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VALEX (VALIDATION EXPENDITURE): TOWARDS A FINANCIAL UNDERSTANDING OF INNOVATION ADOPTION PROCESSES IN STARTUPS

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ABSTRACT

The article analyzes financial management in technology-based startups during the validation phase of their business model, focusing on the classification of expenses that do not fit into the traditional accounting categories of investment (CAPEX) or operation (OPEX). A case study was conducted, and a qualitative methodology was employed that incorporated inductive and axial coding. This methodology enabled the identification of spending patterns associated with experimentation, validated learning, and decision-making in environments characterized by high uncertainty. The findings reveal the existence of an "accounting gray area," in which strategic activities such as prototype development, product testing, participation in competitions, or technical iterations are invisible in conventional financial records, despite their relevance to the evolution of the business model. The primary contribution of this study is the proposal of the VALEX (Validation Expenditure) category, conceptualized as an emerging accounting instrument. The VALEX category facilitates the classification, justification, and traceability of these expenses within internal accounting systems. The study is grounded in theoretical references such as Lean Startup, Customer Development, and innovation accounting, and it offers empirical evidence that supports the need to adapt accounting frameworks to the challenges of innovative entrepreneurship. The study offers several practical implications for entrepreneurs, investors, and incubators. It also puts forward several research suggestions for the future. These suggestions aim to validate, quantify, and operationalize the use of VALEX in different contexts and sectors.

KEYWORDS: Technology-based startups; Validation of business models; Financial management; Accounting categories; VALEX (Validation Expenditure)

1. INTRODUCTION

In Latin America, approximately 75% of startups face dissolution before reaching two years of operation, and in Mexico, only one in five manages to survive beyond the third year (Startup Genome, 2023; INEGI, 2022). This high mortality rate, which is prevalent even in consolidated ecosystems, demonstrates the structural challenges faced by these organizations during their nascent stages. These challenges include conditions of uncertainty, scarcity of financing, and constant pressure to validate their value propositions in very short periods of time (Cassar, 2004; Gompers & Lerner, 2004). Despite these challenges, startups remain recognized as significant contributors to innovation, job creation, and productive transformation in strategic sectors (Bandera et al., 2017; Oliva et al., 2022).

A critical juncture in the life cycle of such organizations is the validation stage of the business model. This phase involves experimenting with real customers, developing minimum viable products (MVPs), conducting pilot tests, and testing key hypotheses using evidence obtained from the environment (Ries, 2011; Blank & Dorf, 2012). The process of validation necessitates the allocation of resources, including both human capital and financial resources, with a focus on the acquisition of knowledge rather than on the operation or expansion of an enterprise. However, traditional accounting methods have not been sufficiently adaptable to support this exploratory logic. In practice, many of the expenses associated with the validation process are not recorded or differentiated in the startups' accounting systems, which makes their strategic relevance invisible (Kelley, 2018; Allen, 2022).

The conventional accounting system organizes business expenses into two primary categories: Capital expenditures (CAPEX) refer to investments in long-term tangible or intangible assets, while operational expenditures (OPEX) encompass recurring costs associated with day-to-day operations (Damodaran, 2012; Brigham & Ehrhardt, 2013). While this logic has proven beneficial in the context of well-established companies, it falls short in accurately reflecting the experimental nature of startups. In the latter, numerous disbursements are neither capitalizable investments nor recurring operations (Frederiksen & Brem, 2017). Consequently, an "accounting gray area" emerges, impeding both the planning and accounting for key expenses associated with developing the business model.

A number of authors have previously cautioned about the necessity of aligning financial instruments with the strategic logic of entrepreneurship. For instance, Idris (2024) contends that conventional frameworks frequently underestimate the value of learning acquired during the initial validation stage. Similarly, Kelley (2018) documents how entrepreneurs often categorize strategic expenditures under generic headings such as "marketing" or "development," neglecting to recognize their experimental nature. This absence of comprehensive financial records hinders startups' capacity to convey authentic progress to investors or support institutions (Allen, 2022; Frederiksen & Brem, 2017), which can impede their access to capital and jeopardize their sustainability.

