South Asian Journal of Social Studies and Economics

Volume 21, Issue 12, Page 88-101, 2024; Article no.SAJSSE.127043
ISSN: 2581-821X

The Entrepreneurial Mindset: Views and Perspectives of Cacao Entrepreneurs on Innovation and Entrepreneurship in Bicol Region, Philippines

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/sajsse/2024/v21i12920

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/127043

Original Research Article

Received: 14/09/2024
Accepted: 18/11/2024
Published: 02/12/2024

ABSTRACT

Innovation and entrepreneurship are fundamental drivers of economic growth. Oftentimes, sustainable development is equated with these two indices where untapped potential and emerging industries are available that present countless opportunities for the people. A research study was conducted composed of cacao farmers, farmers/processors and farmers/processors/traders residing in various towns in the Bicol region, Philippines aimed at determining their perception, innovation and entrepreneurial initiatives and strategies. A survey-questionnaire was designed and administered to 70 cacao farmers and entrepreneurs and qualitative data analysis techniques, such

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Cite as: *Ramirez, Ramona Isabel S., and Ma. Teresa B. Lirag. 2024. "The Entrepreneurial Mindset: Views and Perspectives of Cacao Entrepreneurs on Innovation and Entrepreneurship in Bicol Region, Philippines". South Asian Journal of Social Studies and Economics 21 (12):88-101. https://doi.org/10.9734/sajsse/2024/v21i12920.*

as thematic coding and content analysis was employed to analyze result of the interview and focus group discussions. Findings of the study showed that farming is the primary focus for the majority of respondents (67%), with only a minority involved in processing or trading activities. The most highly recommended innovative cacao-based products with potential market success are primarily in the food and confectionery categories, with substantial interest in beverages and skincare products. Ninety-one percent (91%) are willing to pay a premium for innovative cacao products because they value supporting local entrepreneurship and a good sign of a strong community support for local businesses with high level of willingness to invest in locally developed products. Job creation and empowerment of small-scale farmers are considered as top benefits of a community-based value-added cacao products enterprise. Limited financial investment/capital is the most significant problem faced, followed closely by unstable demand and low and unregulated farm gate price of agricultural commodities.

Keywords: Entrepreneurship; innovation; cacao products; cacao entrepreneurs.

1. INTRODUCTION

Innovation and entrepreneurship are fundamental drivers of economic growth. Oftentimes, sustainable development is equated with these two indices where untapped potential and emerging industries are available that present countless opportunities for the people.

The Philippines is acknowledged as one of the middle-income economies with the fastest innovation catch-up, alongside China, India, Iran, and Vietnam. It is also among the 26 economies classified as Global Innovation Index (GII) Achievers, surpassing expectations considering their respective development levels (WIPO, 2022 as cited in NIASD). However, our country dropped its spot in the GII as it ranked 59th in 2022 from 51st in 2021 among 132 competing countries. Hence, the Philippines missed its target rank of top one-third by the end of plan period (PSA, 2022).

There is a great deal of opportunities just waiting to be tapped which will enable our country to step up and maintain the stature in the GII. One way is to motivate the increasing number of enterprises operating which is reported by the Philippine Statistics Authority. The 2022 List of Establishments (LE) recorded a total of 1,109,684 business enterprises operating in the country. Of these, 1,105,143 (99.59%) are MSMEs and 4,541 (0.41%) are large enterprises. Micro enterprises constitute 90.49% (1,004,195) of total establishments, followed by small enterprises at 8.69% (96,464) and medium enterprises at 0.40% (4,484) (DTI, 2022). These data include chocolate and cacao-based industries which are sprawling in various parts of the country.

The Philippine Statistics Authority reported that from July to September 2022, production of cacao (dried beans with pulp) was estimated at 2.65 thousand metric tons or an increase of 8.2 percent, from 2.45 thousand metric tons output in the same period of 2021. The leading cacao-producing region was still Davao Region, which produced 2.02 thousand metric tons or 76.1 percent of the total cacao production for the quarter. (PSA, 2022). Despite this increase in production, the cacao industry continue to face challenges such as low productivity, lack of modernization, and limited market access. In recent years, there has been a concerted effort to transform these challenges into opportunities by leveraging innovation and entrepreneurship at the community level.

One strategy that has been adopted is the concept of value addition. By adding value to raw cacao through processing and product diversification, communities cannot only increase their incomes but also create a sustainable livelihood that will foster their creativity. From artisanal chocolates to specialty cocoa butter and beyond, the potential for value-added cacao products is vast, providing a platform for farmers and local entrepreneurs to thrive in both domestic and international markets. This report will delve into the perception of actors involved in the cacao industry relative to promoting innovation and entrepreneurship through community-based value-added cacao products in the Philippines particularly in the Bicol region.

2. REVIEW OF RELATED LITERATURE

Initiatives on innovation and entrepreneurship has been strengthened through The Innovative Startup Act (RA 11337) law which was enacted in 2019. It aims to strengthen, promote, and

develop an innovative and entrepreneurial ecosystem and culture in the Philippines. It focuses on providing benefits and removing constraints to encourage the establishment and operation of innovative new enterprises and businesses.

