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Experiment Board: From idea to validation in the digital mental health business

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Abstract*— This work validates a Minimum Viable Product (MVP) for digital psychological support by integrating the Experiment Board and Lean Startup, applying sequential qualitative and quantitative validation with real users. The contribution lies in showing how the Experiment Board can function as a traceability system that connects findings with design and business model decisions. The research was conducted in two phases: (1) opportunity validation through semi-structured interviews with seven users, analyzed using deductive qualitative coding and axial categorization, identifying access barriers (cost, time, stigma, and privacy) and a preference for secure and personalized digital solutions, confirming that 71% turn to digital alternatives in the face of these barriers; these findings guided the initial MVP iterations. (2) solution validation with thirty users, obtaining a Net Promoter Score (NPS) of +20 and 53.3% promoters. Logistic regression analysis identified ease of use, personalization, and perceived value as critical predictors of adoption. The results support the development of an evidence-based Lean Canvas, reducing risks in the development of a digital mental health solution.

Keywords*-- Experiment Board, Javelin, hypothesis validation, Minimum Viable Product, Lean Startup, digital mental health applications.

I. Introduction

The growing prevalence of anxiety, stress, and depression disorders among young people represents a critical global challenge: in Latin America, the treatment gap reaches 74.7%, one of the highest in the world [1], where the shortage of professionals (an average of 3.4 psychiatrists per 100,000 inhabitants), economic barriers, and stigma limit access to traditional services [2]. This situation generates unmet demand that requires accessible, culturally sensitive, and valid digital psychological support solutions, which have demonstrated complementary effectiveness to in-person treatments for the prevention of psychological well-being problems among young people.

In this context, digital solutions supported by agile methodologies have emerged as a promising approach to managing uncertainty in startups. The Lean Startup methodology proposes iterative cycles of Build, Measure, and Learn to validate hypotheses with real users [3], while the Experiment Board (Javelin) offers a structured mechanism for defining, testing, and documenting critical assumptions, connecting user evidence with product and business model decisions [4].

However, while previous studies have addressed digital mental health solutions or Lean Startup applications independently, there is limited evidence on how the Experiment Board can be systematically applied as a traceability mechanism linking user perspectives, MVP design decisions, and business model development.

This work applies the iterative cycles of Lean Startup [3] and the Experiment Board (Javelin) [4] to design and early-validate a digital MVP for psychological support that integrates emotional assessment, personalized content, and continuous follow-up. The experiment will be conducted in Metropolitan Lima and Callao (Peru), focusing on young adults aged 18 to 39 years from socioeconomic levels A, B, and C, with access to smartphones and internet connection and without active clinical treatment.

Validation is structured in two iterative phases using the Experiment Board or Javelin. First, opportunity validation seeks to confirm whether the identified problem is relevant and urgent for the target segment; interviews with users and the analysis of secondary sources support the decision to build the MVP and define the initial elements of the Lean Canvas. Second, solution validation evaluates satisfaction with the proposed functionalities through quantitative metrics; the results determine whether to pivot, persevere, or iterate the business model before committing significant resources to development and scaling. This approach reduces investment, time, and effort risks by grounding strategic decisions in empirical evidence validated with real users, while maintaining the ethical responsibility of the project.

The article is organized into four sections: the literature review on existing demand and current digital mental health solutions, the applied methodology and contribution of validation through the Experiment Board and Lean Startup, and finally the presentation of results and the synthesis of the validations conducted.

II. State Of The Art

The growing demand for mental health support justifies the development of digital solutions in response to limited access to specialized services, it is estimated that between 75% and 90% of people with mental disorders do not receive adequate treatment. In Peru, this gap is particularly critical, with only 10 psychologists and 3 psychiatrists per 100,000 inhabitants [5]. Specialized chatbots have demonstrated effectiveness in population-level prevention [6], while digital platforms show high acceptability among at-risk youth [7]. In

Latin America, high demand contrasts with limited information quality and structural inequalities affecting vulnerable populations [8], [9]. Evidence shows that artificial intelligence (AI) solutions focused on psychological well-being significantly reduce anxiety and depression symptoms, supporting their potential as accessible and scalable interventions [10].