According to the principles of Lean Startup (Ries, 2011), Customer Development (Blank & Dorf, 2012), and Innovation Accounting (Frederiksen & Brem, 2017), it has been proposed that the progress of a startup should not be measured exclusively in terms of revenue. Rather, validated learning should serve as the primary metric for evaluating the success of a startup. However, these methodological perspectives lack an accounting proposal that would allow for the recording and analysis of the resources invested in generating this learning. As Riepe and Uhl (2020) have noted, this absence has resulted in a disconnection between the discourse of innovation and the financial instruments available to manage it with rigor.

In addressing this challenge, the article puts forth the nascent accounting category of VALEX (Validation Expenditures). This category is intended to encompass expenses incurred in the validation of hypotheses related to an early-stage business model, which do not align with the categories of capital expenditure (CAPEX) or operating expenditures (OPEX). The objective of VALEX is to facilitate the visibility of resources for strategic learning, thereby enabling their registration, analysis, and traceability within internal accounting systems. Furthermore, it paves the way for the development of indicators such as the cost per validated hypothesis, iteration efficiency, or the percentage of capital allocated to validation (Moro-Visconti, 2024).

This proposal is supported by a case study of a Mexican biotechnology-based startup that emerged in a university environment and is dedicated to developing sustainable biodiesel for the textile industry. The technology employed is founded on the use of microalgae, thereby presenting an ecological alternative to conventional industrial dyeing methods. This technology is currently undergoing rigorous technical and commercial validation processes (González et al., 2024;

Santisteban et al., 2021). Despite the presence of pilot sales, institutional support, and technical validations, the company has yet to achieve stable revenues or fully define its business model. This strategic juncture necessitates a thorough examination of its spending logic and financial rationality (Kemell et al., 2023; Page & Holmström, 2023).

The case offers insight into three primary aspects. Firstly, their financial decisions have been oriented towards experimenting with limited resources under uncertainty, as is often the case in scientific endeavors. Secondly, the organization has faced difficulties in classifying its validation expenses under conventional accounting categories, developing ad hoc internal solutions. Thirdly, it has shown openness to share data and reflections on its process, which has allowed for the in-depth documentation of spending patterns associated with validated learning.

The methodology employed is qualitative and exploratory, structured as a single case study. In accordance with the tenets of inductive design and axial coding criteria, semi-structured interviews, thematic analysis, and interpretative triangulation were applied to construct emergent categories that were not contained in conventional accounting language (Charmaz, 2006; Corbin & Strauss, 2008).

The objective of this article is twofold: first, to understand how technology-based startups manage their resources during the validation phase; and second, to conceptually and empirically justify the relevance of VALEX as an emerging accounting category. In doing so, it seeks to build a bridge between the strategic logic of innovative entrepreneurship and the financial frameworks that must accompany that logic in practice, especially in the relationship with stakeholders such as investors, incubators, or public funds.

In summary, this work contributes to the contemporary discourse on accounting and innovation by elucidating a hitherto unstructured logic of expenditure. VALEX does not intend to replace CAPEX or OPEX; rather, it is designed to complement these existing practices, offering a third way that allows for a more accurate representation of the uses of capital in exploration environments. It is imperative to acknowledge that the process of validation incurs financial expenditures, which must be meticulously documented and systematically examined. This is a pivotal component in fostering financial management that is aligned with the tenets of agile, scientific, and learning-focused entrepreneurship.

2. THEORETICAL FRAMEWORK

Early-stage startups are organizations in the nascent stages of development, even if they have not yet fully validated their business model or achieved revenue generation. These organizations are frequently distinguished by their temporality, customer discovery orientation, and pronounced reliance on rapid iterations to refine their value proposition (Blank & Dorf, 2012; Ries, 2011). These companies have not yet developed stable operating processes or formal accounting structures, and frequently use limited financial resources to design, build, and test preliminary versions of their solutions in real-world contexts.

In terms of technological maturity, many of these startups operate at TRL levels 3 to 6, meaning they have passed laboratory conceptual validation but still require functional and pilot testing in relevant environments (Yun et al., 2016; Kemell et al., 2023). These stages entail substantial investments in prototyping, market validation, and MVP development, though they may not necessarily yield immediate economic returns. Consequently, their financial decisions are more aligned with learning objectives than with profitability criteria, and their cash flow is significantly influenced by the cost of experimenting and validating their business model (Frederiksen & Brem, 2017; Oliva et al., 2022).