The effects of this policy are visible in the rapid expansion of the country's start-up ecosystem. In 2020, the Department of Trade and Industry (DTI) reported that the Philippines has more than 1,100 startups, 35 incubators and accelerators, 50 investors, 200 co-working spaces, and 40 venture capitalists (PWC Philippine Startup Survey Report 2020). Metro Manila's Startup Ecosystem Value grew from USD2.1 billion to USD3.5 billion. Metro Manila is also recognized for being in the Top 20 Asian Ecosystem in Funding, Top 30 Asian Ecosystem in Performance, and Top 30 Asian Ecosystem in Talent & Experience (Global Startup Ecosystem Report 2023). Meanwhile, Naga, Iloilo, Cebu, and Davao were hailed as potential innovation hubs (Global Startup Ecosystem Report, 2022).

Similarly, Naga City being one of the progressive cities in the Bicol region continues to solidify its position as a strong player in the Philippine startup ecosystem, advancing 48 spots in the global rankings of startup cities since its inclusion in the annual startup index in 2022 (Naga City News, 2023). Remaining among the top 1000 startup cities worldwide, Naga is one of only five cities in the Philippines to achieve this distinction, maintaining its fourth spot in the country after Manila, Cebu, and CDO. The city has also progressed from the 20th spot to the 19th spot in Southeast Asia. Globally, Naga has demonstrated notable improvement, rising from the 952nd to the 904th spot in the 2023 Global Rankings.

This staggering result on ranking is brought about by the increasing desire of Filipinos to venture into business. About four in every five Filipinos prefer to own their own business if they could, citing a number of benefits such as being able to manage one's time (Monzon, 2023). This is according to survey conducted by analytics firm OCTA Research for Go Negosyo, the advocacy arm of the Philippine Center for Entrepreneurship, which found that 78 percent of respondents aspire to become entrepreneurs.

In the context of cacao production, entrepreneurship is becoming a byword, especially in cacao industry. To become successful entrepreneurs, some attributes need to be in place. Entrepreneurial competence has significant positive effect on cocoa productivity, so an increase in farmers' entrepreneurial competence will increase cocoa productivity, and vice versa (Echdar, 2017). For entrepreneurial competencies are capabilities of farmers in land preparation, planting, maintenance, harvesting and post-harvest cocoa. Farmers with good entrepreneurial competence will produce better cocoa productivity because it is a manifestation of behavior to plan activities to achieve the target. Farmers must be competent, skilled farm managers to perform their tasks planned farm when to plant, harvest, marketing results, seeking capital, control the farming operation. Therefore, building institutional and entrepreneurial competencies of integrated and sustainable farmers is considered significant. Entrepreneurial competence and institutional farmers provide significant impact on the productivity of cocoa. It shows the magnitude of the contribution of entrepreneurial competence and institutional productivity of farmers on cocoa.

Entrepreneurial enterprises have focused the need for efforts to increase quality through better management, certification and consistency in post-harvest processing (Villasis, 2022). These efforts are largely achieved through direct relationships between the processor/exporter and producers. Contracting, training in production methods and promoting cacao producer associations are steps that these enterprises have taken as a means of capturing credence demands in global markets. Through contracting, some of the difficulties of vertical integration are mitigated, but the contracts and associations facilitate de facto provenance and lower costs of certification. Creating a network of cacao suppliers to ensure uniform quality and provide fermented and dried beans with the exact attributes the company seeks is very critical.

To further support the development of cacao industry, strategic measures are essential. Zulfiandri (2023) recommends a mutual public-private partnership between cocoa farmers and the cocoa processing industry in a complete agro-industrial system, strengthening capacity building for post-harvest handling at the farmer level, provision of incentive schemes for farmers and domestic processing industries, deepening and developing diversification of cocoa products that are more downstream to retain the maximum added value in the country, improvement and

strengthening of marketing institutions from the farm level to exports, developing business and R&D cooperation with cocoa institutions and industries abroad and intensifying advocacy about the health benefits of chocolate to boost demand

At the global level, evolution and innovation in the cocoa industry is shaped by both opportunities and challenges. Strategies to effectively link productivity and sustainability tend to be disconnected and, in many cases, work against each other (Herve, 2021). Evolution from cocoa to chocolates, the type of stakeholders and partnership that plays significant roles in the products evolution and the information and knowledge that have been associated with the short-term boom-and-bust cycles can lead to a long-term boom-and-bust cycle with country-wide consequences. Different evolution trajectories of cocoa from the old world to the new world and West Africa have shaped the flavor patrimony of cocoa and innovative sociotechnical systems needed for transformative change. Transformative change should be progressive by exploring new perspectives at various level (substitutions), review or revise the governance structure of existing socio-technical system centered on productivity-enhancing interventions and initiate a co-building and co-construction of the whole system by integrating emerging sustainability challenges.

