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Business Model to Reduce Sugary Drink Consumption with an Amazonian Fruit Beverage Sweetened with Yacon Syrup Using Lean Methodologies

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***Abstract*– The predominance of ultra-processed and sugary beverages in the market has created an urgent need for nutritious alternatives. This issue significantly impacts public health, highlighting the necessity for healthier options. Despite efforts by the World Health Organization to promote healthy eating, natural and nutritious products remain scarce. This study presents a business model for introducing an Amazonian fruit-based beverage sweetened with yacon syrup, an innovative solution focused on reducing the consumption of sugary drinks, integrating methodologies.**

To validate this business model, a combinatorial entrepreneurship model integrating Lean Startup and Scrum was developed, structured into five phases to enable rapid and efficient product development iterations. This entrepreneurship model focuses on validating the beverage which is the value proposition of the business model. Also, the pricing and channel of the model are validated. The validation process included surveys of 384 university students and adults from socioeconomic levels A/B-C. The beverage was technically and experimentally evaluated, showing high acceptance. Among respondents, 87.5% confirmed the prevalence of ultra-processed products and the difficulty in finding natural options. In organoleptic tests, the beverage received high average scores for taste (3.5), aroma (3.4), and sweetness (3.3) on a 1-to-4 scale.

Regarding the business model, 55% of respondents accepted a price range of 7 to 9 soles (USD 1.89 - 2.43), and 90% preferred receiving promotions via social media. The study confirms the beverage's market acceptance and commercial viability. The conclusion is that the proposed product meets the demand for healthy options and demonstrates high market potential. Keywords-- Lean, methodology, business model, beverage, value proposition.

I. Introduction

New findings reveal an alarming increase in the global consumption of highly processed and sugary beverages. The Pan American Health Organization (PAHO), in its latest report dated October 23, 2019, indicates that industrialized foods, such as fast food and sugary beverages, are displacing nutritious diets, thereby generating negative health effects [1]. In Latin America, the trend of sugary beverage consumption is rising and is associated with increasing rates of obesity and related diseases. In the Peruvian sectoral context, data from the Ministry of Health (MINSA) reveal a similar pattern, with an increase in the prevalence of chronic diseases linked to the consumption of these products [2]. As such, it is evident that this consumption represents a social problem, as it is closely linked to public health and affects a large segment of the population. According to Europa Press [3], this issue is one of the "leading causes of death and years lost due to disability worldwide." In response, the Community Health Network notes that reducing sugar consumption contributes to lowering the likelihood of developing cardiovascular diseases [4].

In addition to the social problems associated with excessive consumption of highly sugary beverages, the negative economic and environmental impacts of this issue have also been evidenced. Economically, it increases healthcare costs and reduces labor productivity. Environmentally, the consumption of these products depletes natural resources, as they require significant amounts of water. Furthermore, a distinguishing factor of this problem is its prevalence in society; due to the easy availability and supply of highly sugary beverages, their consumption remains frequent. Another factor is their role as a trigger for various cardiovascular diseases, which are a leading cause of morbidity. It is estimated that in Peru, by 2030, these diseases will account for most deaths [1].

Considering this, recent years have seen studies focused on developing natural and nutritious substitutes for traditional sugars, which are harmful to health, used in beverages and other foods. One solution involves the creation of a dairy-based beverage naturally sweetened with thick palm sap [5]. The results of this research provide guidelines for using palm sap as a sweetener in dairy-based products; however, it has been found that its use slightly alters the beverage's composition. Another study proposes using monk fruit extract as a natural sweetener due to its glucose-reducing and antioxidant properties [6]. However, this product has not yet been applied to beverages, so its effectiveness remains undefined.

Given this context, this article designs a value proposition aimed at young people and adults who wish to adopt a healthy lifestyle and are conscious of the importance of the foods they consume. This proposal seeks to generate a positive impact in three areas. Socially, it aims to reduce health problems related to excessive consumption of sugary products. Economically, it intends to contribute to reducing costs associated with healthcare and the treatment of cardiovascular and chronic

diseases. Environmentally, it proposes the appropriate and sustainable use of natural resources.

The essence of this proposal is grounded in the Lean Startup entrepreneurship methodologies and the agile Scrum methodology. Furthermore, it considers the use of yacon syrup as a sweetener and tamarind leaves as a preservative. This proposal aims to combine these elements in an Amazonian fruit beverage, offering a healthy and sweet option that does not harm consumers' health.

This article is structured as follows: State of the Art, which discusses the main types of research; Contribution, which outlines the synergy of the studies conducted; Validation, which assesses the research proposal with users from the target market; and Discussion, which reviews the information collected during the proposal validation process.

