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The Role of Multi-Actor Engagement in Improving Market Access for Lead actors- A Case of Pineapple Value Chain in Uganda

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ABSTRACT

In Uganda, the Participatory Market Chain Approach, an innovative methodology, was used to enhance collaboration among market actors to improve the competitiveness of the pineapple sub-sector. Due to limited evidence on how the multi-stakeholder interactions support actors to access markets, this study used the Innovation Systems Function Framework to analyze how the functions and activities of platform actors enhanced the visibility of the pineapple innovations. The study employed a qualitative approach involving focus group discussions with 75 pineapple farmers and 44 key informant interviews. Eleven respondents from the public and private sectors who participated in the participatory market chain approach process were also interviewed. The findings show that functions of entrepreneurial activities, knowledge exchange and development, knowledge dissemination and diffusion, guidance on market formation, and resource mobilization contributed greatly to enhance market access for pineapple innovations. Collaborative engagement is therefore important to obtain knowledge about user behavior and preferences for integration into the product development process.

Keywords: lead actor, market access, multi-actor engagement, pineapple, Uganda

RÉSUMÉ

En Ouganda, l'approche participative de la chaîne de marché, méthodologie innovante, a été mobilisée pour renforcer la collaboration entre les acteurs du marché et améliorer la compétitivité du sous-secteur de l'ananas. En raison du déficit d'éléments probants sur la manière dont les interactions multi-acteurs soutiennent l'accès des acteurs aux marchés, cette étude a recouru au cadre des fonctions des systèmes d'innovation pour analyser comment les fonctions et activités des acteurs de la plateforme ont accru la visibilité des innovations liées à l'ananas. L'étude a adopté une approche qualitative combinant des discussions de groupes focalisés auprès de 75 producteurs d'ananas et 44 entretiens avec des informateurs clés ; en outre, 11 répondants des secteurs public et privé, ayant participé à l'approche participative de la chaîne de marché, ont été interviewés. Les résultats indiquent que les fonctions activités entrepreneuriales, échange et développement des connaissances, dissémination et diffusion des connaissances, orientation de la formation des marchés et « mobilisation des ressources » ont fortement contribué à améliorer l'accès au marché des innovations en ananas. L'engagement collaboratif s'avère donc déterminant pour capter les comportements et préférences des utilisateurs et les intégrer au processus de développement des produits.

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Mots-clés: acteur chef de file, accès au marché, engagement multi-acteurs, ananas, Ouganda

INTRODUCTION

In Sub-Saharan Africa, the increased urbanization, the emergence of a middle class, changes in dietary patterns, and consumer preferences for non-grain foods provide prospects for the transformation of agri-food systems thus encouraging farmers to integrate and compete in markets (Reardon *et al*., 2015; Bentley *et al*., 2021). According to Borsellino *et al.* (2020), such changes offer new opportunities to smallholder farmers who can successfully access and participate in transformed markets. However, they are also serious threats to unorganized smallholder farmers due to high transaction costs to modern agri-food markets (*Ibid* 2020). Value chain approaches have been progressively promoted as holistic intervention frame works for inclusive smallholder engagement in evolving agri-food markets (Kilelu, 2017). The shift to commercialize agriculture requires changes in production processes for agricultural products that target high-value markets (Bolwig *et al*., 2011; Lee *et al.*, 2012). In Uganda, smallholder farmers, including pineapple producers and processors, face significant barriers to accessing high-value markets, often due to inadequate market linkages, limited production capacities, and challenges in meeting quality standards. Despite favorable growth in demand for horticultural products domestically and regionally, small holders struggle to participate effectively in such markets due to systemic and capacity-related constraints. Innovative multi-stakeholder approaches, such as the Participatory Market Chain Approach (PMCA), have shown promise in addressing these challenges by fostering collaboration across diverse actors within agricultural value chains.

Through structured interactions, PMCA aims to build trust, enhance information flow, and facilitate joint activities, all of which can be instrumental in market access. However, evidence remains scarce on the specific ways in which such interactions foster access to markets for agricultural innovations, especially in developing contexts. This study addresses this gap by using the Innovation Systems Function Framework (ISFF) to analyze PMCA's role in Uganda's pineapple sector. Specifically, it examines how functions such as knowledge exchange, capacity building, and resource mobilization within the PMCA contribute to smallholders' ability to access competitive markets. The findings would provide insights into how multi-stakeholder platforms can better support small-scale integration into high-value value chains. The ISFF was suitable for this study because the pineapple platform activities required more actor interactions, knowledge exchange, collaboration and linkages between diverse actors, businesses, and institutions which the framework advocates for (OECD, 2013).

