

Research Article

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Tailoring business models for small-medium food enterprises in Eastern Africa can drive the commercialization and utilization of vitamin A rich orange-fleshed sweet potato puree

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Abstract: Orange-fleshed sweet potato (OFSP), a promising crop for alleviating vitamin A deficiency (VAD), can be utilized at home and in commercial food processing as a basic and functional ingredient. The root can be processed into puree that is incorporated in baked and fried products and other products, with a high acceptability rate. When used as a wheat substitute in a bakery, the OFSP puree significantly cuts the production cost. In the last few years and with the intensified promotion of OFSP and OFSP puree products as a sustainable food-based strategy to tackling VAD at the population level, many small-medium food enterprises (SMEs) in the Eastern Africa Region (EAR) have shown great interest in utilizing the OFSP puree in their commercial product lines. However, the OFSP and OFSP puree value chain for commercial usage is still underdeveloped posing raw material supply challenges. In addition, the SMEs are early-stage businesses lacking the capacity and proper business models to propel them to sustainably venture into OFSP processing. As such, there is a need to engage and support SMEs in tailoring business models suitable for their scaling needs along the OFSP value chain to make available in the market, affordable

nutrient-dense OFSP-puree products. This article presents the approach that was used to offer tailored Business Development Services (BDS) for selected SMEs in EAR to scale up their capacity to commercialize OFSP puree and puree-based products. The BDS designed and supported six integrated modules: business profile development, business model canvas, understanding the numbers/finances, OFSP value chain analysis, SWOT analysis, and growth plan, to develop and document individual business capacities and aspirations. The SMEs identified numerous opportunities and entry points for OFSP value chain development and expansion through the BDS depending on their business needs.

Keywords: orange fleshed sweet potato puree, commercialization, tailored business models, business canvas model, food SMEs, nutrient-enriched bakery ingredients

1 Introduction

Sweet potato (*Ipomoea batatas*) is an important crop globally and its consumption has increased considerably over the past few decades in tropical countries including the Eastern Africa Region (EAR). In particular, the nutrient-enriched (biofortified) orange-fleshed sweet potato (OFSP) is an important food security crop in Africa with great potential to curb vitamin A deficiency (VAD) among women of reproductive age and young children. However, the OFSP value chain in many Sub-Saharan Africa (SSA) countries that have adopted the crop is generally underdeveloped, resulting in huge post-harvest losses (PHLs) and contributing to the persistent perennial food shortages and nutrition security challenges [1–3]. Furthermore, the crop has been among the neglected as it is associated with the rural poor and, thus, not commercially attractive [4]. Even

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though Affognon *et al.* [5] noted that technologies developed to address PHLs arising from off-farm activities are limited, there is a chance to develop innovative OFSP products that are attractive to consumers and that can be distributed widely beyond the rural poor communities. To minimize these losses establishing strong commercial channels for the OFSP would bring immense benefits not only to the producers but also to the processors and consumers, enhancing both health and livelihoods. Often, government contexts exclude the private sectors' (small-medium food enterprises' [SMEs']) participation in agricultural development, whereas the sector may play a considerable role in reducing food waste through innovations aimed at commercializing shelf-stable products. Sedlmeier *et al.* [6] discussed the monetary approach to reducing food waste whereby the redistribution of the surplus occurs through identifying and developing (secondary) markets, typically in the form of business models. Kurniawati and Yuliando on the other hand, pointed out that SMEs, characterized by flexibility and receptiveness to new business ideas, could offer a channel through which the OFSP value chain in SSA can be developed for economic, nutritional, and social impact [7].

In many instances, SMEs' interests are mostly in the low-income markets, which offers them business growth opportunities and integrates well with strategies targeting accessibility and affordability of nutritious foods to poor households. These small companies tend to innovate and invest in new technologies and processes in order to beat the competition from the macro and well-established food companies. Additionally, the SMEs are less cumbersome and more creative than large enterprises and can spend less time dealing with tax forms and the employment and health insurance agenda and more time innovating their products or services [8]. The approach of "demand creation" by processors (SMEs) rather than the conventional "supply-demand" approach, which has been widely applied in other fields [9], may be more effective in scaling up the commercialization of OFSP puree and products. It involves getting an in-depth understanding of consumer needs and developing products with desirable characteristics, and finally introducing them to the consumers, leveraging on the benefits they would derive from them [10]. SMEs have been known to contribute greatly to the economic growth of both developed and developing countries. In the EAR, SMEs are being born each day, with the majority targeting the food and agriculture sector [11], which offers a remarkable opportunity to commercialize OFSP puree and puree-based products. Muzhingi *et al.* [12] and Owade *et al.* [13] reported that bakery products are some of the products that can be prepared by incorporating OFSP puree. In terms of

the cost of production, OFSP puree has been found to be a great substitute for wheat, replacing up to 50% of the wheat used, ultimately cutting down on the importation of wheat [14]. Bocher *et al.* [15] noted that commercial OFSP puree production has been improved and is poised for profitable, larger-scale output. In the EAR, OFSP is becoming increasingly a cash crop, driven by increased awareness of health and nutritional benefits and the challenges in the food sector, which have increased its competitiveness compared to maize [14,16–18].