II. State of the Art

To collect and select articles for the systematic literature review, an organized, transparent, and reproducible approach was employed. The eight-step strategy for locating articles in this study consisted of: (1) initial research to determine keywords and databases; (2) database search (Scopus and Web of Sciences); (3) filtering by publication year; (4) filtering based on open access; (5) filtering by Q1, Q2, and Q3; (6) filtering based on abstracts; (7) duplicate elimination; and (8) categorization.

A. *Organization by Typologies*

The articles collected for the systematic literature review were grouped into eight typologies: (1) Natural sweeteners for food products, (2) Beverage preservation methods, (3) Design of solutions focused on the food industry using the Lean Startup methodology, (4) Design of solutions for startups using Scrum, (5) Sensory factors that raise awareness of healthy consumption, (6) Multisensory packaging attributes that influence purchase intention, (7) Interventions in physical microenvironments promoting product purchases, (8) Retail marketing strategies. Figure 1 illustrates all the steps for locating and selecting the articles.

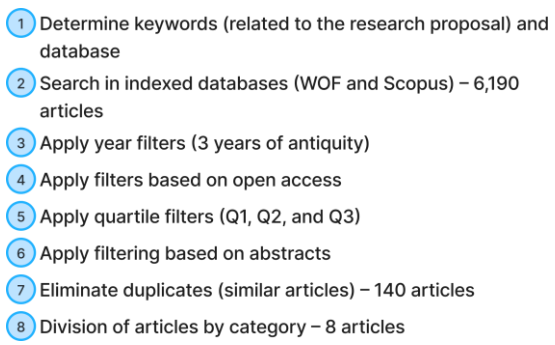

Fig. 1 Steps in the systematic literature review

B. *Natural Sweeteners for Food Products*

In recent years, various studies have focused their efforts on analyzing the negative health effects associated with excessive consumption of beverages sweetened with artificial sugars. Studies show that this issue is closely linked to chronic diseases such as type 2 diabetes, cancer, and others. This highlights the need to find natural sweeteners that can replace the refined and harmful sugars currently used in the beverage industry. Ban et al. [6], in their article, propose monk fruit extract as a natural sweetener due to its high glucosidase inhibitory capacity (65.9%) and antioxidant properties (98.37%). Similarly, it is noted that sugar derived from thick palm sap is a viable substitute due to its low fructose (2.7%) and glucose (1.3%) content and its high antioxidant capacity for free radicals [5]. Da Silva et al. [7] and Dionisio et al. [8], present yacon syrup as an alternative sweetener because it contains 22% fructooligosaccharides (FOS), which help reduce triglyceride and cholesterol levels, as well as blood glucose levels. Asghar et al. [9], highlight coconut sugar as a substitute due to its high vitamin content (116.19 µg/ml), antioxidants, and low sucrose content (6.91%). Watanabe et al. [10], mention that rhamnose and xylose found in steviol glycosides from stevia leaves are a sweetening alternative. These components provide sweetness to stevia but also impart its characteristic bitterness, noticeable in products such as beverages. However, they exhibit neither harmful nor particularly beneficial health effects.

The correlations among the properties of the various natural sweeteners demonstrate that there is no single ideal substitute. Studies validate the efficacy of using natural resources as sweeteners to replace harmful artificial sugars.

C. *Preservation Methods for Functional Beverages*

In a world where beverage production and processing are essential for global supply, certain microorganisms find a habitat in these products. These microscopic invaders are the root cause of spoilage in beverages and/or fruit and vegetable juices, resulting in reduced shelf life, loss of quality, and negative impacts on organoleptic qualities. Identifying and applying effective preservation methods to ensure the quality of functional beverages is thus crucial. [11], [12], [13] and [14], focus on specific preservation techniques amidst growing concerns about the safety of chemical additives and the side effects of thermal treatments. Articles [11] and [12], for example, evaluate the impact of tamarind and beetroot leaf extracts on the physicochemical attributes and microbiological quality of beverages during storage, extending shelf life by approximately one week. Juices analyzed in [15] and [16], on the other hand, improved their shelf life by about 14 days. The beverage treated with PL [17], retained 61% more antioxidants, 38.8% more phenolic compounds, and 68.2% more vitamin C after 45 days of refrigerated storage. Meanwhile, beverages in [18] and [19], subjected to high-pressure processing and sulfitation at 100 ppm and 150 ppm, respectively, revealed a shelf life of up to 90 days under refrigeration.