In digital business innovation, the Lean Startup methodology proposed by Ries replaces extensive planning with iterative build, measure, and learn cycles to validate business hypotheses [3]. Similarly, the Experiment Board (Javelin) is a visual tool designed to structure, test, and document hypotheses through direct customer evidence [4]. Its purpose is to reduce early-stage failure risk by helping entrepreneurial teams understand the real problem before designing the solution. It aligns with Lean Startup by promoting validated learning and data-driven decision-making. Previous studies highlight its usefulness in identifying early opportunities, particularly in sectors such as digital health and education, where trust, personalization, and scientific evidence are essential for adoption [11].

The Lean Canvas proposed by Maurya [12] consolidates validated learnings into a visual business model, connecting empirical validation with strategic planning. Among validation metrics, the Net Promoter Score (NPS), introduced by Reichheld [13], is widely used to measure recommendation and satisfaction in digital products, particularly in health and wellness contexts where trust and usability influence adoption.

The Minimum Viable Product (MVP) represents the simplest version of a product launched with essential features to validate hypotheses with real users [14]. In digital solutions, MVPs reduce development time and enable early iteration through measurable feedback [15]. Information security in mobile health ecosystems is a critical challenge, as psychophysiological data require stronger protection than conventional commercial applications. Security protocols influence both legal compliance and user acceptance, while security-by-design approaches help mitigate vulnerabilities during early development stages [16].

Taken together, these tools provide a robust methodological framework for early validation of digital business opportunities, particularly in sensitive sectors such as psychological well-being, where trust, empirical evidence, and user experience are decisive success factors.

III. Methodology

This research was developed under a sequential exploratory approach, articulating phases to validate both an opportunity and a solution in the context of digital psychological well-being, supported by qualitative and quantitative analysis within an iterative exploration process guided by the Lean Startup build, measure, and learn cycle. The methodological process focused on implementing the Experiment Board (Javelin) as the central axis for hypothesis exploration, risk reduction, and evidence-based decision-making. Unlike other applications limited to the diagnostic stage, this study extended the board's use to qualitative and quantitative validation, demonstrating its potential as a traceability system between findings and business model design.

Ethical considerations inherent to digital mental health applications were also incorporated, ensuring informed consent, confidentiality, and protection of participants' personal data through usage policies and responsible information management. Transparency regarding the tool's purpose was maintained to avoid generating dependency or replacing professional care, while promoting a user-centered approach with clear boundaries regarding the application's scope.

A. Opportunity Validation through the Experiment Board (Javelin)

Although global reports highlight the mental health treatment gap in middle- and low-income countries as evidence of unmet demand and market opportunity for digital solutions [5], general statistics do not capture the underlying causes of treatment abandonment or technological distrust. Therefore, in the first stage, focused on qualitative opportunity validation, semi-structured interviews were conducted with seven young adults aged 18–39 years. Participants were selected through convenience sampling to prioritize deep insights into emotional experiences and access barriers.

This approach made it possible not only to confirm the existing gap, but also to identify root causes and perceptions regarding information security that limit the use of digital psychological support alternatives, complementing statistical evidence with detailed behavioral understanding.

The interviews were transcribed and organized for analysis using deductive thematic qualitative coding, following the methodological guidelines proposed by the Delve guide [17]. Subsequently, a codebook was developed, followed by a second round of axial recoding and thematic categorization, enabling the construction of a relational matrix used to integrate findings into the Experiment Board (Javelin), guiding the definition of the customer, the problem, and the success criteria for MVP design.

Based on the qualitative findings, the highest-risk hypothesis of the Experiment Board was validated: "Young adults aged 18–39 face barriers to timely psychological support and, in response, use or intend to use digital alternatives to self-manage their emotional well-being."