A significant challenge confronting these entities pertains to the inability to meticulously document the expenses incurred in this validation process. A considerable proportion of these disbursements do not align with investment in fixed assets or sustained operating costs. Consequently, they fall outside the conventional financial management structures.

2.1 Limitations of the traditional accounting framework in innovation environments

In conventional business accounting, expenses are commonly classified into two broad categories: CAPEX (Capital Expenditure) and OPEX (Operational Expenditure). Capital expenditures (CAPEX) refer to investments in long-term physical or intangible assets that augment an organization's operating capacity and are formally recognized as assets on the balance sheet. Conversely, OPEX encompasses the recurring expenses necessary to maintain the company's daily operations and are directly reflected in the income statement (Brigham and Ehrhardt, 2013; Damodaran, 2012).

While these categories are functional for consolidated companies, they present important limitations in the context of early-stage startups. These organizations must make strategic decisions regarding validation, the costs of which do not align

neatly with traditional accounting structures. For instance, the development of a functional prototype, a market test, a series of paid interviews with key users, or participation in innovation competitions do not generate assets or operating income; however, they are critical for validated learning (Frederiksen & Brem, 2017; Allen, 2022; Idris, 2024).

Furthermore, authors such as Kelley (2018) and Riepe and Uhl (2020) emphasize that many entrepreneurs tend to categorize these expenses in a ambiguous way within generic accounts, such as "marketing" or "development," which impedes their strategic analysis and hinders transparency with external parties. The dearth of accounting transparency has ramifications for the accountability of incubators, investors, and public funds. These entities are unable to differentiate between the use of resources for scaling operations, acquiring assets, and validating hypotheses.

2.2 Contemporary approaches to startup financial management

A variety of models and theoretical proposals have been put forth to offer frameworks adapted to the reality of innovative startups. The necessity of agile tools to manage cash flow under conditions of uncertainty is emphasized by some scholars; others propose alternative financial indicators or learning-based metrics. In this context, concepts such as financial runway, strategic burn rate, innovation accounting, and iterative financial design practices have emerged (Ries, 2011; Frederiksen & Brem, 2017; Idris, 2024).

These proposals are unified by one salient point: traditional accounting models are inadequate in capturing the logic of experimentation and discovery that characterizes startups. Therefore, it is imperative to establish an intermediate accounting structure that renders validation costs evident, thereby enabling their classification, analysis, and monitoring.

Table 1. Models and theoretical approaches for financial management in technology-based startups. Source: Authors.

Author	Model	Description	Advantages	Disadvantages	Remarks
Kelley (2018)	Guide to Creating Financial Statements	Educational proposal to teach entrepreneurs how to build basic financial statements, cash flow projections, and distinguish between CAPEX and OPEX.	Accessible and clear for non-financial users. Promotes basic understanding for decision-making.	It does not propose a specialized categorization for validation costs.	He does propose adapting accounting to the entrepreneurial environment, noting that traditional methods do not always capture the financial logic of a startup in validation.
Idris (2024)	Qualitative Review of Strategic Financial Practices	It analyzes real practices in the financial management of startups, such as runway planning, burn rate control, and decision-making in uncertainty.	Based on field evidence. It addresses relevant issues such as liquidity, expense control, and financing.	It lacks a replicable quantitative model.	He proposes that startups need tailor-made financial practices to survive in volatile environments.
Yun et al. (2016)	Phase-Based Performance Metrics	Defines financial and efficiency indicators by project stage (planning, design, procurement, construction, and commissioning).	Allows benchmarking by phase. Clarify financial goals at each stage of development.	Focused on large-scale capital projects, not necessarily startups.	It does not explicitly justify a model for startups, but its sequential application reveals the need to adapt metrics to agile and experimental cycles
Frederiksen and Brem (2017)	Accounting Innovation for Startups (Innovation Accounting)	Based on Eric Ries' approach, it proposes to measure validated learning, efficient use of capital, and the impact of iteration on the business model.	It proposes new traditional non-accounting metrics. Relevant to validation and continuous innovation environments	It does not integrate a formal accounting structure.	He proposes that innovative accounting is necessary to measure progress and learning, different from traditional methods.