The identified correlations suggest that there is no single or universally applicable approach to beverage preservation. Findings have explored a variety of techniques to inactivate

pathogenic microorganisms and extend the shelf life of functional beverages.

D. Solution Design for Startups with Lean Startup

According to data from the Bureau of Labor Statistics, about 70% of small businesses fail to survive their first decade, with progressively increasing failure rates, resulting in a global success rate of only 30%. This suggests that most failed startups did not effectively identify or execute viable ideas to reach the market before running out of resources. In this context, the relevance of the Lean Startup methodology stands out, as it is combined with other agile approaches in [20], [21] and [22], while in [23], it is applied independently. Despite their differences, all these approaches address the same research question: "During the process of creating and developing an innovative product, how does the startup continuously adapt its business model to the fluctuating and uncertain requirements of its environment?" The findings of [21], derived from the unified framework of Business Model Innovation (BMI), Lean Startup (LS), and Agile Development (AD), suggest that this approach can effectively orchestrate and manage startups' resource allocation, adapting to external complexities. Lean Startup is thus positioned at the intersection of innovation and agile development, serving as an applicable method for products, services, value propositions, and complete business models.

E. Solution Design for Startups Using Scrum

Traditional project management methods have been used for many years in project execution. However, with the publication of the Agile Manifesto in 2001, interest in agile methods increased, and satisfactory results were obtained in executing and solving complex projects using agile approaches. Among these methods, which are selected and applied based on the project's suitability and purpose, SCRUM is the most frequently preferred. In this study, SCRUM, an agile project management technique, is examined as applied independently in articles [24], [25], and [26]. In article [27], SCRUM is combined with the Agile Maturity Model (AMM) and used to evaluate the development process of initiatives in two groups working on Business Process Reengineering projects. Despite differences in application, SCRUM has enabled a flexible project management process in each case. The effectiveness of SCRUM's key events—Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective—has been evaluated to minimize risks arising during initiative management. Results indicate that SCRUM significantly improves team coordination, transparency in the process, and adaptability to unexpected changes, leading to greater efficiency and project execution success.

Identified correlations suggest that implementing SCRUM, either independently or in combination with other models, contributes to greater efficiency and success by improving both team communication and responsiveness to changes.

III. Contribution

A. Foundations Subsection

The value proposition is developed using the Lean Startup entrepreneurship methodology and the agile Scrum methodology. On one hand, Lean Startup, characterized by its "build-measure-learn" cycle, enables continuous iteration and agile product adaptation to change market demands [21]. On the other hand, integrating the agile Scrum methodology allows for efficient management of product development or implementation. This methodology encompasses four main SCRUM events as research alternatives: Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective [27]. Combining these methodologies and their approaches maximizes success by valuing trial-and-error practices. Additionally, the uniqueness of this proposal focuses on using yacon syrup [8], a sugar substitute that, although it has received little attention in previous research, has been technically proven as a sweetener in beverages. Furthermore, a preservation process that includes tamarind leaf extract [11], is implemented. This decision is based on the industry's growing concerns about the safety of chemical additives and the potential side effects of thermal treatments. This improvement not only enriches the product's value proposition but also aligns with market demands.

B. General Subsection

Considering the identified issues, this article proposes developing an Amazonian fruit beverage sweetened with yacon syrup to provide the target segment with a healthy and sweet option that does not negatively affect their health. This solution will be developed using the Lean Startup (LS) methodology and the agile Scrum (S) methodology. The proposed solution focuses on reducing the economic, social, and environmental impacts caused by excessive consumption of highly processed and sugary beverages among the population. Therefore, its development through the entrepreneurship model is crucial. Figure 2 presents the entrepreneurship model that combines the methodologies and will be used to develop the proposed solution.

It is worth noting that the model has five phases: (1) Market analysis and solution proposal, (2) MVP design, (3) MVP development, (4) MVP monitoring and control, and (5) Results retrospective. These phases enrich the value proposition by focusing on addressing the problem, proposing a solution, planning development with a user-centric approach, and maximizing trial-and-error validation. The main advantage of the model is that it allows for product adaptation according to user requirements while maximizing trial-and-error practices, increasing the likelihood of successful product development.

C. Detailed Subsection

The hybrid methodology that combines Lean Startup principles with the Scrum framework is presented as a highly effective and adaptable approach for product development, as illustrated in the previously presented visual model. Below are the detailed phases of the hybrid methodology:

The first phase, "Market Analysis and Solution Proposal," focuses on thoroughly understanding customer needs and proposing solutions to meet them. At this stage, personal interviews with target segment users are conducted to identify the problems they face, and possible solutions are proposed. The second phase, "MVP Design," defines the strategy for agile and efficient development of the Minimum Viable Product (MVP) using Scrum principles.

