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Short Communication

Nutrition Entrepreneurship in the Coffee Industry: A Case of Varacco's COFFEE Framework

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Abstract

This short communication highlights the innovative application of nutrition entrepreneurship in the coffee industry, focusing on Varacco Inc.'s COFFEE (Coffee-based Farming and Entrepreneurship Engagement) framework. Nutrition entrepreneurship combines business innovation, nutrition science, and community engagement to address malnutrition and empower marginalized groups. Varacco's framework enhances coffee-growing communities' socio-economic and nutritional well-being by integrating product development, digitalization, capacity-building, and inclusivity. Leveraging technologies like the Internet of Things (IoT) and a commitment to sustainability, the framework promotes equitable livelihoods while supporting the demand for quality, nutritious coffee products. This communication provides insights into the framework's impact on improving nutritional outcomes, agricultural productivity, and community resilience, offering a model for sustainable development in agricultural value chains globally.

Keywords— Nutrition Entrepreneurship, Coffee Industry, Sustainability, Digitalization

1 Introduction

The Philippine coffee industry faces a persistent challenge: a growing consumer demand juxtaposed with declining production volumes [1]. This decline is attributed to farmers transitioning to alternative crops and converting agricultural lands into real estate, recreational areas, and urban developments [2, 3]. In 2020, the Department of Agriculture reported that approximately 1,300 hectares were dedicated to coffee cultivation, prompting efforts to reverse this trend through new tree planting and rehabilitating existing trees [4].

The intersection of nutrition science and entrepreneurship offers transformative potential for industries like coffee, where challenges such as low productivity, poor nutritional knowledge, and inequities in value distribution persist [5, 6]. Entrepreneurship in nutrition can be described as the ability to identify opportunities and create meaningful value by developing innovative products and services that address the specific needs of communities [7]. These entrepreneurial skills empower dietitians to effectively navigate challenges and enhance their impact in promoting health and well-being.

Coffee, a staple in Filipino households [8], can become a powerful vehicle for addressing nutritional gaps, especially when integrated with innovative products and sustainable practices. Varacco Inc. exemplifies this through its COFFEE framework, an initiative that merges sustainable agricultural practices with nutrition-centered business strategies. The framework addresses the dual goals of improving nutrition and empowering coffee farmers by focusing on product innovation, capacity-building, and inclusivity. By integrating entrepreneurship into agricultural value chains, such as coffee, businesses can address systemic challenges like low productivity and limited access to technology while contributing to the well-being of farmers and consumers [9]. Coffee's role as both a widely consumed product and a culturally significant commodity underscores its potential to drive transformative changes in nutrition and sustainability.

Smallholder farmers dominate coffee production globally, and empowering them through innovative frameworks like Varacco's COFFEE model aligns with research showing the importance of farmer capacity-building for resilient food systems [10]. Additionally, addressing inequities in value chain distribution is critical, as studies reveal that farmers often receive disproportionately low returns relative to market prices [11].

Varacco's integration of nutrition science and business innovation enhances its relevance to academic and practical discussions on sustainable agriculture. By leveraging digitalization and IoT technology, the framework advances the efficiency and traceability of coffee production, which are essential components of future agricultural systems [12]. Including women and youth in these initiatives further strengthens the model, as gender and generational inclusivity are proven drivers of community resilience and economic growth [13].

This study contributes to the literature by highlighting the intersection of nutrition entrepreneurship and agricultural innovation, offering a replicable framework for addressing malnutrition and empowering marginalized communities. It also aligns with the global Sustainable Development Goals (SDGs), particularly those related to zero hunger, decent work, and sustainable consumption and production patterns. By analyzing Varacco's COFFEE framework, this communication provides actionable insights for policymakers, practitioners, and researchers to enhance sustainability and equity in agri-food systems.

2 Methodology

This study employed qualitative research methods, including framework analysis, focus group discussions, and key informant interviews with Varacco's leadership and farming communities. Data sources included Varacco's legal documents, video recordings, and market analysis reports. The Framework Analysis method [14] was used to evaluate the alignment of Varacco's COFFEE framework with nutrition entrepreneurship principles. Supporting academic literature contex-

tualized the framework's contributions to sustainable agriculture and nutrition-driven business models.

