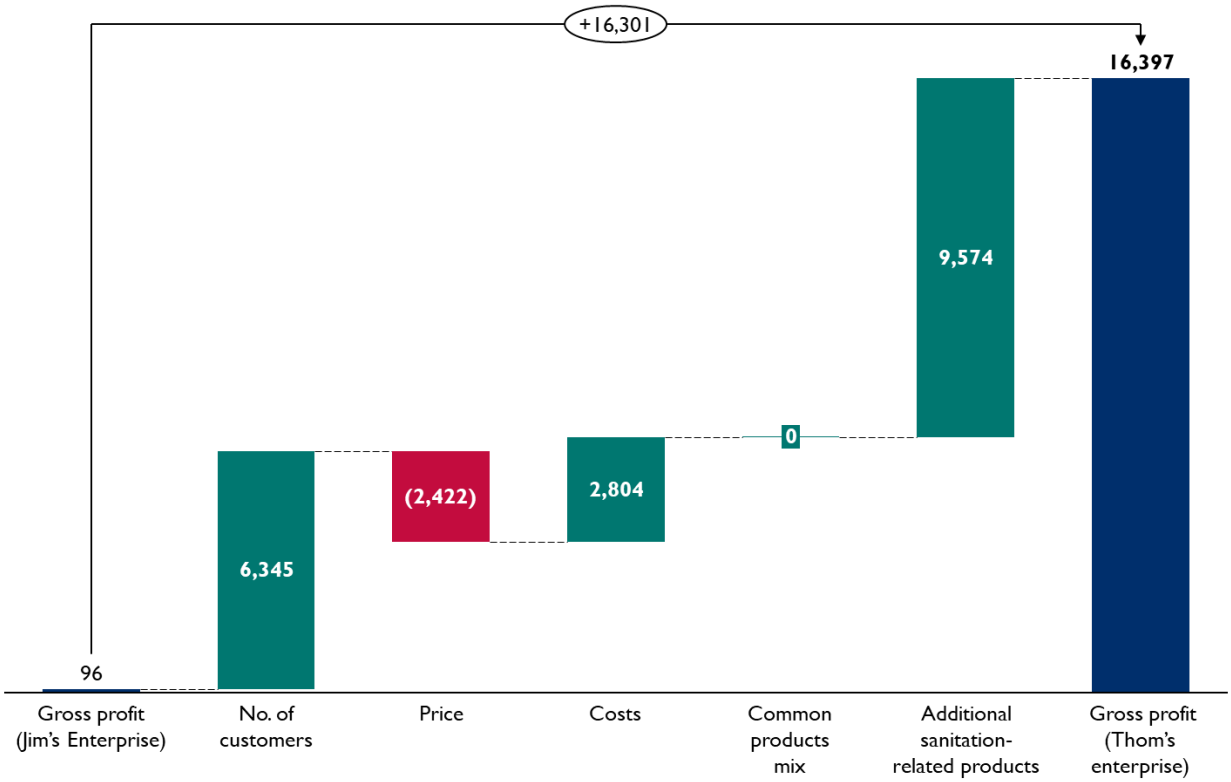
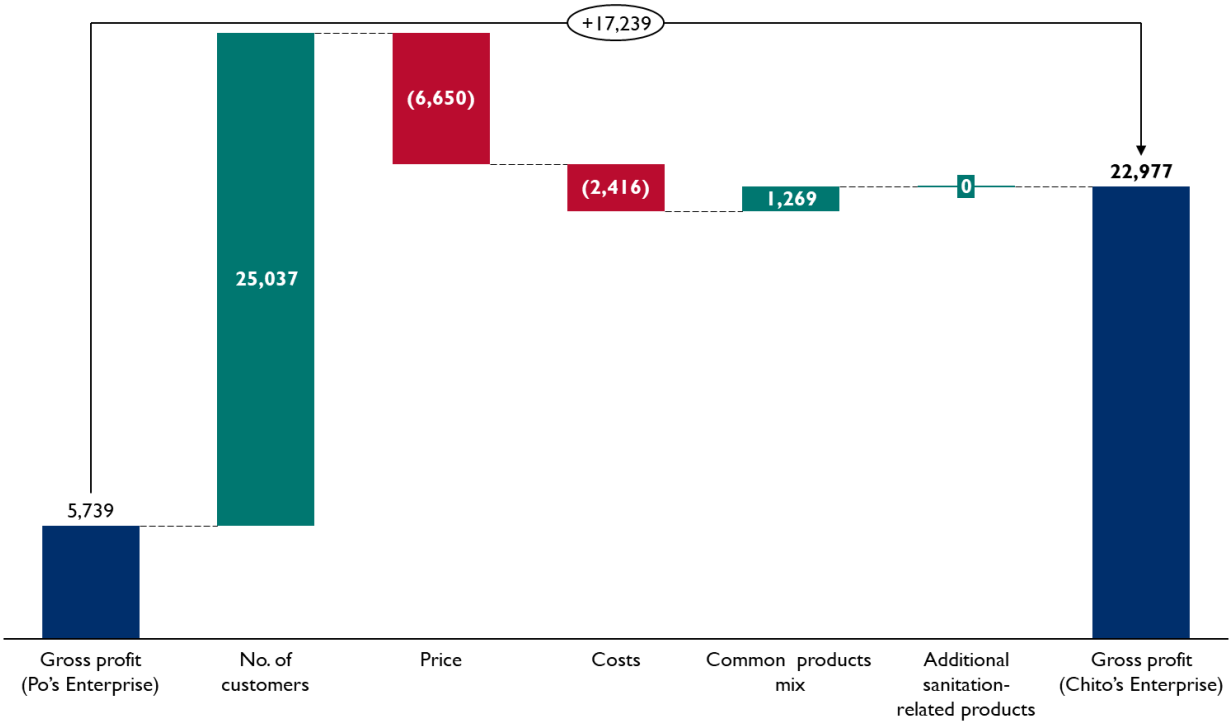