2.3 Definition of analytical categories: CAPEX, OPEX and VALEX

The study proposes a conceptual framework to facilitate the classification of startup expenditures during their validation stage. The proposed framework is supported by three analytical categories. These categories function as pivotal dimensions for the analysis of the logic of resource allocation in contexts characterized by high uncertainty.

Capital expenditure (CAPEX) is defined as expenses incurred in the acquisition of long-term tangible or intangible assets, with the objective of augmenting an organization's operational capacity (Brigham & Ehrhardt, 2013; Damodaran, 2012). In the case under analysis, this encompasses the acquisition of self-financed machinery, trademark registration, and infrastructure development. Despite being executed in the early stages, these initiatives align with strategic investment decisions grounded in

technical evidence and future projections.

OPEX (Operational Expenditure) is a term used to describe the recurring expenses associated with the day-to-day operation of a project. These expenses may include the acquisition of raw materials, payments to collaborators for operational tasks, delivery logistics, or the use of digital tools for business management in its early stages. These operating expenses are planned to sustain the minimum operation, even in the absence of a consolidated business model, and are recognized as costs that directly impact the results of the period (Brigham & Ehrhardt, 2013; Yun et al., 2016).

VALEX (Validation Expenditure) is proposed as an emerging and differentiated category, designed to classify expenses intended to validate the business model in conditions of high uncertainty. These expenses, which often do not generate immediate income and cannot be capitalized as assets, fulfill a critical strategic function by allowing evidence of the environment to be obtained, key hypotheses to be validated, and strategic decisions to be adjusted (Frederiksen & Brem, 2017; Ries, 2011; Allen, 2022). The following activities are imperative for the evolution and sustainability of an entrepreneurial project, despite the fact that they do not constitute stable operations: the production of prototypes, the development of minimum viable products (MVPs), participation in competitions, failed tests, presentations to experts, and first contacts with the market (Blank & Dorf, 2012; Idris, 2024).

3. METHODOLOGY

This research employs an exploratory qualitative approach, with a focus on the analysis of a unique case of an early-stage technology-based startup. This strategy is appropriate when seeking to understand phenomena that have received minimal study within their natural context and with blurred boundaries between phenomenon and environment (Yin, 2018). The objective of this study is to examine the way startups manage their cash flow during the validation phase of the business model. Specifically, it will focus on the challenges they encounter in classifying their financial expenses in the absence of an accounting category that reflects validated learning (Charmaz, 2006; Frederiksen & Brem, 2017).

The study employs an instrumental case study approach, as delineated by Yin (2018). This methodological framework entails the examination of a particular case not for its intrinsic merit, but rather for the purpose of elucidating a broader phenomenon. The overarching objective is to underscore the necessity of recognizing an emerging accounting category, designated as VALEX (Validation Expenditures). The conceptualization of VALEX aims to encapsulate strategic validation expenditures that do not conform to conventional CAPEX and OPEX frameworks (Kelley, 2018; Allen, 2022; Idris, 2024).

The selected unit of analysis is an anonymous technology-based startup that emerged within the Mexican university ecosystem. This organization has developed a sustainable biodye from microalgae, with applications in the textile industry, and is in an advanced phase of technical and commercial validation. The case was selected on the basis of its thematic relevance, its accessibility in terms of detailed information, and the entrepreneurial team's demonstrated commitment to active engagement in the research process. The company has obtained public evidence of its trajectory, institutional support, and participation in incubation programs. This allows it to document its financial decisions in real contexts of high uncertainty in a comprehensive manner.

3.1 Data collection

The information was obtained through three semi-structured interviews conducted between May and June 2025. The participants were three founding members of the startup, each with a clearly defined role:

- The technical director, responsible for the biotechnological development of the product.
- The commercial co-founder, in charge of alliances, pilot sales and distribution channels.
- The operational and financial manager, in charge of budget control, relations with incubators and internal reports.