Given that the OFSP puree is a relatively new food ingredient in the EAR market, and the majority of the SMEs engaged in the OFSP value chain lack the capacity and business knowhow to profitably position OFSP puree products in the market, developing their capacity can contribute to scaling the utilization of the OFSP puree. The International Potato Center (CIP) and partners in 2018 joined efforts to drive the commercialization of OFSP puree by working with selected SMEs in the EAR to develop their business capacity in OFSP puree and puree products processing through tailored business models. To prepare the SMEs to achieve scale and optimal OFSP and OFSP puree utilization, SMEs from Kenya, Uganda, Rwanda, Ethiopia, Tanzania, and Malawi were involved in the Business Development Services (BDS) training. The main goal was to offer business solutions to facilitate economic potential in the OFSP value chain and make the SMEs more effective and competitive in the marketplace.

Overall, the BDS aimed at enhancing and tailoring the SMEs' capacity to take advantage of a promising market potential within the OFSP value chain, including the processing, utilization, and marketing of OFSP puree and puree products, and to identify the threats to enable the development of risk mitigation as well as resource mobilization strategies. Developing the business capacity of prospective and current SMEs engaged in the OFSP value chain can contribute to the scaling efforts. SMEs that can clearly articulate their value proposition, cost structure, markets, and growth strategies have a much higher chance of attracting technical and financial partners as well as developing effective partnerships with actors along the OFSP value chain. For instance, through the BDS, each SME developed a one-page business profile which is instrumental in facilitating their resource mobilization efforts, a key component of achieving their growth objectives. In view of the above, the business support was designed to empower SMEs to adopt tailored profitable business models that are applicable to the context of each firm, establish efficient and effective business processes and operations, and develop strategies for sustainability-oriented business models [19,20].

2 Methods and materials

2.1 Selection criteria for the SMEs

Purposeful selection of the SMEs was done based on their proposition for developing the OFSP value chain and their strong interest in expanding their product portfolio to include OFSP puree products. The BDS were done over a period of 2 months, with activities stretched across the six BDS modules. Given that the services were offered during the COVID-19 period, structured questionnaires, and business diagnostics (needs assessment) were administered remotely via virtual platforms.

2.2 BDS approach

2.2.1 Initiation

A relationship-building activity was done between individual SMEs and the BDS provider. It involved an introductory stage between the SMEs and BDS provider, building rapport, understanding each SME's current operations, management and leadership, growth aspirations, and the ecosystem and value chain in which they operate.

2.2.2 Business diagnostics

The diagnostics involved understanding each SME's strengths and weaknesses and their unique business needs. In-depth exploratory discussions with each SME guided by a structured set of questions, focusing on the market, the business, the people, the product, the business case, and the venture structure were done. A SWOT analysis model was used to identify the strengths, weaknesses, opportunities, and threats for individual SMEs.

2.2.3 Tailored business development support

The six SMEs received one-on-one coaching and mentoring in key business strategies and were introduced to methods and tools needed to undertake a successful and growth-oriented business. Based on their unique needs and opportunities, each SME completed key activities, including developing a Business Model Canvas (BMC) and business profile, preparing a growth plan, and conducting OFSP value chain analysis for their respective enterprises. The BDS also included financial literacy training and simplified financial modeling. Each SME

received regular guidance and intensive coaching and mentoring from the BDS provider throughout this process.

2.2.4 Wrap-up and feedback loop

At the end of the BDS exercise, the SMEs were required to submit their plans and targets based on templates provided to guide future implementation. Guided by a structured questionnaire and open-ended discussions, SMEs were encouraged to give their feedback on the relevance of the tools and exercises and the effectiveness of the different coaching and mentoring sessions included in the business development support.