To complement the analysis, minimal quantitative validation was incorporated to contrast the central assumption. During the interviews, participants' declared use or willingness to use digital alternatives when facing therapy access barriers was recorded. This allowed evaluation of the predefined success criterion: "At least 70% of interviewees use or have sought digital alternatives to manage their emotional well-being when facing barriers to traditional psychological support."

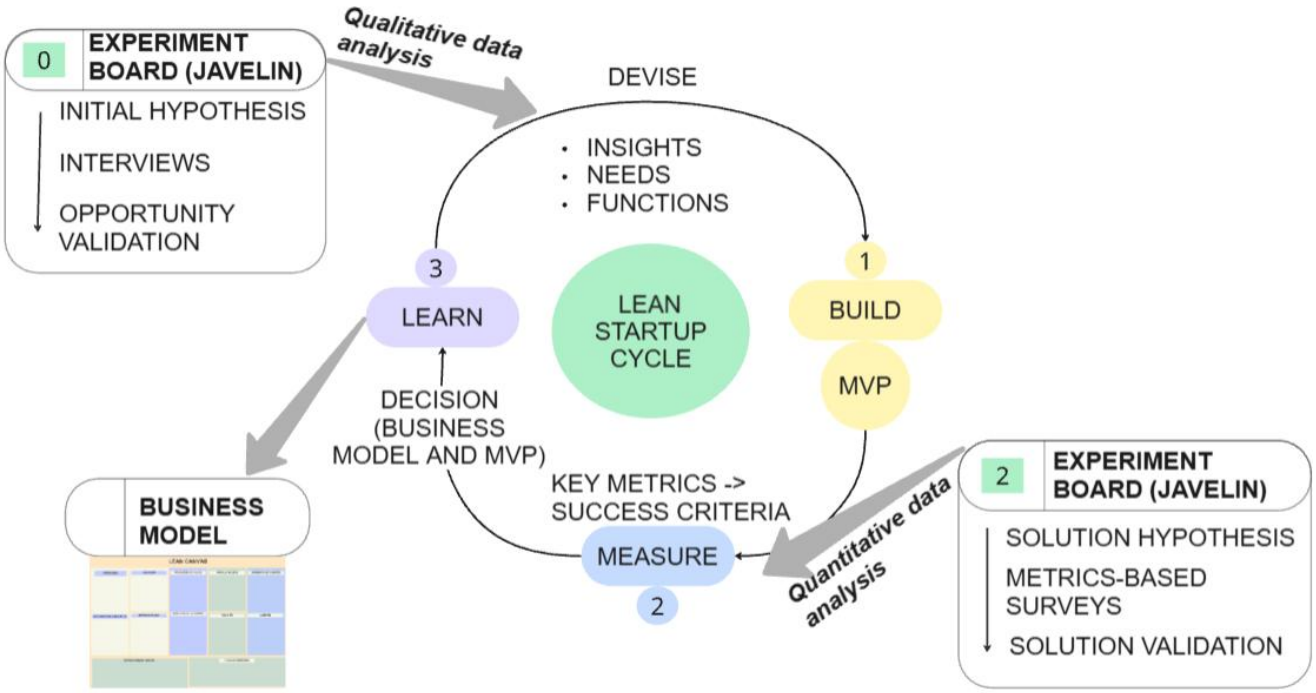

Fig 1. Proposed validation framework integrating Experiment Board, Lean Startup, and Lean Canvas.

Finally, axial thematic categorization and the relational matrix enabled the synthesis of key insights, prioritized needs, and functional implications, establishing the critical MVP attributes. This qualitative–quantitative methodological integration supports the validity of the identified opportunity and guides the initial solution design [18].

B. Solution Validation through the Experiment Board (Javelin)

Once the opportunity was validated in the first phase, the insights obtained supported the construction of the initial MVP and defined its essential components. In this second phase, the Experiment Board was applied again to validate the proposed solution, following the Javelin methodological structure organized into three blocks: (1) definition of the solution hypothesis and highest-risk assumption, (2) experiment design with measurable success criteria, and (3) results analysis to guide decisions to pivot, persevere, or iterate [19]. This phase aligns with the "Measure" stage of the Lean Startup cycle, where actionable metrics quantify user-perceived value before scaling the product [3].