Figure 28 shows that *Jim's enterprise* primarily suffered from low sales, which made it difficult to generate a profit. *Jim's enterprise* had a unit gross profit of USD 19.23, but it sold only five toilets in 2017. The resulting gross profit was inadequate to cover operating expenses and led to a loss (negative cash net profit). The enterprise operated in a region with a poor road network, which limited its ability to expand geographically, and it also was not known to many customers. Unlike *Thom's enterprise, Jim's enterprise* did not sell any additional, sanitation-related products that could increase its profits. *Jim's enterprise* can benefit from strategies for customer acquisition (i.e., increase customers) and increasing share of customer's wallet detailed in the recommendations to improve its profit and viability.

Figure 29: GMVA bridge (USD) between *Po's enterprise* ("Small LP") and *Chito's enterprise* ("Large HP") (2017)



The GMVA bridge between *Po's and Chito's enterprises* (Figure 29) highlights the role of the number of customers in enterprise viability (refer to Section 5.1.1.3). *Chito's enterprise* sold toilets at a lower price than *Po's,* but it had almost five times as many customers, which helped generate substantial additional profits and address its relative price and cost disadvantage compared to *Po's enterprise*. Like *Thom* and *Son, Chito* also adopted an active sales strategy. He sold toilets in nine communes, compared to the four in which *Po* sold his toilets.

In addition to the 'number of customers' driver, *Chito's enterprise* also benefited from the 'product mix' driver. While both enterprises sold a similar toilet package with interface and substructure components, *Chito's enterprise* also sold a more expensive variant with five cement rings and two pit covers (instead of three and one in the common package sold by both enterprises). This allowed *Chito's enterprise* to enhance its profits further, as it was able to cater to more customer segments with diverse choices.

U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Tel: (202) 712-0000
Fax: (202) 216-3524
www.usaid.gov