Context. The Participatory Market Chain Approach (PMCA) is an inclusive methodology developed to foster collaboration among diverse stakeholders within agricultural value chains. Originally designed to improve pro-poor innovation in agricultural markets, PMCA provides a structured platform for different actors farmers, processors, traders, researchers, and policymakers to engage in facilitated processes that encourage information sharing, joint problem-solving, and trust-building. This collaborative approach not only addresses market inefficiencies but also builds the social capital essential for sustainable value chain development (Bernet *et al.*, 2006; Horton *et al.*, 2023). Figure 1 presents the three generic phases of the PMCA methodology.

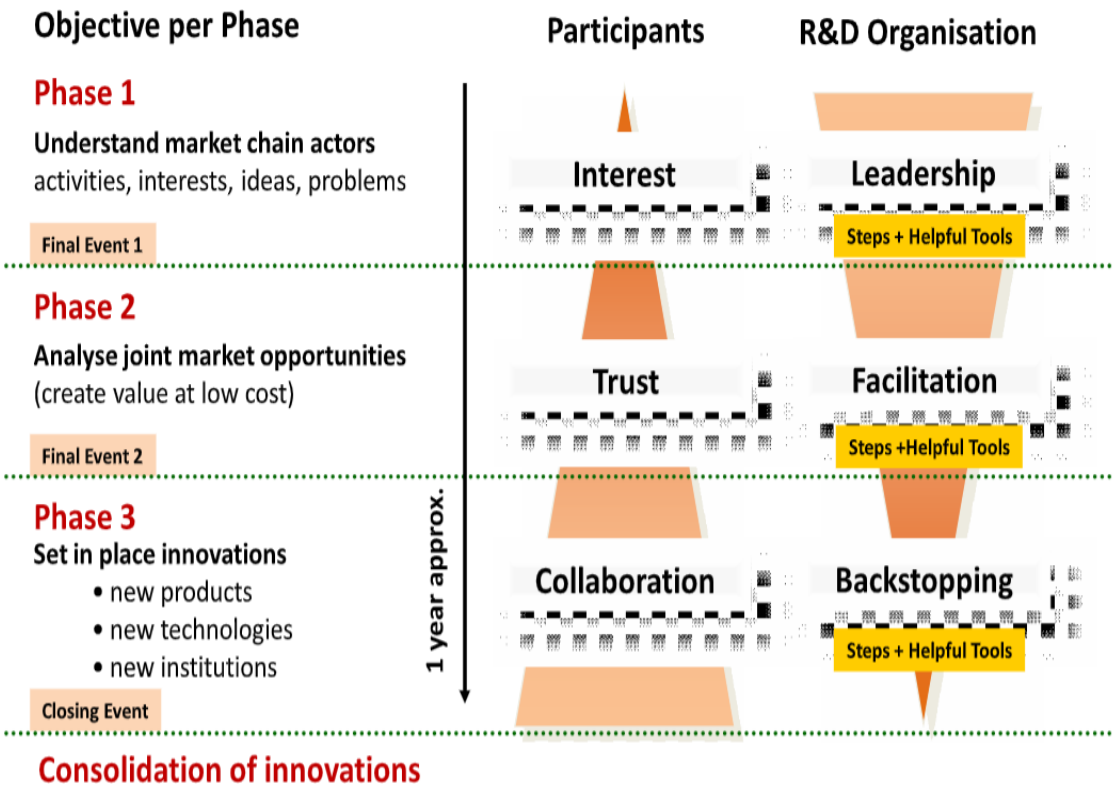

Figure 1. Adapted from PMCA User Guide, Bernet *et al.*, 2006

As an innovation platform, PMCA aligns with the Agricultural Innovation System (AIS) model, which emphasizes actor interactions, knowledge exchange, and institutional support to drive agricultural transformation (Hall *et al.*, 2006). Innovation platforms like PMCA aim to overcome typical smallholder constraints by facilitating multi-actor engagement, thus allowing participants to jointly explore and capitalize on market opportunities. PMCA's implementation in Uganda has shown promise in improving horticultural competitiveness, particularly for small scale pineapple farmers and processors who have traditionally faced limited access to high-value markets. To assess PMCA's effectiveness, this study employs the Innovation Systems Function Framework (ISFF). ISFF is a policy and analytical tool that examines the critical functions necessary for innovation within complex systems (Hekkert *et al.*, 2007; Turner *et al.*, 2016; Binz and Truffer, 2017; Planko *et al.*, 2017). This framework identifies functions such as knowledge development, resource mobilization, and market formation, which are instrumental in evaluating how PMCA activities support smallholders' market access. Table 1 provides an overview of ISFF functions, illustrating the framework's applicability to PMCA's objectives within Uganda's pineapple value chain.