Innovation in the cacao industry also extends to the utilization of by-products. Traditionally considered waste, pod husks, pulps, and bean shells can be transformed into valuable products such as dietary fiber, antiwrinkle cosmetics and preservatives, animal feed, organic fertilizers, paper-making materials, and biofuels (Indiarto, et.al., 2021). The cocoa pulp can make mixed drinks, kefir drinks, wine, and other products such as marmalade and vinegar—one of the latest innovations in research on renewable energy for cocoa bean shells

Lastly, the success of innovation in the cacao industry also depends on the willingness to adopt new technologies. A research study was conducted to gain a better understanding of the variables determining farmers' willingness to pay for hybrid cocoa seeds, and the amounts farmers are willing to pay for these technologies (Emmanuel, 2023). Faced with the volatility of bean prices in an increasingly unstable external market, and with the increasing demand from emerging processing industries, farmers are looking for varieties with high productivity and capable of withstanding climate change and diseases. Hence they prefer hybrid cocoa variety to improve the productive capital of cocoa farms. However, little is known about the factors that determine willingness to pay for the adoption of improved seeds. The results show that the sex of the farmer, the level of education and the number of people living in the respondent's household have a positive influence on the willingness to pay for cocoa variety.

3. METHODOLOGY

A mixed-methods approach was employed to comprehensively explore cacao production practices, value addition activities, and perceptions of innovation and entrepreneurship in cacao-based products within the Bicol region, Philippines. A structured survey questionnaire was designed and administered to 70 cacao farmers and entrepreneurs across various provinces in the region. The survey captured key quantitative data related to their production practices, value addition activities, and their views on the promotion of innovation and entrepreneurship within their communities. To complement the quantitative data, in-depth interviews and focus group discussions (FGDs) were conducted with selected respondents. These qualitative methods aimed to delve deeper into the challenges, barriers, and opportunities in fostering innovation and entrepreneurship in the cacao sector.

Quantitative data were analyzed using descriptive statistics to identify trends and patterns among respondents. For the qualitative data, thematic coding and content analysis were employed to identify recurring themes, key insights, and perspectives from the interviews and focused group discussions.

4. RESULTS AND DISCUSSION

4.1 Category of Respondents

Table 1 shows a total of 70 respondents composed of cacao farmers, farmers/processors and farmers/processors/traders residing in various towns in the Bicol region, Philippines who were selected for this research study. Out of 70 respondents, 67% are solely farmers. This indicates that majority of the respondents are involved only in farming, with no involvement in processing or trading. This could suggest that the primary activity in the region is farming, or that

most individuals focus only on cultivation rather than engaging in other parts of the agricultural supply chain. Twenty-four percent (24%) are involved in both farming and processing. This indicates that value addition through processing is a relevant activity, though it is not as common as farming alone. Only 9% are engaged in all three activities: farming, processing, and trading. This group represents the most diversified respondents, who not only produce and process agricultural goods but also engage in trading.

Table 1. Type of Respondents

Type	Frequency	Percentage
Farmer	47	67
Farmer/Processor	17	24
Farmer/Processor /Trader	6	9
Total	70	100

4.2 Perception on Innovation and Entrepreneurship

Respondents were asked several questions relative to their ideas on innovation and entrepreneurship for cacao-based products in their local community. Fig. 1 illustrates the responses to the question regarding the creation of value-added cacao products and their potential to stimulate entrepreneurship. Majority of respondents, which is more than half of the respondents (69%) strongly believe that the creation of value-added cacao products can effectively stimulate entrepreneurship in local communities. This indicates strong support for the idea and suggests that many see it as a promising opportunity for economic development. However, a smaller portion of respondents (21%) agree with the statement, indicating that while they see potential benefits, they may not feel as strongly about the impact as those who selected "Strongly Agree." Moreover, a small number of respondents or 10% chose to reply “Neutral”. This suggests that they may be uncertain about the impact of value-added cacao products on local entrepreneurship or they lack information in order to arrive at a more conclusive answer. Overall, respondents show a positive outlook on the potential for value-added cacao products to foster entrepreneurship in their community.

This research result is in consonance with the findings of a research study that cacao farmers are generally open to innovation and new technology. However, while farmers respond positively to certain innovations, they do not fully adopt others. This uneven adoption, is not just a result of limited resources or poor extension services but stems from a failure to address the multiple challenges farmers face when introducing new innovations, including insecure land-use rights, youth disinterest, migration, and seemingly lucrative alternative land use. While promising innovations, such as agroforestry and smartphone applications for agricultural service delivery and training, are currently being implemented, such innovations, will only lead to sustainable cocoa cultivation if these broader challenges are addressed, thereby moving beyond a narrower concern with yields and climate change mitigation and adaptation (Boadi, 2022).