The third phase, "MVP Development," centers on creating the first version of the Amazonian fruit beverage sweetened with yacon syrup (MVP). The processes defined in phase two are applied at this stage. In the fourth phase, "MVP Monitoring and Control," the results of the first version of the beverage are evaluated in the target market segment, and continuous corrections and improvements are applied based on collected feedback. Finally, the fifth phase, "Results Retrospective," closes the cycle by encouraging reflection on the completed process and allowing adjustments based on collected feedback.

well as explicitly demonstrate whether an idea is worth pursuing. For the second phase, "MVP Design," a "User Preferences Identification Form" is used. This tool plays a crucial role as it collects data directly from potential users, helping ensure the MVP is relevant and appealing from the start. In the fourth phase, "MVP Monitoring and Control," an "Evaluation Matrix" is employed. This tool is selected for its capacity to quantify subjective aspects such as viscosity, flavor, aroma, and convert them into objective data. While these three tools are highlighted in this article, it is essential to note that the hybrid methodology encompasses a broader range of tools, including brainstorming, affinity matrices, weighted factor matrices, among others.

1) Experiment Board: The application of this instrument begins with creating a list of potential customers. These potential customers must be related to the sector being addressed and aligned with the motivation behind the value proposition to be developed. With the segment defined, a list of problems that these customers might experience is created. At this stage, a brainstorming session is conducted to identify problems, and one is selected for testing. Following this delimitation, a risky assumption is formulated to validate the problem and the segment. Similarly, a success criterion to

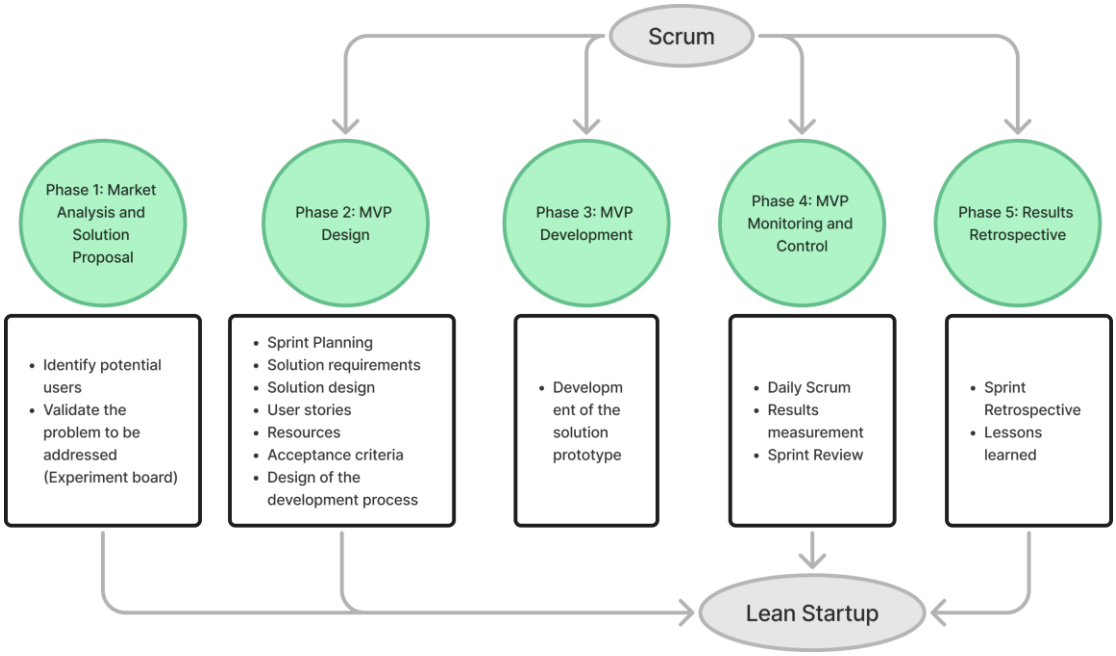

Fig. 2 Lean Startup-Scrum Model

It is worth mentioning that the Lean Startup-Scrum model can be deployed using one or more tools. In the first phase, "Market Analysis and Solution Proposal," the central tool is the "Experiment Board" [28]. This instrument is chosen for its ability to organize and effectively structure ideas and tests, as

validate them is determined. Once all these elements are defined, experimentation is conducted, consisting of user interviews.