2.1 Conceptual Framework

Gleaned from Framework Analysis: A Qualitative Methodology for Applied Policy Research of Srivastava and Thomson [14], the authors decided to use the conceptual framework in Figure 1.

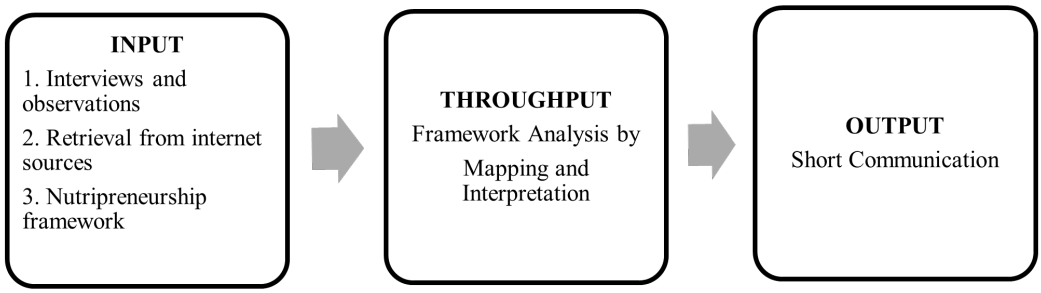

Figure 1.
Conceptual Framework

The conceptual framework for this study is structured into three interrelated phases: input, throughput, and output, each serving a distinct role in the analytical process.

Input

The input phase establishes the foundation of the analysis, comprising diverse data sources, including internet-based research, video documentation from Varacco, legal records, the nutrition entrepreneurship model, and firsthand observations. These inputs provide the necessary groundwork for exploring Varacco's strategies and operations in-depth.

Throughput

The throughput phase systematically evaluates Varacco's experiences from 2018 to 2022. The analysis focuses on applying the nutrition entrepreneurship model, which has been specifically tailored for the coffee industry, enabling an in-depth assessment of Varacco's strategic decisions, operational effectiveness, and innovative practices.

Output

It consolidates the evaluated data into a cohesive narrative highlighting Varacco's current plans, successes, and contributions to the coffee industry. This phase presents the outcomes of the analysis and contextualizes them within broader discussions of entrepreneurship and sustainable agricultural practices.

2.2 Data Collection

Both primary and secondary data were collected. Primary data was gathered through (a) interviews with five senior leaders of Varacco Leadership Team to understand the development and implementation of the COFFEE framework; and (b) two focus group discussions (FGDs) with farming communities composed of smallholder coffee farmers with five to six participants each in Bukidnon and Davao sites to capture their lived experiences and challenges. On the other hand, secondary data sources were taken from internal Varacco policies, project reports, and market analysis, as well as video recordings of training sessions and community engagements.

The data collection was conducted at the project sites over six months from July–December 2022. Discussions were recorded with participants' consent.

2.3 Ethical Considerations

This study adhered to the principles of the Declaration of Helsinki on research involving human participants. In the conduct of research, participants received clear information about the study and provided written or verbal consent. To ensure the confidentiality of the responses, participants' data were anonymized and all digital and hard-copy files were securely stored. Cultural norms were respected, and local interpreters supported discussions when necessary.

3 Results and Discussion

The inputs through original data and information from Varacco focusing on the Nutrition Entrepreneurship (Nutripreneurship) model were analyzed and interpreted to attain the review objectives. The COFFEE framework is an operational model that integrates nutrition entrepreneurship into the coffee value chain, addressing community nutrition and economic development.