Moreover, previous findings showed positive return on investment for cacao production and processing. The result of research conducted by Lirag (2021) showed high return on investment which is about 77.89% and 160% for the farmer and processor, respectively but a low return on investment

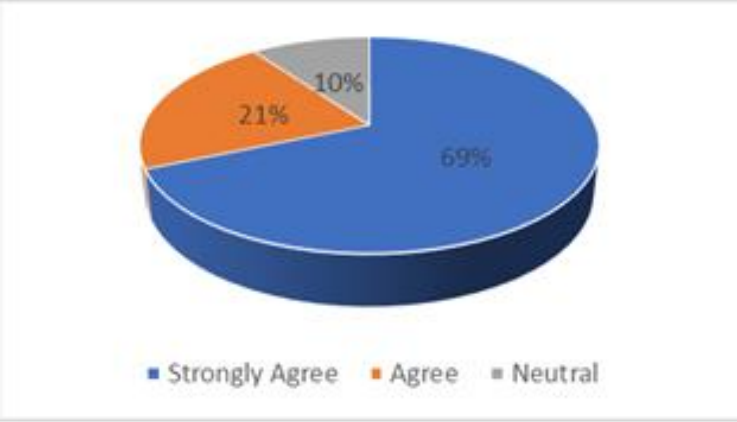

Fig. 1. Responses on Creation of Value-added Cacao Products

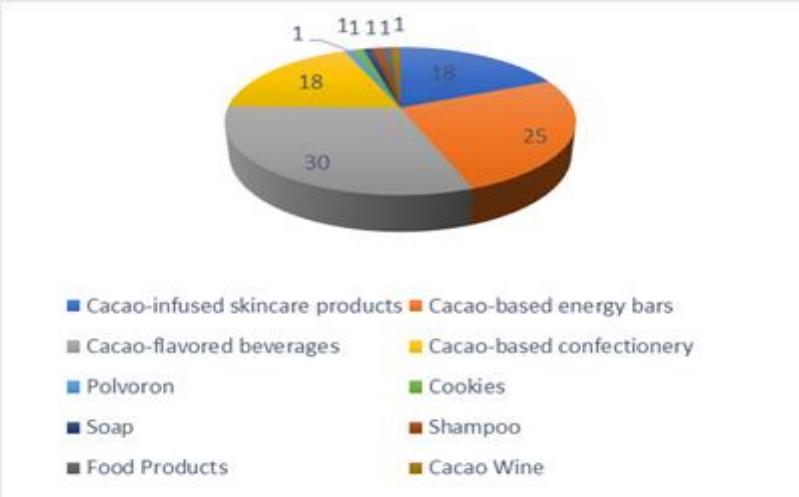

Fig. 2. Cacao-based Products with Potential Success in the Market

of 13% for traders [4]. The value added from farmer to processor is Php 590.00/kilogram, and Php 125.00/kilogram from processor to trader. Various opportunities and prospects for cacao production had been identified such as increased technical and production support from the government, presence of R & D programs, increasing trend towards wellness & healthy lifestyle, and increasing businesses offering cocoa-based products.

Fig. 2 shows various recommended cacao-based products that have the potential for market success. The largest number of respondents (30) indicate that a significant portion of the recommendations focus on cacao-flavored beverages. This suggests a strong market potential for cacao-based food items. This is followed by cacao-based energy bars (25) showing that cacao-based confectionery items, such as chocolates and sweets, are also highly recommended for market success. This reflects the traditional popularity and consistent demand for cacao in confectionery. Following this is the cacao-based confectionery and cacao-infused skin care products with 18 respondents each. Cacao has a strong potential for skincare products and highlights the versatility of cacao beyond the food industry. The following products have 1 respondent each namely, polvoron, soap, other food products, cookies, shampoo and cacao wine. This represents the smallest portion with potential for marketability but still, must be carefully considered since the research result show some interest in these products. This result demonstrates that the most highly recommended innovative cacao-based products with potential market success are primarily in the food and confectionery categories, with substantial interest in beverages and skincare products as well.

There is indeed, numerous products which can be produced from cacao/cocoa. A previous study suggested that cocoa pods can be used as dietary fiber, antiwrinkle cosmetics and preservatives, animal feed, organic fertilizers, paper-making materials, and biofuels (Indiarto, 2021). The cocoa pulp can make mixed drinks, kefir drinks, wine, and other products such as marmalade and vinegar—one of the latest innovations in research on renewable energy for cocoa bean shells

This is further corroborated by another research study where valuable nutrients and bioactive compounds from cocoa has served as a raw material for the development of innovative cosmetic and pharmaceutical applications , et al, 2021). However, despite the great economic importance of cacao exploitation, the amount of waste and by-products that are generated is incompatible with sustainable development. The cacao industry represents a challenge for the improvement of technologies focused on the recovery of different residues, particularly for the extraction of bioactive compounds for different purposes. Likewise, environmental applications involving waste transformation, such as saccharification of biomass to obtain biofuels (bioethanol and biodiesel) and waste conditioning for removing contaminants through adsorption processes, portray a formidable task