2) User Preference Identification Form: This questionnaire, consisting of 11 questions, is designed to gather valuable information about user behavior. Its focus is on understanding user preferences and the factors influencing their purchasing decisions. Key questions explore preferences for ingredients, type and size of packaging, and priority characteristics when selecting a product. The interpretation of this instrument provides a deeper understanding of the target market's preferences and the elements influencing their choices, ensuring that the MVP is designed to directly address the needs and desires of consumers.

TABLE I
QUESTION PROTOCOL

How often do you consume products related to the developed solution?
Which of the following elements would you prefer as the main component in a product of this type?
Which of the following characteristics do you consider most relevant when selecting a product like ours?
What type of packaging do you prefer for a product like the one developed?
What packaging size do you consider most convenient for this type of product?
Through which sales channel do you prefer to purchase products like ours?
Are you familiar with [key component of your product]?
Are you interested in trying a product that contains [key component] as part of its formulation?
What do you think would be a significant benefit of consuming products with [key component]?
Would you be willing to pay for a product like the one developed?
Would you be willing to participate in tasting events or market tests before the launch of the developed solution?

3) Property Evaluation Matrix: To apply this tool, it is first necessary to establish the evaluation criteria for the solution being developed. This requires defining the properties and/or attributes to be evaluated. Once the evaluation criteria are set, scores are assigned to each of them. It is important to note that these criteria should align with the technical evaluation of the solution, and the comparison in the matrix is made among the different versions of the solution developed. The version with the highest cumulative score compared to other prototypes is deemed suitable for testing with potential users.

TABLE II
PROPERTY EVALUATION MATRIX

	Proposal 1	Proposal 2	Proposal 3
Description			
Property 1	3	2	2
Property 2	4	4	4
Property 3	3	3	3
Total Score	15	14	12

D. Contribution Subsection: Process

Figure 2 shows the process flow for applying the Startup-Scrum entrepreneurship model. The activities outlined in the flowchart are divided into the five phases of the model. The process begins with phase 1, "Market Analysis and Solution Proposal," and concludes with phase 5, "Results Retrospective," based on the feedback collected during the validation of the proposal.

IV. VALIDATION

In this validation section, to provide detailed information on the objective of the proposed solution and its feasibility, validation is conducted for the problem, the solution, and its business model. For the latter, the Lean Canvas business methodology is used, which, according to [29], breaks down business ideas into small components to identify the value proposition or innovative element focused on solving the identified problem. Additionally, this methodology is intuitive and easy to visualize, as it provides a comprehensive view of the business idea planned for launch.

Of the nine modules in this methodology, only three are validated: the value proposition, which is the beverage; the revenue source, based on pricing; and the channels, which are divided into promotion and commercialization.

Therefore, the validation structure for this study includes a description of the validation scenario, outlining the context in which the study is conducted. At this point, the problem is addressed, and previously implemented solutions are described. Furthermore, the validation design is presented, including the proposed solution and its technical and experimental validation. Additionally, the business model is validated by showcasing the survey results regarding pricing and channels.

This structure ensures that the results obtained are reliable and adequately contextualized in relation to previous studies and the objectives set forth in the research.

A. Description of the Validation Scenario

It was determined that the unit of analysis would be young people (students from private universities) and adults from socioeconomic levels A/B - C, residing in West Metropolitan Lima, who are interested in adopting a healthy diet. A potential population of 323,000 users was identified, supported by data from the Peruvian Company for Market and Public Opinion Studies [30] and a study by Kantar [31]. Data collection will utilize a survey, employing a finite statistical formula to determine the number of responses necessary for the information to be relevant and representative, resulting in at least 384 responses. These responses will focus on the proposed solution: an Amazonian fruit beverage sweetened with yacon syrup.

This initial experimentation scenario includes a series of methods, procedures, materials, and equipment. Among the materials and equipment are a semi-industrial kitchen, blender, and others. The team responsible for producing the beverage possesses extensive knowledge of the complete process, from extracting fruit pulp and yacon syrup to unifying and packaging the product. In addition, advanced methods are available for evaluating the organoleptic properties of the

product, allowing its acceptance among consumers to be measured.

B. Validation Design

The validation design involves developing a value proposition aimed at reducing the impact of consuming sugary, ultra-processed, and low-nutritional beverages, along with the business model that supports it. In this article, two types of validations are designed: technical and experimental.

1) Problem Validation: To validate the problem addressed by the proposed solution, secondary sources were consulted first, such as the World Health Organization (WHO) report [1], which identifies key societal issues. This report highlights that in recent years, fast food and sugary beverages have displaced nutritious diets, generating negative health effects.

