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ENTREPRENEURIAL MODELING IN ALGERIAN UNIVERSITIES: A COMPARATIVE EXPLORATION OF LEAN CANVAS AND BMC

MODELOWANIE PRZEDSIĘBIORCZOŚCI NA ALGIERSKICH UNIWERSYTETACH: ANALIZA PORÓWNAWCZA LEAN CANVAS I BMC

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Abstract

Subject and Purpose of the Work: This study explores how Algerian student entrepreneurs use two business modeling tools – Business Model Canvas (BMC) and Lean Canvas – within an educational context. It aims to compare their relevance and usage during different stages of project development.

Materials and Methods: A qualitative approach was adopted, based on thematic analysis of nine testimonies from students incubated at the National Higher School of Management in Kolea. Results: Students prefer the Lean Canvas during the ideation phase due to its simplicity and focus on customer problems. In contrast, the BMC is used in later stages for its comprehensive view of the business model. The study highlights that pedagogical and institutional contexts strongly influence tool appropriation.

Conclusions: The tools are seen as complementary. A progressive pedagogical integration is recommended. The study advocates for context-sensitive entrepreneurship education in Algeria, emphasizing visual tools, local relevance, and reflective learning approaches.

Keywords: Business Model Canvas, Student entrepreneurship, Lean Canvas, Project modeling

Streszczenie

Przedmiot i cel pracy: Niniejsze badanie analizuje, w jaki sposób algierscy studenci-przedsiębiorcy wykorzystują dwa narzędzia modelowania biznesowego – Business Model Canvas (BMC) i Lean Canvas – w kontekście edukacyjnym. Celem badania jest porównanie ich znaczenia i zastosowania na różnych etapach rozwoju projektu.

Materiały i metody: Przyjęto podejście jakościowe, oparte na analizie tematycznej dziewięciu wypowiedzi studentów z National Higher School of Management w Kolei.

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Wyniki: Studenci preferują Lean Canvas w fazie generowania pomysłów ze względu na jego prostotę i skupienie na problemach klienta. Natomiast BMC jest wykorzystywany na późniejszych etapach ze względu na kompleksowy obraz modelu biznesowego. Badanie podkreśla, że kontekst pedagogiczny i instytucjonalny silnie wpływa na wybór narzędzi.

Wnioski: Narzędzia są postrzegane jako komplementarne. Zaleca się stopniową integrację pedagogiczną. Badanie opowiada się za edukacją przedsiębiorczości w Algierii, uwzględniającą kontekst, ze szczególnym uwzględnieniem narzędzi wizualnych, lokalnego znaczenia i refleksyjnych metod uczenia się.

Słowa kluczowe: model biznesowy Canvas, przedsiębiorczość studencka, Lean Canvas, modelowanie projektów

The concept of a business model is essential to understanding how companies create value and gain a competitive edge in the market.The evolution of the business model concept has helped clarify how companies adapt to changing market conditions and shifting consumer preferences. For instance, emerging markets often present unique challenges and opportunities that require entrepreneurs to continuously innovate their business models (Munna, 2021).

As entrepreneurs operate in these complex environments, the ability to adapt their business models becomes critical – not only for survival but for long-term success. The dynamic nature of business models enables the integration of innovative strategies that address consumer demands and competitive pressures, thereby fostering resilience in turbulent environments. For example, leveraging technology to improve customer engagement can transform traditional models into more agile frameworks that capitalize on real-time data and feedback (Ócsai, 2021).

This adaptability is crucial to ensuring businesses remain relevant and can effectively harness market value, aligning their operational strategies with broader goals of sustainable development and business growth. By integrating these elements, business models can evolve to address contemporary challenges, maximize value creation, and support sustainable development. Thus, companies must continually reinvent their business models to navigate a constantly changing economic landscape and meet rising societal expectations.

The comparative study between the Business Model Canvas and the Lean Canvas is conceptually justified based on their different epistemological underpinnings as well as pedagogic leanings. The Business Model Canvas, drawn from the strategic-management and value-creation literature (Osterwalder & Pigneur, 2010), focuses on inherent systemic integration between organizational core components as well as long-term sustainability. By contrast, the Lean Canvas is grounded in lean-startup as well as effectuation theories (Maurya, 2012; Ries, 2015; Read et al., 2021), with a preference to prioritize hypothesis validation, customer discovery as well as experimentation in iterations during uncertain conditions.

Comparative research is therefore required to understand how such different logics – planning vs. learning-by-iteration – are internalized within educational systems by new entrants into entrepreneurship (Ghezzi & Cavallo, 2020).