Moreover, market channel for cacao products is highly encouraging. In a recent study of Lirag (2024), majority are directly involved in selling

goods to consumers, either through retail or a combination of wholesale and retail activities. There is a strong inclination towards digital marketing and direct consumer engagement, alongside traditional wholesale and retail strategies. Likewise, market outlet for cacao products in the province suggests that most market activities are locally or provincially focused, with some engagement in regional and international markets (Lirag, 2023). Similarly, a key point to consider when new and innovative cacao-based product is introduced to the market is the promotion and advertising. It is essential that their digital presence be felt especially now that e-commerce and online marketing is prevalent

Fig. 3 is about the willingness to pay for innovative cacao products that may be developed by the community. Majority of respondents (91%) are willing to pay a premium for innovative cacao products because they value supporting local entrepreneurship. This is a good sign of a strong community support for local businesses and a high level of willingness to invest in locally developed products. A smaller portion of respondents (9%) might be willing to pay a premium, but their decision depends on the uniqueness and quality of the product. This means that respondents are more selective and cautious, requiring the product to stand out in terms of innovation and quality before committing to a higher price. This only goes to show that there is a strong inclination towards supporting local entrepreneurs by paying a premium for innovative cacao products, with majority of respondents valuing local business efforts. A small portion might consider paying more based on product attributes.

The optimum price for cacao-based products need to be carefully studied and considered to ensure its success in the market. In the Philippines, a research study was conducted to determine the optimum price for local chocolates using Van Westendorp Price Sensitivity Meter tool (Lirag, 2024). Result of the study showed that the acceptable price range of the locally produced chocolate is between the point of marginal cheapness (PMC) and point of marginal expensiveness. The values outside these range will result in declining number of potential buyers because the locally produced chocolate is either too cheap or too expensive. Furthermore, the optimal price where respondents feel the locally produced chocolate is not too expensive and will not question the quality of the product is Php 1.60 per gram (or $2.88/100grams). This is the best price that does not only satisfy the demand of chocolate customers for affordable price but also maximize profit of the producers

In so far as willingness to pay for cacao related products is concerned, there are some identified factors that must be considered. Findings of a previous research showed that various factors such as sex of the farmer, the level of education and the number of people living in the respondent's household have a positive influence on the willingness to pay for cocoa variety (Emmanuel, 2023).

In terms of benefits that can be derived from establishing cacao-based enterprises, job creation and empowerment of small scale farmers are considered as top benefits (Fig. 4). The research result show that 35 respondents cited these benefits and rank as the highest priority. This indicates a strong