This study adopts the premise outlined by these international entities and, to validate and identify similar problems, interviews were conducted with users possessing characteristics and attributes like those in the previous study. Eight users from the segment were selected and interviewed about issues related to their diet and beverage consumption (see Table 3). It was corroborated that 87.5% of the respondents stated that market products and beverages are predominantly ultra-processed, sugary, and low in nutrition. Additionally, they indicated that it is difficult to find natural, nutritious products without artificial ingredients.

TABLE III
RESPONSES FROM INTERVIEWED USERS

User	Problem	Is valid the problem?
1	"Finding natural drinks is a complicated task"	Yes
2	"It is difficult to acquire natural drinks in stores"	Yes
…	…	…
4	"There are no drinks without chemicals and sweeteners; they are processed"	Yes
…	…	…
8	"It is difficult to obtain truly natural drinks"	Yes

At the conclusion of identifying the problem, the solution to address it is proposed. It is important to highlight that the identification and validation of the problem, as well as the formulation of the proposed solution, take place in phase 1, "Market Requirement Analysis and Solution Proposal." To identify the solution, the beverage, a rigorous process was carried out, including idea generation and evaluation through a weighted scoring matrix. Various evaluation criteria were defined for this purpose. Once the solution was selected, it was developed using the Lean Startup and Scrum methodologies to optimize the process. Upon completing the beverage preparation, the evaluation phase began, detailed in the following sections.

2) Technical Validation of the Beverage: It should be noted that the technical validation of the Amazonian fruit beverage is the first of two validations. This phase is carried out exclusively with the work team, evaluating the organoleptic properties of the beverage at three different time intervals, referred to as "Daily Sprints." In the entrepreneurial model developing the proposal, this event takes place in phase 4, "MVP Monitoring and Control." The evaluation time intervals are a) one day, b) three days, and c) five days after preparing a batch of six units. A specifically designed evaluation matrix is used for this purpose. It is worth mentioning that the methodology of general magnitude hedonic scale (gMLS), developed by Bartoshuk et al. (as cited in Castañeda, 2013) [32], is used for evaluating organoleptic properties. This methodology includes intensity descriptors arranged in a bipolar fashion, where 1 represents "weak," 2 indicates "moderate," 3 denotes "strong," and 4 corresponds to "very strong." However, the characteristics encompassed by these descriptors vary depending on the property being evaluated.

On Daily 1, data is collected regarding the state of the organoleptic properties of the beverage one day after its preparation. The results of this evaluation are shown in the following table.

TABLE IV
RESULTS OF DAILY 1

	Drink 1	Drink 2	Drink 3
Storage temperature (°C)	10ºC	10ºC	10ºC
Viscosity	2	2	1
Smell	4	4	4
Taste	2	3	2
Color	2	2	2
Sweetness	2	3	1
Total Score	12	14	10

On Daily 2, the same data collection process is conducted three days after preparation. The collected data is presented below.

TABLE V
RESULTS OF DAILY 2

	Drink 1	Drink 2	Drink 3
Storage temperature (°C)	10ºC	10ºC	10ºC
Viscosity	2	2	1
Smell	3	3	3
Taste	2	3	2
Color	3	3	2
Sweetness	2	3	1
Total Score	12	14	9

Finally, on Daily 3, data on the properties is collected five days after preparation. These results are displayed in Table 6.

TABLE VI
RESULTS OF DAILY 3

	Drink 1	Drink 2	Drink 3
Storage temperature (°C)	10ºC	10ºC	10ºC

Viscosity	2	2	1
Smell	3	3	3
Taste	2	3	2
Color	3	3	3
Sweetness	2	3	1
Total Score	13	14	10

Once data on the properties of the beverage have been collected at these time intervals, the scores assigned to each organoleptic property are averaged and grouped. These results are presented in the following matrix.

TABLE VII
EVALUATION MATRIX OF PROPERTIES

	Drink 1	Drink 2	Drink 3
Storage temperature (°C)	10ºC	10ºC	10ºC
1st daily scrum: 1 day	12	14	10
2nd daily scrum: 3 days	12	14	9
3rd daily scrum: 5 days	13	14	10
Total Score	37	42	29
Average score	12	14	10

It is important to highlight that, before conducting these evaluations, the ideal properties of the beverage have been established (Table 8). Therefore, the beverage selected and evaluated in the daily sprints must resemble and/or approach the established score to be selected for initiating experimental testing with the target user segment.