Specifically, this study (1) examined how the knowledge exchange processes enabled the lead actors to access better markets, (2) analyzed how the capacity-building mechanisms supported the lead actors to market their products, and (3) examined how joint learning processes empower actors to improve their businesses.

Table 1. Functions of Innovation Systems

Functions of Innovation Systems	Description
(F1) Entrepreneurial activities	Actions of entrepreneurs who deploy the potential of new technologies, knowledge, networks, or markets to create business opportunities. They face many uncertainties and trigger learning about the innovation and, for example, its functioning in the context of experimentation.
(F2) Knowledge development	Learning and developing new knowledge as a central element of innovation.
(F3) Knowledge diffusion through networks	Exchange of information and views of those concerned through networks, allowing information to spread and better align with the system.
(F4) Guidance of the search	Prioritization by the actors to guide resource allocation and create momentum for preferred options.
(F5) Market formation	(Niche) the market for innovation and the possibility for those aiming to promote the innovation to (initially) facilitate market creation (e.g. through subsidies or facilitating carriage to far-way markets).
(F6) Resources mobilization	Assembling of the diverse resources (e.g. financial, human, social, and physical resources) required to enable all activities in the innovation system to be done.
(F7) Creation of legitimacy/counteract resistance to change	Function of creating legitimacy—critical to fostering acceptance and reducing resistance to innovations.

Adopted from Hekkert *et al*., 2007

METHODOLOGY

Study Design. The pineapple platform was used as a case to understand how actor engagements enhanced market access for selected innovations in the local context. The approach was appropriate because it enabled the researchers to obtain "factual' data required to answer the study research questions based on opinions, views, and experiences of diverse actors engaging in the innovation platforms as a complex phenomenon (Yin, 2013). This study adopted an action-oriented research design to assess the impact of the Participatory Market Chain Approach (PMCA) on market access for small scale processors as lead actors in the pineapple platform. PMCA facilitated the creation of thematic groups, comprising diverse stakeholders from across the pineapple value chain, to explore and develop market opportunities collaboratively. The study employed a combination of surveys, focus group discussions (FGDs), and participatory workshops, allowing for both quantitative and qualitative data collection. The Innovation Systems Function Framework (ISFF) was used to assess PMCA's contributions across functions essential to innovation and market access.

Sampling and Data Collection. During PMCA phase 1, the study was conducted in four key pineapple-producing districts in Uganda of Iganga, Bushenyi, Luwero and Mityana. A purposive sampling approach was employed to select participants based on their involvement in the pineapple value chain and their role within PMCA. A total of 119 stakeholders comprising smallholder farmers, traders, processors, extension agents, and researchers were interviewed.

Data collection was structured as follows:

1. **Survey**: An initial survey was conducted to gather baseline information on production volumes, market access, and participant expectations. The survey targeted 75 smallholder pineapple farmers and 44 other value chain actors, including traders and processors, to understand their market engagement and identify key areas for improvement. Survey results were then used to inform the formation of thematic groups.

   Focus group discussions: Semi-structured interview guides and discussion checklists targeting different chain actors were developed and used to collect data in terms of type of information and skills acquired from interactions, estimated production and sales, market outlets, promotion and selling strategies.

2. **Formation of Thematic Groups**: Based on survey findings, two thematic groups focused on fresh pineapple products and processed pineapple products were established. Each group comprised15–25participantsrepresenting producers, traders, processors, research and development agents, and extension staff. The thematic groups provided a platform for members to explore joint market opportunities, discuss challenges, and identify potential innovations.

3. **Thematic Group Meetings**: In Phase Two, thematic groups held regular meetings facilitated by research and development (R&D) personnel. During the sessions, participants used participatory tools, including SWOT analysis, to evaluate and prioritize market opportunities. Each group identified specific market opportunities that were feasible and aligned with stakeholder interests. Through collaborative discussions, selected opportunities were refined into actionable innovations, which were then further developed and tested by smaller working groups. Platform actors realized that lead actors needed well-developed business plans, which were used as guiding and fundraising tools. Experts were identified to join the platform and supported the lead actors to develop business plans for three innovations.

4. **Development of Innovations:** In Phase Two, the most promising market opportunities were selected for further development into product or service innovations. Each thematic group formed smaller working groups that focused on individual innovations, such as pineapple juice, lollies and chips. The working groups engaged in product conceptualization, marketing strategy development, and preliminary testing with local consumers. The iterative process included market assessments and feedback from R and D personnel to refine product features and improve market alignment.