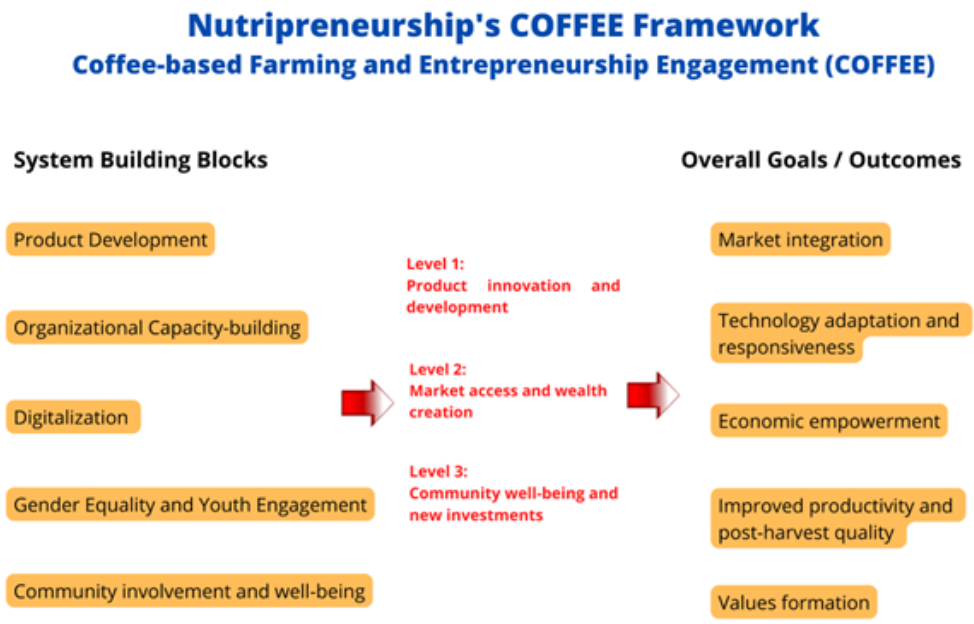

Figure 2.
Varacco's Coffee-based Farming and Entrepreneurship Engagement (COFFEE) framework

The framework (Figure 2), Coffee-based Farming and Entrepreneurship Engagement, provides a systematic approach to coffee farming and entrepreneurship. The framework outlines the fundamental components of the system and the main objectives, with a primary emphasis on developing products, integrating into the market, and promoting innovation and capacity-building at different levels. The method includes essential components such as adapting technology, accessing markets, empowering the economy, promoting gender equality, and enhancing community well-being, emphasizing its complete character. The framework seeks to promote sustainable growth and development in the coffee sector by utilizing a series of interconnected phases, as depicted in the figure. These steps include product development, productivity improvement, and community involvement. Figure 2 is a valuable tool for comprehending and executing a systematic approach to coffee farming and entrepreneurship. It encourages sustainable practices and inclusive growth in coffee-producing communities.

The Nutripreneurship COFFEE model is made up of the following building blocks and their attributes:

1. Product Development: Nutrition as a Core Driver

Varacco's coffee products are designed to provide authentic, high-quality beverages that cater to the health-conscious market. These products are enriched with natural ingredients such as coconut sugar and locally sourced coffee beans, reducing dependence on instant coffee while promoting nutritional value [15]. This approach aligns with consumer trends emphasizing healthier, sustainable food choices, bridging the gap between nutrition and convenience [16].

2. Organizational Capacity-Building: Empowering Farmer-Scientists

Farmers are trained in sustainable coffee production and nutrition literacy, equipping them to understand the health implications of their produce. By fostering awareness of nutrition's role in consumer health, Varacco empowers farmers to see themselves as contributors to societal well-being, not just agricultural producers.

3. Digitalization: Scaling Nutrition-Driven Production

Through IoT integration, Varacco monitors soil health, crop conditions, and climate parameters, ensuring optimal production of nutrient-rich coffee beans. Real-time data also facilitates precision agriculture, reducing waste and enhancing the nutritional quality of the coffee [17]. Digital platforms further expand market reach, connecting health-conscious consumers with ethically produced coffee.

4. Gender Equality and Youth Engagement: Inclusion for Nutritional Impact

Women and youth are key stakeholders in Varacco's operations, contributing to production processes, marketing, and community outreach. Women are empowered to incorporate nutritional goals into agricultural decision-making. Youth involvement in agriculture is essential for creating employment opportunities and supporting the development of agri-food systems in developing nations [18].