TABLE VIII
IDEAL ORGANOLEPTIC PROPERTIES OF THE BEVERAGE

Criteria	Ideal Characteristics
Storage Temperature (°C)	The beverage should be preserved at room temperature (13°C) for a period of 5 days, and under refrigeration (10°C ±) it should last more than 14 days.
Viscosity	Strong (3 points): Noticeable viscosity, evident density, requiring moderate effort to drink.
Smell	Strong (3 points): Pronounced, intense aroma, dominated by carambola and yacon, with evident sweet notes.
Taste	Strong (3 points): Pronounced, intense flavor, dominated by carambola and yacon, with evident sweet notes.
Color	Strong (3 points): Mustard yellow color.
Sweetness	Strong (3 points): Prominent and balanced sweetness, distinctive but not overwhelming, well integrated with carambola and yacon.
Score	15

In this context, Beverage 2, composed of 26 grams of yacon syrup, 50 ml of water, 250 ml of carambola pulp, and a natural preservative, has demonstrated compliance with the required criteria during the first 5 days after production. The formulation of Beverage 2 maintained an additional point throughout the evaluations and achieved the highest score, indicating that it meets the desired characteristics and can be produced for user testing.

3) External Validation of the Beverage: This second validation of the beverage focuses on experimenting with the proposed solution among target users. It is conducted after completing the technical organoleptic tests. For this purpose, a second batch of 8 beverage units is prepared for user testing. This production is carried out during the "Sprint Review" event, which is part of phase 4. In this batch, issues identified during the technical evaluations were corrected, and improvements and replacements were made regarding materials and equipment. The tastings conducted with the target audience are shown in Table 9, displaying the acceptance of the beverage and the scores assigned to each of its organoleptic properties. It is important to note that the same users who validated the problem are now validating the beverage. Each criterion rated by the user tester is on a scale from 1 to 4: 1 is weak, 2 is moderate, 3 is strong, and 4 is very strong. For example, the viscosity criterion is expected to achieve a score of 3, indicating noticeable viscosity and density that requires moderate effort to drink. The taste criterion should also achieve a score of 3, indicating a pronounced and intense flavor dominated by carambola and yacon, with evident sweet notes. The smell should receive a score of 3, reflecting a pronounced and intense aroma dominated by carambola and yacon, with evident sweet notes. The color should achieve a score of 3, indicating a mustard yellow color. Finally, the sweetness criterion should achieve a score of 3, indicating prominent and balanced sweetness, distinctive but not overwhelming, well integrated with carambola and yacon.

Below is Table 9, showing the scores assigned by users to each criterion after tasting the beverage.

TABLE IX
EVALUATION CRITERIA FOR THE BEVERAGE'S ORGANOLEPTIC PROPERTIES BY USERS

	User 1	User 2	…	User 8	Average
Viscosity	3	4	…	3	3.1
Smell	3	3	…	3	3.3
Taste	3	2	…	3	2.9
Color	4	3		3	3.0
Sweetness	3	3	…	3	3.0

4) Business Model Validation:

Price

One of the modules of the Lean Canvas that is validated is the revenue stream, which translates to the beverage's price. For its analysis, it is highlighted that the price is closely influenced by both internal and external environmental factors. Internal factors include the cost of raw materials, CIF, and associated labor. Simultaneously, external factors, such as the retail price of competing products, were evaluated. It is relevant to note that the competition maintains a price range between S/.3.50 and S/.16.00, which, based on the current exchange rate of 1 USD = 3.70 PEN, corresponds to a range of approximately USD 0.95 - 4.32.

After this analysis, a survey was conducted targeting the objective segment to determine the most appropriate price.

The price range most chosen by users was applied (see Table 10). This range was closely related to the external and internal factors of our value proposition. As a result, we can affirm that over 55% of respondents accepted a price of 7 to 9 soles, which corresponds to a range of approximately USD 1.89 to USD 2.43. Considering that the sample consisted of 384 responses, this equates to 212 users.

TABLE X
SURVEY RESULTS RELATED TO THE BEVERAGE'S PRICE

What is the maximum price you would be willing to pay for a beverage of this type?	
S/5.0 to S/7.0 (USD 1.35 - 1.89)	17%
S/7.0 to S/9.0 (USD 1.89 - 2.43)	26%
S/9.0 to S/11.0 (USD 2.43 - 2.97)	57%

Promotion

The channel module was then validated. The following question was posed to the sample: "On which platform or medium would you prefer to receive information about promotions and updates related to the beverage?" Ninety percent voted in favor of social media, specifically Facebook and Instagram (see Table 11). This result aligns with secondary sources indicating that, as of August 2023, Facebook and Instagram were the most popular social networks in Peru. Facebook leads with a total of 22,540,000 users, followed by Instagram with 8,483,000 Peruvian users [33]. Considering this, it was deemed crucial to translate and validate this preference into concrete actions, leading to the decision to create a page on both platforms.