5. **Marketing concepts for pineapple innovations**: the process involved four major steps of (a) general perception to know consumption and purchasing behavior, (b) evaluate the "perception gap" to assess product quality, (c) understand the visual logic in order to know the desired packaging material and information, and (d) evaluation summary to understand critical issues for developing the marketing concept for the products. Using the hedonic scales, a focus group session of six young women were asked to assess the products based on the major attributes of shape, color, flavor, size, texture, graphic design (see the sample evaluation sheet Table 2).

Table 2. Sample evaluation Sheet for Pineapple chips

	Before tasting				After tasting			
Product attribute	A	B	C	D	A	B	C	D
Shape								
Color								
Texture								
Perception on taste								
Crispness								
Flavor								
Total								

1= "very negative", 2 = "negative", 3 = "OK", 4 = "good", 5 = "very good"

Data Analysis. Data analysis largely involved qualitative approaches:

Qualitative Analysis: Transcripts from FGDs, thematic group discussions, and interviews were coded using the Innovation Systems Function Framework to identify key themes related to knowledge development, resource mobilization, and market formation. Thematic analysis was applied to capture stakeholder perspectives on PMCA's contributions to market access, utilizing NVivo software to manage and organize the data.

Synthesis of Findings: outputs from the PMCA application were synthesized to provide a holistic assessment of PMCA's impact. After the end of the project, in 2019-2021, the team interviewed 11 key actors (2 processors, 2 distributors, 2 farmers and 5 traders) who participated in the PMCA process. Since this research was actor-oriented, project documents including progress reports and information dissemination materials were reviewed to corroborate key informant interviews. This triangulation validated findings and supported conclusions on PMCA's effectiveness in fostering collaborative innovations and enhancing market access.

Before the actual field interviews, the research team explained their role to the respondents, the purpose of the interviews and guaranteed them anonymity and non-disclosure of their insights. For ethical consideration, voluntary informed consent was sought from all respondents who participated in the study. Responses were paraphrased or recorded verbatim and then integrated with the results and discussion as anecdotal evidence to support the narratives.

RESULTS and DISCUSSION

Table 3 provides a brief illustration of how each function was fulfilled in the pineapple platform and later described in detail.

Guidance of search: Guidance in priority setting was perceived as the first function in the take-off phase and created a vision for the pineapple platform. This function entailed the formulation of rules of engagement, which was primarily carried out by the facilitators in close collaboration with the private sector partners including pineapple processors as the lead actors. Results from rapid market survey guided the pineapple platform actors to understand the current activities, needs challenges and opportunities. The actors confirmed that pineapples are grown as a sole crop or intercropped with banana. Farmers majorly grew Smooth Cayenne and Queen Victoria varieties locally known as "Sasilimu". This information was used to guide the market

opportunity of sucker multiplication. The level of value addition and processing was quite low and most pineapple processors used rudimentary processing technology and equipment which affected the product quality. Pineapple juice, wine and snacks were the main products on the market. The results were shared at the Phase one event where 56 pineapple value chain actors were clustered around the fresh pineapple and processed pineapple groups that formed the basis for thematic meetings. The meetings enabled the actors to jointly identify, and analyze, the interests, needs, challenges and opportunities in the pineapple value chain and their respective themes of interest. The engagements further created a forum for interested key actors to meet regularly, share, interact and learn from each other.

Entrepreneurial activities: The participation of entrepreneurs is key for any innovation to take off since they are best positioned for knowledge acquisition and have to invest enormous resources to generate the innovation. Lead institutions provided relevant information that enabled actors to identify the most suitable market opportunities based on the two thematic groups (i.e. fresh and processed pineapple). Participatory analytical tools including Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis, Rapid Market Appraisals (RMA's) and focus group discussions enabled the actors to identify and evaluate seven joint market opportunities. The market options were pineapple juice, lollies, chips, processing bio-gas from leaves and stems, fertilizers from residues and seed multiplication. Three innovations including rebranding pineapple juice, developing pineapple snack (*baghia*) and solar-dried chips for the local market emerged. Two lead actors (BRISK and RUCIFRESH) were identified to drive the process.

Thematic meetings and small working groups based on these market opportunities acted as virtual spaces for rigorous actor interactions aimed at improving pineapple product presentation and quality as a strategy to enhance market access. Regular interactions through thematic meetings enhanced the

Table 3. Activities implemented by Innovation systems functions

Functions of Innovation Systems	Activities implemented
(F1) Entrepreneurial activities	- Identified 3 processors as lead actors and promoted entrepreneurial experiments via experimental learning. - Identified seven market options in Phase II.
(F2) Knowledge development	- Generated knowledge through 10 thematic meetings.
(F3) Knowledge diffusion through networks	- Facilitated information and knowledge exchange through 10 thematic meetings and working groups. - Capacity building of 51 pineapple actors through trainings and exposure visits. - Provided education and training opportunities. - Five FGDs and 44 KIIs conducted.
(F4) Guidance of the search	- Articulated value chain actor needs, interests, challenges and opportunities via rapid market survey. - Provided incentives for entry and maintenance.
(F5) Market formation	- Created markets or appropriate market conditions for three pineapple products. - Re-shaped three pineapple innovations through product development processes.
(F6) Resources mobilization	- Provided subsidies for three pineapple innovations through cost-sharing. - Financed innovation processes for PMCA phases.