The MVP integrated four validated functional components: standardized psychological well-being tests (WHO-5, GAD-7), personalized content pathways based on emotional profiles, an empathetic AI agent based on active listening principles, and a repository of vetted professional resources. Based on these elements, the highest-risk hypothesis was formulated: "Users will trust an application with varied and personalized content to support their psychological well-being and will want to use it as part of their daily routine." This assumption was considered critical because its invalidation would directly affect business model viability.

To evaluate this hypothesis, dual success criteria were established: (C1) at least 50% of users classified as promoters through Net Promoter Score (NPS ≥ 9), a widely validated metric for measuring loyalty and recommendation intention in digital products [12]; and (C2) at least 50% of users rating ≥ 4/5 in critical adoption drivers: ease of use, content personalization, and perceived value [20]. These criteria were defined before experimentation to ensure objective interpretation and reduce confirmation bias.

The experiment was conducted with 30 users, a sample size defined under the Central Limit Theorem criterion, which supports acceptable inferential robustness in exploratory studies with samples of 30 or more [21]. Participants interacted with the functional MVP and completed a structured post-use NPS survey. Quantitative data were analyzed in Python using regularized logistic regression (Ridge), an appropriate method for small samples with predictor collinearity [22]. This analysis identified the drivers with the greatest impact on intention to use and NPS, generating validated learning for strategic decision-making.

This methodological approach combines actionable metrics with quantitative analysis, ensuring that collected information directly informs MVP development and refinement of the Lean Canvas business model. The results

determine whether to persevere with the current solution, pivot toward alternative functionalities, or iterate specific elements before committing resources to full development.

C. Business Model Consolidation

The validated learnings obtained from both phases of the Experiment Board can be systematically integrated into the Lean Canvas, a tool that structures the business model into nine blocks: problem, customer segments, unique value proposition, solution, channels, revenue streams, cost structure, key metrics, and competitive advantage [12]. This consolidation transforms the empirical evidence collected into documented strategic decisions, ensuring coherence between validated hypotheses and the operational planning of the digital product.

The articulation between the Experiment Board, Lean Startup, and Lean Canvas constitutes a methodological framework that reduces uncertainty during the early stages of entrepreneurship. The disciplined use of these agile tools in sensitive contexts such as mental health helps prevent premature investment decisions and ineffective validation processes. This approach makes it possible to identify necessary pivots before committing significant resources, balancing experimentation speed with social responsibility in solutions that impact psychological well-being.

IV. Validation Results And Analysis

To ensure that the experiment captured real intention to use and not only responses conditioned by social desirability bias, three validation mechanisms were implemented: (1) users interacted with a complete functional MVP for a defined minimum period, not with static prototypes or conceptual descriptions, ensuring that evaluations reflected tangible product experience; (2) the post-use NPS survey included open-ended qualitative questions that made it possible to triangulate numerical ratings with users' explicit justifications regarding their willingness or resistance to recommend the application; and (3) success criteria were established before data collection and communicated neutrally during the process, avoiding influencing responses through team expectations or biased question framing. This methodological design prioritized obtaining honest signals about perceived value, minimizing common distortions in early validations where users tend to overestimate their adoption intent out of courtesy or because evaluations are based on abstract concepts rather than real products.

A. Opportunity Validation

In this first phase, the work focused on the hypothesis stated in the Experiment Board, which indicated that users face barriers to accessing timely psychological support and, in response, use or seek digital alternatives to self-manage their emotional well-being. Based on this, seven semi-structured interviews were conducted with young people and adults between 18- and 39-years old living in Lima, who represent the segment defined on the board as the target customer (users interested in caring for their mental well-being through digital solutions).