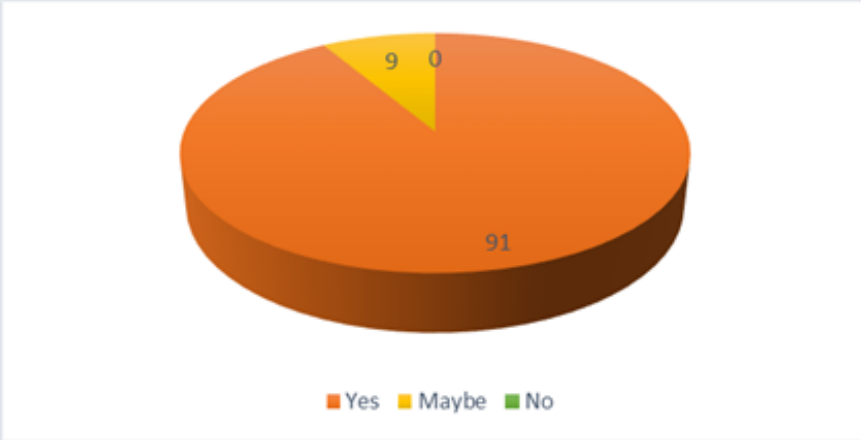

Fig. 3. Willingness to Pay for Innovative Cacao-based Products

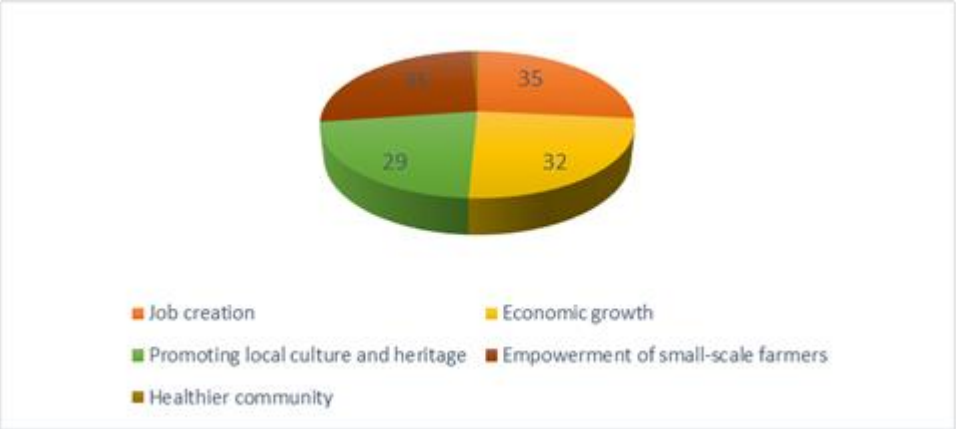

Fig. 4. Benefits of Cacao-based Product Enterprise

belief that such an enterprise would significantly contribute to providing employment opportunities within the local community. This is followed by economic growth as another key benefit, identified by 32 respondents and ranked third. This suggests that respondents see significant potential for a community-based cacao enterprise to boost the local economy, contributing to overall economic development and stability. Promoting local culture and heritage is also considered an important benefit, with 29 respondents highlighting this aspect. It ranks fourth, indicating that while economic and employment benefits are prioritized, there is also a strong recognition of the value in preserving and promoting the local culture and heritage through cacao-based products.

The benefit of fostering a healthier community is identified by only 1 respondent, making it the least prioritized benefit and ranking fifth. This indicates that while health benefits are recognized, they are not seen as the primary impact of a community-based value-added cacao products enterprise compared to economic and cultural benefits.

This finding aligns with Hernandez (2022) who emphasizes that institutional efforts to strengthen the cacao sector must go beyond investment to establish new hectares. Other important aspects must be considered such as: strengthening the skills and knowledge of producers to improve crop management practices (human capital), promoting the participation of household members in associations (social capital), stimulating sensitivity to the rooting and sustainable management of the crop (cultural capital), and promoting processes of technification and adaptation of the infrastructure of fermenters and dryers, which will make it possible to guarantee an adequate quality of the cacao bean (built capital) (Hernandez, 2022).

4.3 Current Innovation and Entrepreneurial Initiatives and Strategies

The partnership of community and university efforts in driving innovation and entrepreneurship has become a key driver of socio-economic development in Bicol region. The Central Bicol State University of Agriculture (CBSUA) is increasingly collaborating with local communities to foster a culture of innovation and entrepreneurship. These partnerships result in initiatives that not only address local challenges but also create opportunities for sustainable growth and development.

Presently, the following innovation and entrepreneurial strategies and initiatives are being undertaken by both the local cacao group communities and CBSUA which highlights successful models of collaboration and innovative solutions:

a) Support Structures: The formation of cooperatives and associations of cacao farmers/entrepreneurs with continued guidance from CBSUA provide significant assistance who are just starting with their businesses. For instance, as a cooperative like the Cacao and Pili Growers Association Sorsogon, Inc. (CAPIGASI), they are able to effectively manage their resources, share experiences and knowledge with one another especially on the marketing schemes they can practice. Likewise, they are able to promote collective ownership, economic fairness, resilience and empower members of the

cooperative/association to work together for mutual benefit.

This strategy is in consonance with the findings that within an organization, farmers need to manage resources collectively, share knowledge, and implement effective marketing strategies (Echdar, 2017). Likewise, the focus on collective ownership and economic fairness resonates with the findings of Rueda (2023), which emphasize that collective action enhances farmers' access to high-value chains, leading to economic upgrading and higher incomes.

b) Business Support and Entrepreneurship: Various trainings and workshops in entrepreneurship, business management and financial literacy had been conducted to help community members start and manage their enterprises effectively. These also provided mentorship opportunities and facilitate networking with successful entrepreneurs, industry experts, and potential investors. These were conducted on different dates mentioned below with CAPIGASI members and other members of cacao growers and entrepreneurs. The training sessions and skills development focused on developing skills in various cacao production, including farming practices, fermentation, drying and processing:

Table 2. Training/ Workshop/ Activity for developing skills in various cacao production

Title of Training/ Workshop/ Activity	Date Conducted	Sponsor	Estimated Number of participants
2nd Cacao Festival and Technology Forum	November 9, 2023	CBSUA	150
1st Regional Cluster Summit and Cacao and Coconut Fair	December 1-3, 2023	Department of Trade and Industry and Camarines Sur Cacao Council	100
Cacao Congress	December 1, 2023	Camarines Sur Cacao Council	80
CAPIGASI Site Visit	February 27-28, 2024	CBSUA, Department of Agriculture	50
Memorandum of Agreement (MOA) Signing between CBSUA and CAPIGASI	May 28, 2024	CBSUA, Southeast Asian Regional Center for Graduate Study and Research in Agriculture -Seed Fund for Research and Training (SEARCA-SFRT)	50

The 2nd Cacao Festival included among others, a Technology Forum where research results on cacao were discussed and shared to the participants. The topics discussed were the following:

Table 3. Topics discussed in the 2nd Cacao Festival

Topic	Resource Speaker
Cacao Nursery Establishment	Dr. Celerino B. Llesol
Good Agricultural Practices (GAP) for Cacao Production	Dr. Celerino B. Llesol
Development and Processing of Local Chocolates	Prof. Julieta M. Casaul
Price Determination for Locally-produced Chocolates	Prof. Ma. Teresa B. Lirag

The Cacao Summit and Fair was a venue for cacao processors to showcase their cacao-based products such as chocolates, tablea, polvoron, wine, to name a few. The venue provided more clients and customers access to these products. Moreover, there were lectures provided relative to cacao processing and development.