Rural Community in Development (RUCID) indicated that currently, the organization is recognized as a key player in food processing because the engagement with diverse pineapple platform actors enhanced his learning behavior and integration of knowledge into the product development process of their business. Discussions with this processor revealed that the PMCA process enhanced their negotiation skills and experiences by learning to identify and work with other actors. Further, in 2018, RUCIFRESH one of the lead actors in close collaboration with the Netherlands embassy trained youth in food processing as explained;

"The PMCA process enabled me to strengthen my business in food processing by training 50 students in pineapple processing, with a DIT certificate and now they are self-employed (Processor, Mityana district).

According to one of the members of Kazo Organic Farmer group, farmers had a challenge of accessing quality pineapple planting materials so the pineapple project supported them to acquire 3,000 disease free tissue culture suckers. The group supplied fresh pineapple to RUCID; one of the lead actors who bought the fruit on weight basis at USD 0.137 per kilo.

Knowledge development, dissemination and diffusion (F2 and F3): According to the pineapple actors, engaging in the PMCA process enabled them to work closely with Uganda Industrial Research Institute, the Uganda National Bureau of Standards and Makerere University for product development, branding and certification of RUCIFRESH and BRISK products in figure 2. The role of research and development was well-demonstrated at different levels.

Figure 2. Prototype RUCIFRESH pineapple juice, chips and BRISK pineapple juice with improved branding

Pineapple actors provided technical and practical knowledge which supported the lead actors to shape and reshape the innovations based on their target consumers. While participatory market research guided the demand and supply of processed pineapple products, selling points and marketing strategies.

For instance, sensory assessments were conducted to guide the improvement of the products (in figure 2) for better positioning on the market. RUCIFRESH and BRISK juices were liked for their flavor, taste (sweetness and colour (yellow), while GODEB was disliked due to its colour, though it was perceived to be sweet (Figure 3 a). In terms of branding, BRISK was liked due to the unique shape of the bottle, and the graphic design which showed that the product was natural and fresh (Figure 3b). RUCIFRESH scored low due to the poorly designed label of the product which was unattractive to the consumers.

The pineapple snack (Figure 2) was tested alongside other products (Organic, GODEB and SNACKY) on the market. Results of the sensory assessment of the different pineapple snacks show that RUCIFRESH scored low across all test parameters (Figure 4a). However, participants preferred the product due to its crispness, flavor and shape. Customers mainly preferred SNACKY due to its shape, graphic design and size of the pack (Figure 4b) implying that for better access to markets, the three product attributes need to be given critical attention during the product development process**.**