The analysis was carried out through deductive qualitative coding, following the methodological guidelines of the Delve guide (2024). The transcripts were cleaned, segmented, and reviewed iteratively, and an ID was also assigned to each participant. In the first round, initial coding was applied based on predefined categories related to the Experiment Board hypothesis. According to the interview structure divided into 4 segments: (1) perceived relevance of mental well-being, (2) existence of access barriers, (3) willingness to use digital solutions, (4) assessment of perceived usefulness. Subsequently, a codebook was developed and a second round of axial recoding was performed, where codes were categorized and selectively refined to ensure conceptual consistency. From this coding, four central themes emerged:

1) Valuing mental well-being: Participants recognize the importance of caring for their emotional stability. Example: "*Caring for my emotional well-being influences how I react and how I carry out my activities.*" Code: Importancia_del_Bienestar (E1).

2) Access barriers: Limitations of time, cost, and distance are reported, which makes it difficult to continue formal psychological processes. Example: "*Between the travel and the session, almost three hours were gone; I couldn't keep going.*" Code: Barreras_Tiempo (E4).

3) Current coping strategies: Personal activities such as physical activity and rest are combined with the use of digital content to relieve discomfort when immediate support is not available.

Example: "*Going to the gym helps me a lot; it's like my safe place.*" Code: Afrontamiento_Actividad_Fisica (E1)

Example: "*When I didn't have a session, I watched YouTube videos to calm anxiety, about breathing exercises.*" Code: Afrontamiento_Guia_Medio_Digital (E6).

4) Intention to use digital solutions: There is positive intention toward a digital app if it offers confidentiality, useful content, and personalization to emotional needs. Example: "*I would use it in moments of stress to complement my daily life.*" Code: Intención_de_Uso_Positiva (E4).

The success criterion defined in the Experiment Board ("At least 70% use or have sought digital alternatives in response to access barriers") was met, with 5 of 7 interviewed participants (≈71%) reporting having used some form of digital support (videos, podcasts, guided exercises, or AI) when they could not access in-person psychological help.

TABLA I
VALIDATION OF THE USE OF DIGITAL ALTERNATIVES IN RESPONSE TO ACCESS BARRIERS

Interviewee ID	Identified barriers	Alternative used	Success criterion
E1	Limited access	Videos/exercises	Yes
E2	Cost/connection	Motivational content	Yes
E3	Lack of time	Videos	Yes
E4	Falta de tiempo	Conversational support only	No
E5	Immediate support	Mindfulness/YouTube	Yes
E6	Privacy/modality	Videos/podcasts/AI agent	Yes
E7	Self-efficacy and modality	Physical activity/community	No

The success criterion (≥ 70%) was achieved: 5 out of 7 participants (≈71%) reported using digital alternatives, such as videos, podcasts, guided exercises, or AI, when facing barriers to traditional psychological care. In contrast, participants E4 and E7 did not meet the criterion, as their coping strategies were not aligned with the evaluated opportunity, thereby validating the opportunity hypothesis.

To guide MVP design, insights from the question "What characteristics would make you trust a psychological support application?" were analyzed. According to the "Results and Decisions" section of the Experiment Board, the findings prioritized three key aspects: (i) privacy and professional backing as differentiators, (ii) an initial emotional assessment test to activate personalized pathways, and (iii) a simple and empathetic user experience. These decisions were incorporated into the board's "Solution" block and tested in the subsequent validation phase.

B. *Solution Validation*

In the "Go out and validate the product" stage of the Experiment Board, quantitative solution validation was conducted using NPS and six satisfaction drivers measured on a 1–5 Likert scale: perceived usefulness, ease of use, privacy/trust, personalization, perceived value, and support. The objective was to assess recommendation intention and adoption predictors of the EQUILIBRIA MVP among 30 users (n = 30).

The results showed 53.3% promoters (n = 16), 13.3% passives (n = 4), and 33.3% detractors (n = 10), achieving an NPS of +20 and a mean score of 7.43 (SD = 2.33). This exceeded the board's success criterion (≥ 50% promoters), demonstrating initial acceptance and trust in the digital proposal.