A site visit to one of the cacao growers/association provided CBSUA Cacao team the opportunity to give the needed technical assistance. CAPIGASI, which is based in Bulan, Sorsogon is an active association of farmers and growers which aims to help each other in their desire to further improve their farms and products. The formation of CAPIGASI was further strengthened and access to resources was done through networking with the Department of Agriculture which provided free seedlings and tools.

The various training programs and workshops aimed at enhancing entrepreneurship and business management skills further illustrate the commitment to empowering local communities. These efforts align with the literature that underscores the importance of human capital development in agricultural sectors (Hernandez, 2022). Training sessions cover crucial aspects of cacao production, such as farming practices and processing, equipping farmers with the necessary skills to improve their enterprises. This focus on education and mentorship facilitates networking opportunities, which are essential for accessing markets and fostering sustainable growth.

c) Partnerships and Collaboration: Cooperatives and small and medium enterprises involved in the production of cacao-based products and chocolates are actively and continuously collaborating with the local government units (LGUs) and government bodies such as the Department of Agriculture (DA), Department of Trade and Industries (DTI), non-government organizations (NGOs) like the Camarines Sur Chamber of Commerce and Naga City Chamber of Commerce, and other stakeholders to access funding, technical assistance, and policy support. More importantly, partnership with academic institutions such as the Central Bicol State University of Agriculture (CBSUA) is of primordial importance for ease of access related to research, innovation, and technical expertise.

The active collaboration between cooperatives, small and medium enterprises, and local government units (LGUs) highlights the importance of multi-stakeholder engagement. A research study supports this notion, stating that increased capacity and collaboration among field extension workers and local governments can significantly enhance agricultural productivity and entrepreneurial competence (Echdar, 2017). The partnerships with CBSUA provide essential research, innovation, and technical expertise, thereby reinforcing the local cacao industry's potential for growth and sustainability.

d) Innovation in Product Development: There is a great need to continue investing in R&D to develop new cacao products and improve existing ones. Towards this end, CBSUA has the Cacao Research and Development (R and D) Center to assist cooperatives, cacao farmers and growers in exploring different types of chocolates, cacao-based beverages, and other derivatives.

One project worthy to note is the processing of local chocolates and table a which is now available for marketing by the university. This was made possible through the collaboration of CBSUA with Ghent University and funded by Vlaamse Interuniversitaire Raad Universitaire Ontwikkelingssamenwerking (VLIRUOS), Belgium. Future plans include emphasizing on value-added products such as cacao nibs, cacao powder, and chocolate bars that will cater to niche markets which eventually, will be shared to other cacao/chocolate cooperatives and associations.

Local cacao entrepreneurs can greatly benefit from the international partnership between Central Bicol State University of Agriculture (CBSUA) and the University of Ghent in Belgium as they will have access to cutting-edge research on cacao cultivation, processing, and sustainable practices; knowledge transfer through joint programs, workshops, and seminars is facilitated and access to global networks is enhanced that can create opportunities for local cacao entrepreneurs to connect with global markets.

The current innovation and entrepreneurial strategies are essential to ensure the sustainability of cacao development in the region. In a research study previously conducted, they focused on the importance of networking and collaboration especially with the government (Echdar, 2017). Stakeholders must make efforts, particularly local governments, in order to optimize the function of the help of field workers. For example, increase in the capacity of field extension workers can be through a participatory approach. This approach is oriented to the needs of the farmer relative to counseling, strengthening performance and extension institutions so that activities to improve the entrepreneurial and institutional competence of farmers can be ensured and eventually, will result to increased cocoa production

Over the years, research efforts in the cocoa sector have gradually shifted from upstream to downstream of the value chain on processed products (Mathe, 2023). It is therefore essential to reinvest this service downstream in order to produce the knowledge needed for the transition to sustainability and quality. The emergence and multiplication of niches dedicated to quality and sustainability associated with the demands of

Table 4. Problems Encountered by Cacao Farmers and Processors

Problems Encountered	Mean	Rank
High Cost of Hauling	3.44	5
Limited Financial investment/capital	3.65	1
Poor condition of farm to market road	3.39	7
Low and unregulated farm gate price of agricultural commodities	3.61	3
Perishability of the Agricultural commodities produced	3.24	8
Price fluctuation	3.55	4
Unstable demand	3.63	2
Product quality	3.42	6
Competition	3.10	9

civil society, consumers, and governments may help to pave the way towards the transition.

Similarly, a research result showed that the driving factors of the implementation of integrated management model of coffee and cocoa plantation are the variety of agricultural crops (plantation products, agricultural products, and livestock), while the inhibiting factors are weak networks among government institutions and stakeholders (Soetrioni, 2020). Moreover, the strategy of the implementation of management model are: the role and participation of the community as managers, contribution from government and stakeholders, specific integrated plantation management, provision of facilities and clarity of the implication of the model on local communities, tourists, and government.