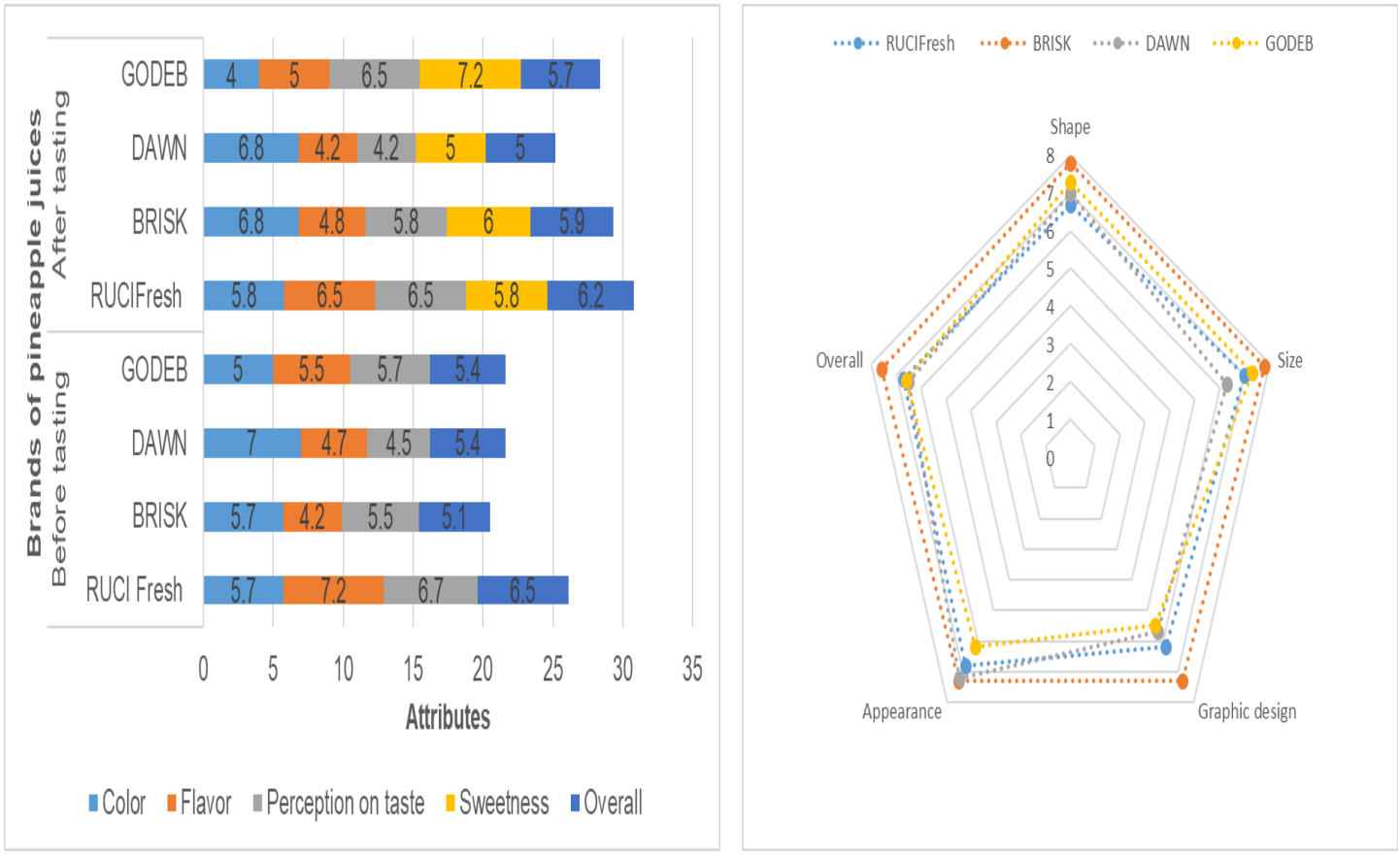

Figure 3. (a) Rating of different pineapple juice products and (b) brands

Figure 4. Rating of different pineapple snack products and (b) brands

The pineapple platform supported knowledge dissemination and diffusion through networks that were created. During the process, the actors shared knowledge, learnt from each other and integrate tacit knowledge to better understand problems and identify better solutions. Each PMCA phase ended with a final event where participants shared progress and experiences. Key informants confirmed that all actors including the farmers, processors, traders, extension agents and researchers exchanged knowledge during the monthly meetings. Capacity-building activities like trainings, exposure visits, market studies and special visits to pineapple farms, processors and markets stimulated experiential learning and empowered actors during the innovation process.

Market formation (F5): Provision of market information in multi-stakeholder processes is important to ensure that innovations are well-positioned in the market. Discussions from the key informant interviews confirmed that during the thematic meetings, the pineapple actors shared information on how to improve the taste, shelf-life and showcasing of the product for the target market. Since BRISK and RUCIFRESH were naturally processed products, platform actors proposed that a fresh pineapple fruit be introduced in the label, reposition the brand name including the nutrition information, source of the raw materials for the product, and expiry date. The processors identified their pantone colors which are crucial for designing the label. The multi-actor engagement process enabled the processors to improve the branding of their pineapple products and other products as confirmed;

"The PMCA platform supported me to improve the branding of my products. I use the same knowledge to improve the labelling of my other products using catching names like organic fertilizers known as ashpy because they contain ash soap and Sulphur. I still work with Deen who designs our labels for the pineapple product. We still pack our juice in glass bottles and we do not use preservatives. Our pineapple juice passed the test of plastic packs. Pineapple ginger does not get spoilt and this is a big achievement for our business" (Key informant, Mityana district*).*

According to one of the lead actors, product branding improved the sales and production of the products as narrated;

"*By the time I joined PMCA, I had a challenge of a bottle mould, my packaging was poor and my product quality was not consistent. My label was crowded but the platform supported me to improve the brand of my product and I penetrated the market better. During the PMCA process, we worked with UIRI to address the issue of taste. We were able to acquire a new mould for the bottle which was more attractive to the end consumers" (*Key informant, Wakiso district*).*

The processors appreciated the platform actors for the identification of appropriate promotion and product quality strategies; including market segmentation and streamlining distribution systems. A case in point was BRISK who was an incubate at the School of Food Science and Technology, Makerere University before joining the platform. The processor also used to perform all the production, managerial and marketing roles. During the post-PMCA period interviews, the processor revealed that they coordinated 15 distributors to supply BRISK products to shops, schools and direct consumers within the Kampala metropolitan area which has improved sales by fourfold (Table 4). After interacting with platform actors, BRISK realized the need to specialize in one pineapple brand for specific market segments.