The interviews lasted an average of 60 minutes and were conducted individually, with a focus on financial decisions related to validation, categorization of expenses, and perception of the usefulness of a new accounting category. The interview guide was organized into five thematic blocks:

1. **General purpose**: To understand how expenses are managed and classified during business model validation, and to explore the usefulness of an alternative accounting category to CAPEX and OPEX.
2. **Background and roadmap**: Compilation of data on the evolution of the venture, main milestones (MVP, pilot sales, pivots), revenue and investment structure, as well as future projections.
3. **Identification of types of expenditure**: Examples and practices related to:

- **CAPEX:** investment in tangible or intangible assets.
- **OPEX: recurring** operating costs.
- **VALEX:** expenses associated with tests, validations, prototypes, iterations, competitions or activities with no immediate return.

4. **Classification and registration**: We inquired about how these expenses are currently recorded, their traceability in financial documents, and whether there are internal policies to differentiate them.
5. **Reflective questions**: Experiences with investors, difficulties in justifying unclassified expenses, and the perception of the value of validated learning were addressed.

3.2 Data analysis

The analysis was carried out in two stages, following a thematic coding strategy (Charmaz, 2006; Corbin & Strauss, 2008):

- In the **first phase**, an open inductive **coding was applied**, aimed at identifying emerging categories directly from the testimonies, without imposing previous structures. This exploratory reading allowed us to capture significant expressions, discursive patterns, and practical rationalities that escaped traditional accounting categories.
- In the **second phase**, axial coding **was carried out**, in which the emerging categories were linked to the analytical categories defined in the theoretical framework: CAPEX, OPEX and VALEX. Likewise, key dimensions such as validated learning, financial traceability, decisions under uncertainty and iterative logic of experimentation were associated.

The final interpretation of the findings was made in the light of the revised conceptual frameworks, in particular those proposed by Blank (2013), Ries (2011), Frederiksen and Brem (2017), Damodaran (2012), Idris (2024) and Allen (2022), with the aim of contrasting the empirical evidence with the theoretical principles on accounting innovation and strategic cash management in technology startups.

4. RESULTS AND ANALYSIS

The results of this research are expected to provide empirical evidence that:

- Demonstrate that the CAPEX and OPEX categories are insufficient to record strategic validation expenditures in early-stage startups.
- Identify informal financial patterns and key decisions around using cash to experiment, iterate, and learn.
- Propose preliminary criteria for delimiting, recording and visualizing VALEX expenditure in internal accounting tools.
- Formulate practical recommendations for entrepreneurs, investors, and incubators, aimed at improving the planning and traceability of these expenses.
- Contribute to the theoretical discussion on emerging accounting and financial innovation in environments of high uncertainty.

4.1 Analysis of results

During the inductive analysis stage, seven emerging categories were identified that reflect how founders experience spend management during the validation process. The following categories are included:

Table 2 presents a synthesis of the results obtained during the inductive coding phase of the qualitative analysis. The categories under discussion were not imposed from the theoretical framework; rather, they emerged directly from the discourse of the participants. This process revealed patterns, tensions, and rationalities that escape conventional accounting schemes.

Table 2. Emerging categories on financial management in technology startup validation processes. Source: Authors.

Pop-up category	Description	Representative quote
Validation as the primary reason for spending	Many expenses made by the startup are aimed at testing hypotheses rather than operating or scaling.	"We sell, but we don't call it commercialization; they are sales that help us to validate the product."
Accounting ambiguity and classification gaps	The founders recognize that various expenses don't fit into CAPEX or OPEX and don't know how to record them.	"We do not classify it as marketing, or as production, or as R+D. It's something in between."
Prototypes as learning vehicles	The team produces pre-release versions of the product not to sell, but to evaluate its functionality.	"We did an MVP of the MVP to see if it worked, but we didn't register it as part of the business yet."
Unrecognized but strategic investments	Some investments such as the purchase of machines are made in advance, based on technical evidence.	"We bought the machine on our own so we wouldn't stop."
Autoxzfinancing in the face of institutional slowness	The lack of institutional support pushes the team to use its own resources to advance in validation.	"They told us that they did support us, but it took so long that we decided to put wool in it ourselves."