TABLE XI
SURVEY RESULTS ON PREFERRED PLATFORM OR MEDIUM

On which platform or medium would you prefer to receive information about promotions and updates related to the beverage?	
Social media (Facebook, Instagram, Twitter)	90%
Email	7%
Online Ads (websites, blogs)	2%
Other	1%

For Facebook, the promotion function was utilized with an initial investment of S/.8 (USD 2.16) over 2 days. According to Facebook, this initial investment is estimated to reach between 411 and 1,200 people. Additionally, an Instagram page named ENCANTO, the beverage's name, was launched. In just two days after its creation, the account managed to attract approximately 50 followers. Furthermore, two posts have been published, each generating over 55 interactions. The link to the Instagram page is provided for reference: Instagram de Encanto.

Channels

Continuing with the validation of the channel's module, the sample was asked: "Where do you usually purchase healthy food products?" As shown in Table 12, most responses indicated convenience stores. Forty-five percent of users regularly purchase healthy food products at stores such as Tambo, Oxxo, and Listo, representing 173 users. It is important to note that this channel has experienced an average growth of 20% over the past year, providing a favorable perspective for entering this market.

TABLE XII
PREFERENCES FOR MARKETING CHANNELS

Where do you usually purchase healthy food products?	
Supermarkets	38%
Online (e-commerce)	5%
Local Stores	12%
Convenience Stores (Tambo, Oxxo, Listo, among others)	45%

5) Validation Through a Landing Page: To ensure greater accuracy and reliability of these results, an additional validation was conducted through the creation of a landing page for the beverage, called ENCANTO. This approach allowed for assessing the product's acceptance in a digital environment before its official launch in convenience stores. The landing page provided detailed information about the product's benefits, natural ingredients, mission, and vision, and included a "Buy Now" button. Clicking on it displayed the beverage's price (S/.9, USD 2.43) with the message "Coming soon to your favorite store," making it clear that it was a market test.

A combination of digital metrics was used to measure the effectiveness of this validation, including the number of page visits and the conversion rate (percentage of visitors who clicked the "Buy Now" button). The landing page link was included in the Instagram and Facebook page descriptions and was also shared during conversations with target customers on social media when they expressed interest in the beverage.

The results of the landing page were highly positive. In the first week, the page received over 150 visits, with a conversion rate of 89%, which is significantly high for consumer products in the pre-launch phase. This digital validation provided crucial data that supported the product's commercial viability. It not only helped adjust the marketing strategy but also confirmed the concept's acceptance by the target market. This additional validation approach through a landing page proved to be an effective tool for measuring product interest and acceptance before committing to large-scale production.

V. DISCUSSION

This section explores the importance of performing additional validations with respect to the proposed solution and the business model that converges it. This study explored the Startup-Scrum model to introduce the Amazonian beverage, combining Lean Startup and Scrum for robust validation. Lean Startup, with its focus on experimentation, ensured the alignment of the product with user needs, while Scrum facilitated the iterative development of prototypes. This combination minimized risks and guaranteed the quality and relevance of the product by prioritizing user feedback.

The integration of Lean Startup and Scrum strengthened the validation of the value proposition. Organoleptic tests, interviews and tastings optimized the product, and surveys validated price and distribution channels among the target audience (youth and adults 18-55 years old, NSE A/B-C). This iterative process highlighted the importance of combining the flexibility of Scrum with the customer focus of Lean Startup to optimize development and reduce market uncertainty.

VI. Conclusions

After conducting a thorough analysis of the study, three fundamental conclusions emerge.

First, the research successfully validated the business model for introducing an Amazonian fruit-based beverage sweetened with yacon syrup. The results of the interviews and surveys confirmed the market's interest in the product, supporting the viability of the proposed solution. This validation was not framed as a health-focused initiative but as a strategic move to meet the demand for a unique beverage in the market.

The application of Lean Startup and Scrum methodologies played a crucial role in optimizing the development and validation process for the business model. Rapid iteration and continuous feedback were essential in identifying and addressing challenges at each project stage, ensuring that the commercialization strategy was well-optimized for market success.

Experimental testing with users demonstrated high acceptance of the beverage among the target segment, reflected in positive scores assigned to the product's organoleptic properties. Both the technical and external validations confirmed that the beverage's formulation met the quality and taste standards expected by consumers, confirming its potential for commercial success.

Finally, the introduction of an Amazonian beverage to the market not only presents an innovative product but also contributes to economic development through job creation and the promotion of sustainable business practices. This research lays the foundation for future initiatives in product development and market expansion, with the potential for significant societal and economic impact.

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