Table 4. BRISK and RUCIFESH estimated sales and income during the 2017-2019 post-PMCA period

Variable	**BRISK**			**RUCIFRESH**		
Period	2017	2018	2019	2017	2018	2019
Total No. of liters	36,000	144,000	504,000	3,801.6	4,752	6,652.8
Gross income (US$)	19,660	98,338	413,000	2,622	3,278	5,326

Further, the processor reported to have engaged directly with pineapple farmers. However, due to their inadequate bulking, the processor decided to engage with five pineapple traders who double as commercial farmers in Luwero, Kayunga and Masaka districts. On average, farmers owned 10 acres and each farmer supplied 600 pineapple fruits weekly at USD 0.05 per piece. Interactions with RUCIFRESH, a local processor indicated that some of the benefits from multi-actor engagement were the acquisition of promotion materials like posters and pull-up banners which are displayed during the exhibitions and shows. It is one of the strategies the local processors used to ensure that RUCIFRESH products had a competitive advantage over already existing innovations known by the consumers. The processor acknowledged the pineapple platform for the support given to the actors, such that they were able to certify their products with the National Bureau of Standards. The processor was able to reduce the branding costs as a result of linking with professionals who were part of the platform as narrated; "Before I joined the platform, *I used to fear, UNBS. However, the researchers supported me in certifying my pineapple juice, pineapple snacks and I was able to penetrate the market. My label was not attractive and it could not show that it's a real quality product. However, the input I received from the actors of PMCA enabled me to improve the quality of my labels. Currently, I produce my labels in China in order to reduce production costs. Before I used to produce each label at Ushs.400 but now I produce each label at Ushs.80*. (Key informant, Mityana district)
The improvement in product development and branding enabled the processor to access more markets in Mityana and Kampala and boosted their gross income as indicated in Table 4.

Resource mobilization (F6): The findings indicate that the platform empowered lead actors to develop business plans which

outlined the financial requirements required to fulfil their "dreams". For instance, during the engagement with the platform, RUCIFRESH successfully submitted a proposal of Ushs. 100 million (approximately USD 27,314) to ABi Trust, one of the funding agencies for small-medium level enterprises. This funding enabled RUCIFRESH to upgrade the processing plant to the level that met the Hazard Analysis Critical Control Point (HACCP) requirements. Eventually, the processor was able to compete favorably with other companies on the local and international scene as explained**;**

*"When I joined PMCA**,** the knowledge I got during the development of my business plan enabled me to learn how much funds I need to break even. The crates and improvements I made have enabled me to make big deliveries in Mityana and Kampala. I also learnt that for a processor to do business, they must have crates, transport, and a constant source of pineapples, as raw materials. Testing the brands with the market is very important."* (Key informant, Mityana district**)**

In addition, one of the participants who joined the platform as a farmer to engaged pineapple juice processing obtained a grant of Ushs.58 million shillings from the Bushenyi district local government to support their processing activities.

Creation of legitimacy (F7): The function of creating legitimacy is critical to fostering acceptance and reducing resistance to innovations was found lacking within the pineapple platform. Legitimacy, in the context of innovation systems, involves building credibility and acceptance of innovations among stakeholders, who may otherwise be hesitant. For this function to succeed, actors such as civil society organizations and political leaders are often essential, as they can shape public perception, attract funding, and advocate for policy support. For the pineapple platform, the lead actors and other value chain actors were involved in the platform activities, supported and invested in progressing the ideas that came from the process, to some extent they perceived it as a legitimate endeavor.

DISCUSSION

The PMCA approach enhanced knowledge exchange processes that enabled the lead actors to access better markets. The outcome of the function for guidance for search enhanced ownership of innovation as pineapple actors articulated their interests and needs towards prioritization and the formation of a solution network within which the actors involved set forth value propositions (Lioutas *et al.,* 2022). The diverse knowledge, skills, and resources of the IP actors enabled social learning which was vital for the actors to foster innovations along the pineapple value chain (Swaans *et al*., 2014; Lamb *et al*., 2016). Similar results were reported regarding the value of actor networks in an innovation process (Sanya *et al.,* 2018). The existence of diverse actors represents different roles performed in the network which is critical for its success. The interactions and knowledge exchange also led to improved product positioning for the three innovations in Figure 2.