3 Results and discussion

3.1 BDS modules

3.1.1 One-page teaser/business profiles

The template featured the SME products and services, markets, current production level and future plans, financials, both current and projected, leadership and technical teams, partnership, and investment requirements. The SME profiles fell under the agriculture sector with flexible business models to integrate OFSP processing. The years in operation varied; hence, the SMEs had varied financial standings and revenue, and resource mobilization avenues. On legal status, the SMEs ranged from private limited, parastatals, sole proprietorship, and limited by liability and shares. Possibly, many other SMEs operate informally and unregistered.

3.1.2 BMC

The BMC is a strategic management tool that helps businesses to describe, design, and analyze their business models. BMC helps businesses to visualize their business focused on the eight building blocks of a business: value proposition of products or services, target market and customer segments, market strategy and customer relationship, market channels and entry strategy, key resources, key activities and partnerships, cost structure, and revenue streams [21]. The BMC beats the traditional bulky business plan that spans several pages by offering a much easier and visual way to understand the different core elements of a business.

Using this tool, the SMEs analyzed the scope of existing key partnerships, which were multi-sectoral. The partnerships ranged from OFSP research institutes, governments through the Ministry of Agriculture and Industrialization and Health, farmers and vine multipliers, aggregators, universities, technical consultants, banks, distributors, bakeries and private processors, informal vendors, and funding organizations, among others. The partners play different roles at different nodes of the OFSP value chain, and the SMEs were able to identify key partners in line with their respective business goals. The BMC also looked at the key resources required, financial and non-financial, by the SMEs at the different nodes. There were different resource needs among the SMEs, but what cut across was the need for human and financial resources, regulatory compliance, and facility establishment, including the procurement of processing equipment, transportation, packaging, and storage facilities, among others. Smallholder farmers were also identified as key value chain partners in the production of good-quality roots intended for processing and puree making. However, it would required clustering farmers into farmer groups and additionally developing effective aggregation models for bulking and collection of the raw material.

Further, the BMC helped the SMEs identify the products of interest, targeted market segments, and to lay down market penetration strategies. Their propositions did not differ significantly, as they revolved around the supply of good quality vines, puree processing, varied OFSP puree incorporated baked products, OFSP flour, animal feed, and trainings, among others. For the products to penetrate the markets and generate the much-needed consumer demand, the SMEs identified channels through which demand creation activities and advertising would be carried out. Each SME identified unique target markets, market penetration strategies, and timelines through the BDS. The BDS additionally guided the SMEs to project their revenue streams against the cost structure to give insights on the economic viability of establishing or expanding their businesses. All the SMEs projected high-profit margins from the intended activities and an assurance of the sustainability of their businesses.

3.1.3 Understanding the numbers/finances

Realizing that poor financial management is one of the key causes of SME failure, the module aimed to empower SMEs to make better decisions by utilizing financial statements. Each SME received finance training introducing key finance concepts and illustrating good accounting practices using their own financial data as a case study. Studies indicate

that even reliable and timely prepared financial statements are not enough when owners do not have the ability to use and interpret them accurately. The module aimed to enhance the financial literacy of founders and/or directors to circumvent bad decisions that can leave behind widespread operational problems and ultimately threaten the enterprises' growth.

3.1.4 OFSP value chain analysis

Value chain analysis is a useful strategic management tool. It is a process where an enterprise identifies its primary and support activities that add value to its final product and then analyze these activities to reduce costs (mitigate risks) or increase revenue (maximize opportunities). SMEs identified specific opportunities and threats at each node of the OFSP value chain and developed an appropriate partnership strategy and risk mitigation plan. In the analysis, opportunities and threats identified using the SWOT model were fitted into the value chain point they fell in; producing, sourcing, transportation and storage, processing, marketing and distribution, and end consumer, as applicable to the operations of each SME.

The SMEs scrutinized the opportunities and threats present in the OFSP value chain under each stage, as informed by Laurie *et al.* [22]. Some factors seen as threats in one SME offered opportunities for growth and development in another, depending on individual business context. The constraints and threats centered around product development innovations, inaccessibility to information, poor infrastructure, including poor roads, inadequate transportation and storage systems and the use of outdated processing technologies. Other bottlenecks were the instability of the OFSP supply systems. Some baked and fried OFSP puree products including buns and bread are currently available in the EAR market, thus offering an expansion opportunity for SMEs.