Iteration as informal financial logic	Financial decisions are made on the fly according to strategic urgencies, without a formal budget.	"We do not have a fixed budget; We decide based on what we need to validate at that moment."
Non-monetary value of validated learning	Although certain expenses do not generate revenue, they do produce key evidence for investors or allies.	"Even if we don't pay for it with money, it takes time, opportunity and effort. That is also investment."

In the axial coding, the expenses mentioned by the participants were classified within the three established analytical categories: CAPEX, OPEX, and VALEX. The objective of this classification was to substantiate the rationale behind each expense, evaluating its strategic nature and its relationship with the validation process.

Table 3. Axial coding of the expenses identified according to analytical categories: CAPEX, OPEX and VALEX Source: Authors.

Identified Expense	Analytical category	Justification
Purchase of production machinery	CAPEX	Investment in long-duration physical assets for internal production purposes.
Procurement of microalgae and reagents	OPEX	Recurring operating expenses to maintain small-scale production.
MVP MVP Development	VALEX	Experimental activity aimed at generating learning, not income.
Participation in contests and pitch trips	VALEX	Validation of value proposition before experts and investors.
Employees with a vesting scheme	OPEX	Fixed expense for minimum operation and talent retention.
Production and shipment of samples to customers	VALEX	Expenditure aimed at proving acceptance of the product in the market.
Free use of institutional laboratory	VALEX	A key resource to experiment with, even if it is not recorded in the accounts.
Trademark registration and image design	CAPEX	Intangible assets necessary to consolidate the commercial identity.
Specific technical consultancies	OPEX	Operating expenses to solve specific technical needs.
Non-Income Pigmentation Testing	VALEX	Activity designed to generate evidence with no immediate economic return.

This classification facilitates the visualization of the startup's financial resource allocation between investment, operation, and validation. Concurrently, it empirically corroborates the central hypothesis of the study, which posits the existence of an expense logic that remains unrecognized within the prevailing accounting categories. This logic serves as the justification for the conceptualization of VALEX as an emerging category.

This analytical framework demonstrates that financial management in early-stage tech startups is deeply influenced by the need to experiment, iterate, and learn, rather than by traditional operating logic. The economic decisions that emerge in such an environment do not invariably align with formal accounting principles. Instead, they are driven by survival and discovery strategies. VALEX provides a method for the formalization of the behavior, while ensuring that it remains unaltered in its original state.

5. DISCUSSION

The primary objective of this study was to analyze how an early-stage technology startup manages its financial expenses during the validation process of its business model, and to evaluate the relevance of incorporating the VALEX (Validation Expenditure) category as an accounting alternative to CAPEX and OPEX. The empirical evidence obtained through semi-structured interviews and qualitative analysis reveals that validation is not only a strategic axis in decision-making, but also a differentiated financial logic that is currently not visible by traditional accounting schemes.

A salient finding of the study is that, in the nascent stages of entrepreneurship, a significant proportion of resources are allocated to activities that are oriented towards validated learning. These activities encompass the development of prototypes, the execution of technical tests, interactions with potential customers, and participation in competitions. These actions, while essential in reducing uncertainty and adjusting the value proposition, do not fully align with investment (CAPEX) or operating (OPEX) criteria, resulting in gaps in financial traceability (Frederiksen & Brem, 2017; Kelley, 2018).

This phenomenon aligns with the principles outlined by Ries (2011) in the Lean Startup approach, where validated learning serves as the primary criterion for advancing or pivoting. It also corresponds with the Customer Development model proposed by Blank and Dorf (2012), which underscores the necessity of allocating resources to the identification of customers and their requirements. However, as Allen (2022) has noted, this validation logic rarely translates into coherent accounting structures, which limits entrepreneurs' ability to plan, justify, or report their spending decisions.

Empirical evidence also suggests the existence of an "accounting gray area," a concept previously identified by Idris (2024) and Yun et al. (2016),

wherein multiple strategic expenses are not evident in financial records. In response, the study proposes the VALEX category as an operational alternative, which not only recognizes these expenses but also allows them to be associated with specific performance indicators such as cost per validated hypothesis, efficiency of iteration cycles, or the percentage of capital invested in experimentation.