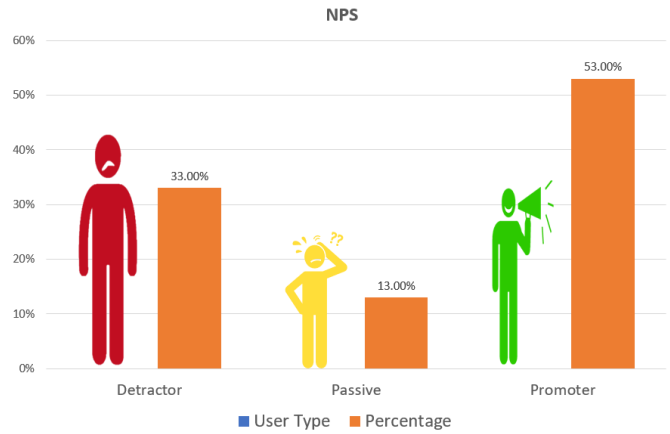

Fig. 2 Distribution of users by NPS categories. This score reflects a favorable initial acceptance of the MVP and a positive willingness to recommend it. Source: Own elaboration based on the NPS analysis (2025).

The predominance of promoters (53.3%) indicates favorable initial acceptance and validates one of the Experiment Board success criteria ((C1) at least 50% of users classified as promoters through NPS ≥ 9).

To identify the factors predicting MVP recommendation, a binary dependent variable was constructed from individual NPS responses, coding promoters (NPS ≥ 9; n = 16) as 1 and non-promoters (n = 14) as 0. A binary logistic regression was then fitted using the six satisfaction drivers as predictors: perceived usefulness, ease of use, privacy/trust, personalization, perceived value, and support.

TABLA II
DESCRIPTIVE STATISTICS OF SATISFACTION DRIVERS (N = 30)

Driver	Mean	SD	Median
Usefulness	3.27	0.87	3.0
Ease of use	3.03	1.00	3.0
Privacy/Trust	3.43	1.22	4.0
Personalization	3.57	1.01	4.0
Perceived value	3.20	0.85	3.0
Support	2.97	0.76	3.0

Source: Own elaboration based on the NPS survey analysis in Python (2025).

The full binary logistic regression model achieved acceptable predictive performance (accuracy = 0.83, precision = 0.87, recall = 0.81). However, no individual predictor reached statistical significance ($p < 0.05$), likely due to multicollinearity among correlated satisfaction drivers [22]. To mitigate this limitation, a reduced Ridge (L2) logistic regression model was estimated using the three least correlated and most actionable business drivers: ease of use, personalization, and perceived value. The reduced model improved performance (accuracy = 0.87; recall = 1.00), identifying perceived value ($\beta = 1.05$), personalization ($\beta = 0.96$), and ease of use ($\beta = 0.83$) as the strongest predictors of recommendation.

To mitigate multicollinearity and improve model stability in a small sample context, a reduced Ridge (L2) logistic

regression model was estimated [22], [23]. Unlike standard logistic regression, Ridge regularization stabilizes coefficient estimates without excluding predictors, making it appropriate for correlated variables and exploratory studies with limited observations.

For the reduced model, the three least correlated and most actionable business drivers were selected: ease of use, personalization, and perceived value. Standardized coefficients were used to enable direct comparison across predictors. The Ridge model improved predictive performance, increasing accuracy to 0.87 and recall to 1.00, outperforming the full model in both metrics. The strongest predictors were perceived value (β = 1.05), personalization (β = 0.96), and ease of use (β = 0.83), all with positive effects.

These findings suggest that recommendation is driven less by the quantity of available resources and more by how meaningful, personalized, and usable the MVP experience is for the user, consistent with technology adoption determinants reported in comparable digital health applications.