3.1.5 SWOT analysis

The SMEs articulated their company objectives for their current financial year and identified their company's key strengths and weaknesses. They also assessed the external environment and identified emerging opportunities and threats in order to develop appropriate growth strategies and/or risk mitigation plans. Issues related to the availability and accessibility of good quality OFSP vines stood out as a strength for developing the value chain. The SMEs realized the importance of partnerships in creating an

enabling environment to develop the OFSP value chain. The SMEs are currently in partnership with research organizations such as CIP, whereby they get information on the agronomic traits of different OFSP varieties and processing characteristics and good agricultural and manufacturing practices. This way, they can advise and work closely with farmers to produce desired-quality roots for puree processing. Other advantages enjoyed by the SMEs through the partnerships were linkages to farmers and the market, both local and international, the development of policies that foster the production and utilization of OFSP by governments, technical and technological backstopping, and financial assistance, among others. From the analysis, OFSP root is available, and farmers are willing to expand production, presenting a great opportunity for the SMEs to utilize the crop. Moreover, the growing demand from consumers for healthy and nutritious foods and the particular interest in nutrient enriched OFSP and OFSP puree products through demand creations activities was reported by the SMEs as both a strength and an opportunity.

3.1.6 Growth plan

A tailored roadmap to reach the business growth target is an important step in growing the business. Each SME developed a forward-looking growth plan with clear targets and related actions, resources, particularly new hires, and capital for the current financial year and future projections. Even though most SMEs were early-stage businesses, the exercise was still very useful as it inspired them to adopt a growth mindset.

The growth plans development focused on four key growth strategies: marketing strategy, market development strategy, product strategy, and diversification strategy. Under the four strategies, target activities, staffing, and capital requirements were spread out across the four quarters of the financial year. The SMEs generally identified communication and awareness creation activities as key to achieving scale. Consumers' needs are constantly changing, and to be ahead, the SMEs need to regularly assess and be in touch with the market.

3.2 Feedback from SMEs

The final stage of the BDS was to evaluate the efficacy of the approach employed and the impact on SMEs' perception in establishing and expanding the OFSP value chain.

All the six SMEs that partook in the exercise found the business profile template employed and the discussions held to be useful. The majority of the SMEs found the four tools employed in assessing status and profile, BMC, OFSP value chain analysis, and developing a growth plan very useful.

The SMEs stated that the BDS advisory gave them a chance to critically analyze their business contexts and future goals and to properly articulate and document them, which is often not the case. The written documents would help in the self-evaluation of progress being made periodically in the future. The overall customized approach was seen as an eye-opener on new business perspectives, the linkage among the BMC components, how they affect each other, and an in-depth understanding of each component.

3.3 Expected outcome of the BDS

With the demand creation activities that have been done by projects promoting the production and consumption of OFSP and products made from the root, and several studies affirming consumer acceptance and willingness to pay for OFSP products, it is projected that current and future demand for OFSP products may surpass the current industry capacity to supply the product. The BDS modules were therefore designed with the ultimate goal of strategically positioning the SMEs to tap into current and prospective scaling opportunities. In the short term, the assessment conducted after the BDS exercise brought into perspective the willingness of the SMEs, supported by scaling partners, to mobilize and allocate resources towards producing and utilizing OFSP puree in developing safe and nutritious products. Even though an impact assessment was not feasible at the time of this report, we report that SMEs are better prepared for OFSP puree-related opportunities. However, longer-term BDS support, follow-up, SME commitment, and resilience will be critical to propelling the SMEs' growth plans. It is expected that if the SMEs implement the advisory given during the BDS, they will be able to have successful and sustainable OFSP puree product lines, and nutritionally superior OFSP products will be available, accessible, and affordable to the different market segments, with an overall improved nutrition status among the poor and vulnerable, rural, urban, and peri-urban households. The successful commercialization will, however, depend on the commitment of the SMEs to implement the individual models developed.

3.4 Complementarities to BDS in efforts to commercialize OFSP puree

Based on the SMEs' feedback and the BDS provider assessment, several complementarities were identified as being essential for the successful commercialization and utilization of the OFSP puree innovation, as follows.

3.4.1 SME/scaling partner selection

SMEs are generally more flexible, adapt better, and are better placed to develop and implement new ideas. However, for SMEs to serve as key scaling partners of the OFSP puree, they must have the capabilities and resources required to create, market, and deliver the value and to generate profitable, sustainable revenue streams. SMEs selected as key scaling partners must also have a proven track record in their business operations or must be start-ups with market-oriented business models that have the potential for scaling. Choosing the right scaling partner can also maximize the impact of tailored BDS.