The function of knowledge dissemination and diffusion played a key role in improving market access for pineapple innovations. Such functions can be performed if state actors as 'facilitators" have better links with regime actors, to demand conducive policies and overcome systemic problems embedded in the public sector domain (Seifu *et al.,* 2022). Such problems including a culture of top-down planning and agenda setting, limited understanding of innovation systems principles and lack of funding to facilitate interactive multi-stakeholder processes (ibid, 2022).

Engaging pineapple value chain actors using the PMCA approach led to capacity-building mechanisms that supported the lead actors to

market their products through modifications for better packaging, product testing and positioning and experiential learning. The study resonates with the findings from earlier studies (Oskam, *et al*., 2020; Lioutas *et al*., 2022) which found that actors can reshape the context by integrating resources, skills, and experiential learning and entrepreneurship capabilities to create new arenas for innovation. Planko *et al.* (2017), noted that for a technology to be successful, entrepreneurs need to develop economically viable products which are attractive to end users. Further, to generate tangible innovations, committed, capable and motivated facilitators need to create an enabling environment and new 'rules of the game' to unlock institutional constraints and logics (Nettle *et al.*, 2013; Horton *et al.*, 2023). However, facilitators and innovators need to be prepared for unexpected or unplanned changes or eventualities, linked to the complexity of innovation processes and use them as feedback for improvement (Bentley *et al*., (2021).

The engagement of multi-actors catalysed the process of co-resourcing and integration during the innovation process. Bentle *et al.*, (2021) observed that the ability to innovate is related to collective action, coordination, knowledge exchange amongst diverse actors amidst others. Thus, researchers used their knowledge and skills, expertise and core competencies to assist the processors to develop entrepreneurial competencies and connect the entrepreneurs with other market actors. The traders and processors also used their market positions in the network, by offering new and alternative products on the market. Strategic combinations of IP-facilitating and complementary systemic instruments are therefore critical to overcome a lock-in and build the capacity for inclusive development (Seifu *et al*.,2022). The multi-actor engagements with extension, researchers and processors created trust among the network actors to learn more about each other and exchange important valuable information regarding their enterprises and other services (Rugema *et al.,* 2017; Figueroa-Rodríguez *et al*., 2019).

However, limited participation from civil society organizations and political leaders hindered effective lobbying efforts. This deficiency affected the advocacy for resources, a supportive implementation environment, and the broader utilization of the innovations. Research suggests that coordinated lobbying whether individually or through networks and coalitions plays a crucial role in enhancing acceptance and market formation for new innovations (Hekkert *et al*., 2007; Planko *et al.,* 2017). Specifically, collective action by these interest groups can generate the necessary "lobbying clout" that legitimizes the innovations within the community and political spheres. To bridge this gap, the platform could consider engaging more with influential civil society groups and policy advocates, possibly through partnerships or targeted outreach. By involving these actors, the platform may more effectively counteract resistance, build societal support, and ultimately, enhance the platform's ability to sustain and scale the innovations.

CONCLUSIONS AND RECOMMENDATIONS

The study found that public-private sector engagement in the pineapple platform enhanced the market access for pineapple and its products via product development. Since access to finance is critical for business development, the study proved that lead actors secured funding from the international and local funding agencies. Nonetheless, the actors leading the process need to have the will to invest their own financial, human or other resources for inclusive market access and development. Follow up and support services after completion of the multi-stakeholder engagements are useful to consolidate innovation processes.

Capacity-building activities including trainings, exposure visits, market studies and special visits to pineapple farms, processors and markets stimulated experiential learning and empowered actors during the innovation process. Capacity development strategies need to be complimented with new institutional arrangements that stimulate platform facilitators to practically use their newly acquired competences in a given local context.

The pineapple platform offered a space for sharing practical experiences and the repeated interactions espoused trust amongst the actors. Trust is an important facet for business-to-business collaboration which in this case accelerated market entry and acceptance of the pineapple innovations. The space and rigorous actor interactions enabled potential innovators to translate their ideas into potential market options for testing, however this required identification of champions in this case the "lead actors" who were able to invest some of their resources to drive the process.

It is evident that innovations systems approach contributes to understanding sustainable processes since it involves diverse actors from the policy level to practice. The different stages of the product development involved collaborative partnerships leading to market access for the products of the lead actors. Therefore, integrating results from collaborative marketing initiatives and consumer studies during the early phases of product development is important for enhancing market access for agricultural innovations. Strong ownership, active leadership for engagement and knowledge sharing mechanisms are instrumental in network formation and management of agricultural innovation systems. This study largely used a qualitative approach to interpret personal perspectives and experiences of the actors as they engaged in the pineapple platforms. Therefore, the major gap from this study requires further research is quantifying the economic benefits of the actors resulting from accessing better markets.

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DECLARATION OF CONFLICT OF INTEREST

The authors declare that they have no conflict of interest in the paper.

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