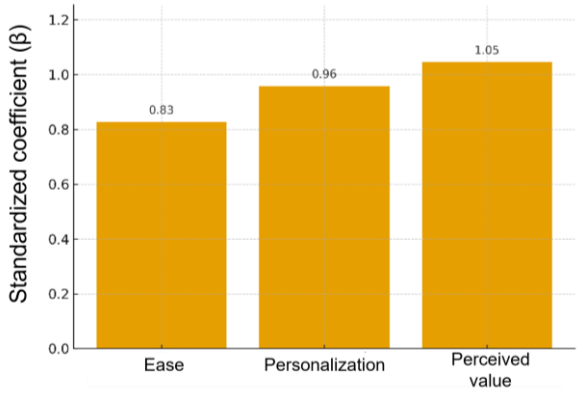

Fig. 3 Standardized weights of the drivers in the Ridge model. Source: Own elaboration in Python (2025).

The results partially validated the second Experiment Board success criterion (C2), which required at least 50% of users to rate ≥ 4/5 in at least two of the three critical adoption drivers in digital health. Personalization (70%) and perceived value (50%) exceeded the defined threshold, while ease of use reached only 36.7%. This does not invalidate MVP validation, but highlights user experience as a priority area for improvement before scaling the solution.

Equilibria's NPS (+20; mean = 7.43) falls within the range reported for early-stage emotional well-being MVPs such as Mello (NPS between +10 and +30) [24], indicating favorable initial acceptance. The comparison also shows convergence in key adoption drivers, reinforcing user experience, perceived value, and personalization as central determinants of recommendation in digital health solutions.

Based on the "Results and Decisions" block of the Experiment Board, the findings indicate clear iteration priorities before scaling: improving usability, expanding personalized content, strengthening privacy communication, and refining professional support functionalities.

Finally, the "Learnings" block confirms that trust, usability, and perceived value are the main drivers of recommendation and retention. Integrating the Experiment Board with NPS reduced uncertainty before launch and strengthened the empirical foundation of the business model. Consequently, the defined success criteria support validation of the initial Javelin hypothesis: "Users will trust an application with varied and personalized content to support their psychological well-being and will want to use it as part of their daily routine".

C. *Synthesis and consolidation in the Lean Canvas*

The findings from both phases—opportunity validation and solution validation—as well as iteration through the Lean Startup phases can be integrated in a structured way into a Lean Canvas, which synthesizes the empirical understanding obtained through the Experiment Board (Javelin). This process makes it possible to transform the collected evidence into strategic decisions regarding design, segmentation, value proposition, and business metrics.

In the Problems section, the main barriers identified in the interviews were incorporated: limited accessibility to psychological services, lack of trust in existing applications, and low content personalization. These perceptions guided the Solution, defined as a mobile application that combines validated emotional assessment (WHO-5, GAD-7), personalization through artificial intelligence, and progressive support with an empathetic chatbot.

V. Conclusions

The Value Proposition was consolidated as "EQUILIBRIA: your empathetic, secure, and progressive digital companion based on ethical AI," while the Customer Segment block was refined based on the patterns obtained in the qualitative phase, focusing on young people and adults aged 18 to 39 living in Lima, interested in psychological self-care without being in active clinical treatment.

The qualitative findings from opportunity validation, together with the quantitative NPS results obtained after interaction with the MVP, made it possible to refine and consolidate the key business model metrics in the Lean Canvas: daily interaction rate, level of perceived personalization, percentage of users who complete the initial assessments (WHO-5, GAD-7), frequency of use of well-being exercises, and overall satisfaction measured by NPS. In parallel, the analysis of value drivers identified and specified the model's sustainable competitive advantages: clinically validated content backing, a database built on scientific evidence, and an artificial intelligence system oriented toward preventive personalization rather than reactive intervention. This integration of qualitative and quantitative learnings into

the Lean Canvas ensures that each component of the model is grounded in empirical evidence validated with real users.

Finally, the channels and revenue stream were defined based on participant feedback, highlighting the value of segmented digital campaigns, institutional partnerships, and a freemium scheme with premium membership and additional services. This revised Lean Canvas represents the consolidation of the entire validation process, showing how the learnings obtained reduce business model uncertainty and strengthen EQUILIBRIA's proposal as an innovative digital solution for psychological well-being in the Peruvian context.

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