5. Community Involvement: Building Nutrition-Driven Ecosystems

Varacco collaborates with communities to promote the integration of coffee into local nutrition programs. This includes advocating for coffee's role in addressing nutrition gaps and enhancing local food systems' resilience to food security. By positioning coffee as an economic and nutritional product, Varacco broadens its impact on community health.

Impacts of Nutrition Entrepreneurship through the COFFEE Framework

1. Improved Nutritional Outcomes

Varacco's emphasis on high-quality, minimally processed coffee provides consumers with a healthier alternative to highly processed instant coffee. This innovation supports better nutritional choices at the consumer level while incentivizing farmers to produce premium-grade coffee.

2. Economic and Social Empowerment

Farmers gain technical knowledge and business acumen through training and capacity-building, allowing them to command better prices and expand their market reach. Women and youth are particularly empowered, fostering a more equitable agricultural landscape.

3. Sustainability and Climate Resilience

IoT-enabled practices ensure sustainable farming while maintaining the nutritional integrity of coffee crops. These practices mitigate environmental degradation and contribute to climate-resilient agriculture [17].

4. Community Resilience

By integrating nutrition entrepreneurship into coffee production, Varacco strengthens local economies and food systems, creating a ripple effect that enhances community resilience against economic and environmental shocks.

The COFFEE framework effectively addresses the dual challenges of low productivity and inequitable value chain distribution in the coffee industry. By integrating nutrition entrepreneurship with sustainable agricultural practices, Varacco creates a replicable model for other developing regions. A comparative analysis with similar initiatives in Latin America demonstrates that farmer-focused strategies significantly enhance crop quality and market access [19].

Moreover, the adoption of IoT and other digital tools aligns with global trends in precision agriculture, which have been shown to increase yields by up to 95% efficiency while minimizing resource use [20]. This technological pivot not only supports environmental sustainability but also strengthens economic outcomes for smallholder farmers. The framework's focus on gender equity and youth engagement addresses systemic barriers to participation in agriculture. Research confirms that empowering women and young people leads to improved decision-making and community resilience, critical factors for long-term sustainability [21]. Additionally, the emphasis on nutrition literacy ensures that farmers view their role as contributors to societal health, rather than just agricultural producers.

Varacco's success demonstrates the importance of aligning business strategies with global sustainable development goals (SDGs), particularly those related to zero hunger, gender equality, and decent work. This alignment is critical for fostering policy support and attracting investment in nutrition-sensitive agricultural models [22].

Through the COFFEE framework, Varacco has created an ecosystem that bridges the gap between nutrition, sustainability, and entrepreneurship. Its holistic approach serves as a case study for policymakers, researchers, and practitioners aiming to replicate its impact on other agricultural value chains.

4 Conclusion and Recommendations

Varacco's COFFEE framework highlights the transformative potential of nutrition entrepreneurship in agriculture. By aligning product development, digital innovation, and community empowerment with nutritional goals, the framework provides a replicable model for addressing malnutrition and advancing sustainable agriculture.

To further enhance its impact:

- **Integrate Nutrition Education:** Develop training modules that deepen farmers' understanding of coffee's nutritional role in diverse diets.
- **Promote Research on Nutritional Value:** Partner with academic institutions to study the health benefits of coffee blends and their potential to address dietary deficiencies.
- **Expand Market Access:** Collaborate with health-conscious retailers and international fair-trade organizations to reach broader markets.

Future research should explore the framework's scalability across other crops and its potential contributions to global nutrition entrepreneurship.

Statements and Declarations

Conflicts of Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper except that the corresponding author is a co-founder of Varacco Inc and founder of Thinnkfarm.

Ethical Considerations

This study adhered to the principles of the Declaration of Helsinki. Informed consent was obtained from all participants.

Data Availability

The data in this study is available upon request from the author.

Author Contribution

The author confirms to write all aspects of the manuscript by reviewing the materials of Varacco Inc. spanning three years of documents. The review is digested into a short communication designed for rapid dissemination and communication.

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