3.4.2 Access to finance/capital

Lack of finance prevents SMEs from improving their productivity and seizing opportunities to expand to new markets. Almost all OFSP SMEs suffer from a severe lack of liquidity, which can impede their productivity and ability to seize market opportunities. Difficulties in accessing finance are one of the major obstacles for early-stage businesses. Therefore, the BDS focused on making the SMEs more attractive to potential financiers. But to be more impactful, development partners should consider forging smart partnerships with targeted financiers (impact funds and commercial loans) within the agribusiness and early-stage capital providers ecosystem [23]. Access to finance coupled with tailored BDS will greatly accelerate the OFSP puree commercialization process.

3.4.3 Access to technology and innovation

Innovation does not only involve research and development activities but also the introduction of new products, services, processes, and business models. Innovation is a vital process of survival under global pressure and gaining a competitive advantage in the food processing industry [24]. To seize market opportunities and grow, SMEs must have access to technology and integrate innovation and newly acquired knowledge into their operations. Thus, continued

collaboration between development partners and SMEs will be an important aspect of scaling the innovation.

3.4.4 Effective partnership

Effective partnership between research institutions, developmental organisations, governments and the private sector is critical for scaling innovation. The SMEs engaged in processing OFSP-enriched products can benefit significantly from their partnerships with different development partners and value chain actors during the scaling process through access to scientific data, knowledge, and technology. As most of the SMEs are engaged in multiple nodes of the OFSP value chain including input supply and production, they can also play a key role in market validation, a critical component of scaling innovation. However, to achieve the overall commercialization and scaling objective of the OFSP puree innovation, development partners should consider brokering smart partnerships with other key stakeholders, including financiers and market players, to address some of the binding constraints for SME growth, for example, capital, market access, among others.

3.4.5 Synergy with complementary initiatives

It is difficult for a project to address all success factors on its own. By creating well-thought-out project synergy within and outside the organization, it is possible to accelerate commercialization and scaling up as articulated by Waized *et al.* [25]. We strongly recommend leveraging previous and prospective projects in the OFSP value chain.

3.4.6 Coaching and mentoring

SMEs must pursue commercially viable business models to achieve financial sustainability and growth. At the same time, SMEs need continued transfer of skills, specifically business acumen as well as networking and partnership through mentorship and coaching. This approach is particularly important for social enterprises with double bottomline objectives – being profitable in the marketplace while addressing societal challenges, for instance, gender and age-specific challenges, through market solutions.

4 Conclusion and recommendations

Successful commercialization and scaled-up utilization of OFSP puree and processing of OFSP puree products by

SMEs depends on several factors, such as the timing and the market conditions, as well as various other external factors. However, the business capacity of SMEs plays the biggest role, in our opinion. Low and Thiele [18] explored the four dimensions of scaling the OFSP value chain; technical, organizational, institutional environment, and leadership, which are some of the components that were assessed in developing the tailored business models for the SMEs. SMEs engaging in the OFSP value chain must have the right skills to run a successful business and thrive in the marketplace. The SMEs that can clearly articulate their value proposition, understand their cost structure, market signals, and growth strategies, and forge effective partnerships with other value chain actors have a much higher chance of succeeding in the marketplace. They also have a better chance of attracting technical and financial partners, which is key to achieving scale. The BDS presented in this article serves as a guide for SMEs to place a value proposition on the OFSP puree products they process, thus generating demand for the products and ultimately driving utilization in industry and consumption among different target groups. With an understanding of individual business needs, clearly tailored business models that consider strengths, weaknesses, opportunities, and threats can be developed to suit the needs of small OFSP puree and puree-based product processors. In addition, the creation of an enabling environment through policy by government and other actors, including civil societies, could serve as an incentive for the SMEs to execute the developed business plans and models.

Developing tailored business models for small OFSP puree and puree products processors is one side of the coin. On the flip side, some gaps around the supply of raw materials still exist and need to be addressed further. These include low and seasonal supply of the OFSP root as an ingredient, poor aggregation and segregation systems, high cost of preservation of the OFSP puree, social and cultural norms around the consumption of sweet potato and derivative products in general, low demand for OFSP products, and lack of policy and guidelines on the inclusion of plant-based ingredients as healthy substituted in food processing, among others. More research must be done to address the highlighted gaps to complement the tailored business models and achieve scale in commercializing OFSP and OFSP puree products. Finally, the BDS presented in this article stops at the developed business models, which do not provide guidance on implementation. Further to these models, we suggest developing business SMART implementation plans, with clear monitoring and evaluation plans to monitor the progress of the businesses and offer course correction when and as required, depending on the

constantly changing market dynamics, to ensure effective execution of the business plans. We also suggest hand-holding of the SMEs at the pilot stage of implementing the business plans to ensure total commitment by the SMEs.

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