The following comparative table offers a visual representation of the proposal's practical applications. It synthesizes empirical findings, juxtaposing them with specialized literature to highlight the unique contributions of this work:

Table 4. Contrast of empirical findings, literature and contributions of the study. Source: Own elaboration

Central theme	Empirical finding of the study	Contrast with literature	Contribution of the study
Validation as a financial hub	Validation is the dominant criterion of expenditure, above operation or investment.	Ries (2011), Blank and Dorf (2012) recognize its importance, but do not address its accounting classification.	Identifies validation as distinct financial logic and proposes categorizing its costs.
CAPEX/OPEX Limitation	Many key activities (prototypes, tests, competitions) do not fit into CAPEX or OPEX.	Frederiksen and Brem (2017), Kelley (2018), Idris (2024) point to this "grey area" but do not propose an operational solution.	It evidences the practical limitation of CAPEX/OPEX and justifies an intermediate accounting category.
VALEX Emergency	Validation costs are accounting-invisible, yet strategically central.	Allen (2022) and Frederiksen and Brem (2017) promote learning accounting, but without a formal category.	It proposes VALEX as a functional, measurable category aligned with validated learning.
Financial communication and transparency	The lack of classification makes it difficult to report to investors and incubators.	Kelley (2018) and Idris (2024) mention this problem, without offering a specific accounting structure.	VALEX improves traceability and strengthens accountability in validation stages.
Financial indicators for VALEX	Useful spending patterns are identified for strategic analysis: cost per validated hypothesis, iteration efficiency.	Innovation accounting (Frederiksen & Brem, 2017) suggests these metrics, but without linking to real accounting systems.	It translates validated learning into accounting indicators applicable for early management.

The findings of this study contribute to the field of entrepreneurial finance by demonstrating that the traditional accounting categories, capital expenditures (CAPEX) for investments and operating expenditures (OPEX) for operating expenses, fail to adequately represent the logic of spending in contexts of high uncertainty and innovation. In this sense, VALEX offers a conceptual and operational solution that facilitates the recording and analysis of expenses linked to validated learning. These expenses are essential for the evolution of the business model, yet they do not generate immediate returns and cannot be capitalized (Allen, 2022; Frederiksen & Brem, 2017).

From a methodological perspective, anchored in the principles of Lean Startup (Ries, 2011) and Customer Development (Blank & Dorf, 2012), validation emerges as a pivotal catalyst for entrepreneurial advancement. However, this centrality had not been clearly translated into accounting language. VALEX addresses this lacuna by enabling the classification of expenditure based on the knowledge generated, rather than being exclusively constrained by its impact on revenues or assets.

Furthermore, the VALEX category facilitates the integration of novel management metrics, including cost per validated hypothesis and iterative efficiency, into customized financial reports. This integration enables evidence-based decision-making. The use of these metrics in VALEX is not merely a theoretical possibility; it is a concrete possibility that has been demonstrated through their application in schemes such as innovation accounting (Frederiksen & Brem, 2017).

VALEX's proposal also provides tangible value for different actors in the entrepreneurial ecosystem:

- **Entrepreneurs**: allows them to explicitly record the expenses intended to validate hypotheses about the product, market or business model, giving visibility to the learning obtained and improving financial discipline.
- **Investors**: They can more accurately assess the use of capital, differentiating between resources aimed at scaling a proven model and those aimed at discovering it. This reinforces transparency and accountability.
- **Incubators and accelerators**: they can use VALEX as a monitoring and support criterion, recognizing that validation is not only a strategic process, but also a financial one.
- **Advisors and accountants**: they have a new accounting category that allows them to record non-recurring but strategic expenses, without forcing their classification like CAPEX or OPEX.

6 CONCLUSIONS

The study corroborates the notion that conventional accounting categories are inadequate in

accurately representing capital application in innovative startups during the validation phase. The empirical analysis suggests the proposal of a novel accounting category, VALEX (Validation Expenditure), which would serve to render visible strategic expenditures aimed at validated learning, experimentation, and decision-making under uncertainty.