4.4 Barriers and Challenges

Table 4 shows the various problems encountered by cacao farmers/processors which can adversely affect their desire to innovate and undertake entrepreneurial activities. All the problems mentioned were at the moderate level with limited financial investment/capital considered as the most significant problem faced, followed closely by unstable demand and low and unregulated farm gate price of agricultural commodities. Competition is perceived as the least significant issue in addition to high cost of hauling, product quality, and poor condition of farm to market road are considered moderate concerns.

These findings resonate with a related study on the challenges of adopting precision agricultural technologies (PATs) in cacao production. Bosompem (2021) identified five major challenges hindering the implementation of PATs: demographic, environmental, educational, economic, and technical challenges. Among these, demographic characteristics, such as the age and education level of farmers, are particularly relevant to the research findings. Farmers with limited capital often lack the educational background and technological literacy necessary for adopting new practices, echoing the difficulties cited by (2019) regarding the aging rural population and labor shortages that threaten the sustainability of agroecosystems.

Furthermore, environmental challenges, such as poor infrastructure leading to difficult access to farms, align closely with the issues raised by the cacao farmers in this study. The poor condition of farm-to-market roads is a barrier that can severely impede access to markets and increase transportation costs, reinforcing the findings of Bosompem (2021) regarding the lack of accessible roads as a major obstacle to the adoption of precision agriculture.

Additionally, Noguiera (2019) highlights that the absence of differentiated price and marketing channels for organic cacao presents significant limitations. This aligns with the research finding that unstable demand and low farm gate prices are prevalent challenges, indicating a lack of robust market mechanisms that could provide stable income for farmers. The study's findings on labor shortages and increased costs associated with adopting new practices further emphasize the economic barriers identified in the literature.

5. SUMMARY AND CONCLUSION

A total of 70 respondents composed of cacao farmers, farmers/processors and farmers/processors/traders residing in various towns in the Bicol region were selected for this research study with the aim of determining their perception on innovation and entrepreneurship, identifying current innovation and entrepreneurial

initiatives and strategies and determining the challenges and problems to ensure success of their cacao-based enterprises.

Findings of the study showed that farming is the primary focus for the majority of respondents (67%), with only a minority involved in processing or trading activities. This could indicate limited access to resources or infrastructure for processing and trading, or that there are barriers (such as knowledge, skills, or market access) that prevent most farmers from moving into other parts of the agricultural value chain. The most highly recommended innovative cacao-based products with potential market success are primarily in the food and confectionery categories, with substantial interest in beverages and skincare products. Majority of the respondents show a positive outlook on the potential for value-added cacao products to foster entrepreneurship in their locality. Ninety-one percent (91%) are willing to pay a premium for innovative cacao products because they value supporting local entrepreneurship and a good sign of a strong community support for local businesses with high level of willingness to invest in locally developed products. Job creation and empowerment of small scale farmers are considered as top benefits of a community-based value-added cacao products enterprise. Limited financial investment/capital is the most significant problem faced, followed closely by unstable demand and low and unregulated farm gate price of agricultural commodities. Innovation and entrepreneurial strategies must be in place and this include support structures through the formation of cooperatives to provide significant assistance for farmers and processors who are just starting with their enterprises, innovation in product development, business support and entrepreneurship and partnerships and collaboration.

6. RECOMMENDATIONS

Based on the results and findings of this research study, the following interventions are hereby recommended:

1. Implement targeted continuous capacity building programs aimed at equipping cacao farmers and entrepreneurs with the knowledge and skills needed to engage in value-added cacao production. This can include entrepreneurship education, business incubation, mentorship, networking, and access to shared facilities and resources.
2. Provide easy and quick access to financial resources for smallholder farmers and community-based entrepreneurs through microfinance initiatives, cooperative lending schemes, and government subsidy programs.
3. Facilitate networking opportunities, trade fairs, and business matchmaking events to connect cacao producers with potential buyers and partners both at the domestic and international level. Likewise, it is essential to strengthen coordination between farmers, cooperatives, processors, exporters, government agencies, research institutions, and NGOs to streamline production, processing, and marketing activities.
4. Strengthen policy support by advocating policy reforms that incentivize innovation and entrepreneurship in the cacao sector.
5. Intensify research and development initiatives to support innovation in cacao production, processing, and product development. This also means strengthened collaboration between universities, industry, and government to conduct research on varietal improvement, disease management, value addition technologies, and market strategies.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that generative AI technologies such as Chatgpt etc have been used during writing or editing of this manuscript.

Details of the AI usage are given below:

1. Enhancement and editing of Review of Literature
2. Improvement of Results and Discussion

ACKNOWLEDGMENT

The authors wish to acknowledge the funding support given by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture -Seed Fund for Research and Training (SEARCA-SFRT) for this project. Likewise, they are grateful for the administrative support of the key officials of the Central Bicol State University of Agriculture headed by Dr. Alberto N. Naperi, SUC President IV in the implementation of this project.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/127043