The incorporation of VALEX not only addresses an operational necessity but also aligns the financial discourse with the foundational principles of contemporary entrepreneurship. The implementation of this system enables the creation of reports that are more aligned with the logic of validation, thereby enhancing strategic planning and strengthening communication between entrepreneurs, investors, and ecosystem actors.

As with all qualitative research based on a single case study, the work does not seek to statistically generalize its findings; rather, its objective is to contribute to the theoretical and practical understanding of emerging phenomena. The information presented here is derived from in-depth interviews with the founding team of a single tech startup. However, it is important to note that this method of data collection is subject to the inherent risks of interpretive bias. Consequently, the research is constrained to the validation phase of the business model, excluding subsequent stages such as scaling or consolidation. In these subsequent stages, the use of VALEX might be adapted or integrated into disparate categories.

This study opens several lines for future research that can broaden and deepen the contributions made:

- Replicate the analysis in multiple case studies with startups from different sectors (technology, health, energy, AI).
- Quantify the impact of VALEX on the strategic and financial performance of ventures.
- Develop financial models that integrate VALEX as a functional accounting category in accounting software for startups.
- Explore how VALEX can be incorporated into flexible accounting frameworks applicable in developing countries, where accounting informality is high, but innovation is key.

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ANNEX 1 SEMI-STRUCTURED INTERVIEW

Purpose of the interview:

The interview aims to understand how expenses are managed and categorized in an early-stage startup, particularly during the business model validation process. Through this conversation, we seek to explore whether traditional accounting categories such as CAPEX and OPEX are sufficient to capture validation expenses, or whether a new category such as VALEX (Validation Expenditure) is necessary.

Company Background

1. Startup Name:
2. Year Founded:
3. City/country:
4. Sector or industry:
5. Number of founders and current team:
6. Current stage of the venture (idea, validation, growth, scaling):
7. Brief history of how the business idea was born:
8. What problem do they solve and how do they do it?
9. Do you currently have income? Clients?
10. Have you raised investment or received institutional support?

2. Business Project Roadmap

The entrepreneur should briefly describe the evolution of their startup, focusing on key milestones, strategic changes, and learnings.

1. What were the main phases that your venture has had so far?
2. What milestones do you consider key? (e.g. MVP development, customer validation, first sale, pivot, investment round)
3. What have been the biggest financial challenges at each stage?
4. How has resource management changed over time?
5. Do you have a roadmap or future projection for the next 12 to 24 months?

Questions to Identify CAPEX Expenses (Capital Expenditure)

Objective: detect investments in fixed or long-term assets

1. Have you made investments in infrastructure, technology, or equipment that has a useful life of more than one year?
2. At what point did you decide to make those investments? Did you already have the business model validated?
3. How do you account for this type of expense? Do they see them as assets?
4. How relevant have these investments been compared to your other expenses?

Questions to Identify OPEX (Operational Expenditure)

Objective: Understand recurring expenses to operate the business

1. What are your startup's main monthly or operating expenses?
2. How do you plan and control these operating expenses?
3. Are you clear about which ones are essential to operate day by day?
4. Do these expenses remain stable or do they vary greatly depending on the moment of the business?

Questions to Identify VALEX Expenses (Validation Expenditure)

Objective: to uncover expenses in validation activities, which are not fixed investment or daily operation

1. Before having a validated business model, what things did you spend money on?
2. Have you invested in prototyping, testing with customers, or releasing preview versions of the product?
3. How much does it cost you to do experiments or tests to validate your value proposition?
4. How do you record those expenses in your accounting? Do you go to the area of marketing, development, R+D?
5. What happens to the money you spent on validations that didn't work? How do you classify it internally?
6. Do you think it would be useful to be able to visualize these expenses as a category of their own? Would it help you make better decisions?

Comparative / Reflective Questions

These questions allow you to see if there is awareness of the difference between categories

1. Do you think validation expenses should be treated the same as operating or investment expenses?
2. Have you ever been asked by an investor or advisor to show the cost of validating your product or idea?
3. Has it ever happened to you that you invest a lot in validating, but you can't justify that expense well in your financial planning?