Indeed, this research adds to the body of literature that has explored entrepreneurial learning processes and tool-based cognition (Kaffka & al, 2021) to recognize the way in which student entrepreneurs transition between the BMC's analytical, structured approach as opposed to the Lean Canvas's opportunity-led, adaptable mentality.

1. The evolution of the Business Model

The evolution of business models reflects ongoing changes in technologies and consumer expectations, requiring companies to adapt continuously in order to remain competitive in the market (Borisova, 2021). This evolution highlights the importance of a proactive approach that enables firms to adjust to emerging trends and shifting consumer needs. Companies must also consider the specific behaviors of consumers in emerging markets, which can differ significantly from those in developed countries

(Axelova, 2005). Understanding these differences is essential for developing effective and contextually appropriate marketing strategies.

There are various conceptions of business models that companies can adopt, ranging from traditional frameworks to more innovative approaches that incorporate elements of corporate social responsibility and shared value creation (Jouison, 2008).

1.1. The Business Model Canvas (BMC)

The Business Model Canvas (BMC), conceived by Alexander Osterwalder, represents a strategic management tool that offers a visual framework for formulating, articulating, and examining business models. Its purpose is to enhance comprehension and foster innovation within an organization by deconstructing the model into nine fundamental elements. The BMC is widely used across various sectors – including manufacturing, services, and social enterprises – due to its versatility and effectiveness in supporting business transformation and strategic planning.

Table 1: The Business Model Canvas according to Osterwalder & Wagner (2011)

<table>
<tr><td rowspan="3">Key Partnerships

Identifies the network of suppliers and partners that support the business model's operation, including alliances and joint ventures.</td><td>Key Activities

Describes the crucial tasks and operations a company must perform to create and implement its value proposition.</td><td rowspan="3">Value Propositions

Describes the unique value a company delivers to its customers by addressing their needs and solving their problems.</td><td>Customer Relationships

Outlines the types of relationships a company establishes with each customer segment, such as personal assistance, self-service, or automated services.</td><td rowspan="3">Customer Segments

Defines the different groups of people or organizations a company aims to reach and serve</td></tr>
<tr><td>Key Resources:

Enumerates the fundamental resources necessary to effectively convey the value proposition, access target markets, sustain relationships, and produce revenue.</td><td>Channels

Explains how a company distributes and markets its product to customers.</td></tr>
<tr><td colspan="2">Cost Structure

Details the costs involved in operating the business model, including fixed and variable costs associated with key activities, resources, and partnerships.</td><td colspan="2">Revenue Streams

Identifies the sources of income generated from each customer segment, detailing how the company earns money.</td></tr>
</table>

Source: Prepared by the authors.

The BMC is composed of nine key elements that collectively describe a company's value proposition, infrastructure, customer relationships, and financial structure, making it a comprehensive tool for aligning business activities and identifying potential trade-offs (Khan & M, 2024).

1.1.1. Key features of the Business Model Canvas

The Business Model Canvas (BMC), developed by Alexander Osterwalder, exhibits several characteristics that make it a valuable tool for businesses (Teece, 2010; Stewart, 2019; Walters & Helman, 2020; Kyfyak et al., 2021):

- **Visual Clarity**: The BMC offers a visual representation of a business model, allowing users to quickly see the relationships between components at a glance. This clarity enhances understanding and facilitates effective communication of the business model.
- **Facilitates Innovation**: The BMC encourages innovation by allowing companies to experiment with various configurations of its nine building blocks. This flexibility enables entrepreneurs to adapt their models to evolving market conditions and consumer preferences.
- **Focus on Value Creation**: The BMC places strong emphasis on delivering value to customers, ensuring that businesses align their offerings with customers' needs and problems – an essential factor in gaining a competitive advantage.
- **Adaptability**: The BMC is easily adjustable and can be regularly updated as the business evolves, making it a dynamic tool for strategic planning and management.
- **Collaborative Tool**: It is inherently collaborative and can be used in workshops and team settings, promoting dialogue and alignment among stakeholders regarding the business strategy.
- **Customer-Centric Approach**: By emphasizing customer segments and value propositions, the BMC helps businesses prioritize customer needs and improve customer engagement.

1.1.2. Limitations of the Business Model Canvas

While the Business Model Canvas (BMC) offers a structured approach for visualizing and developing business models, it has also been criticized for oversimplifying access to complex business environments. For instance, the canvas may not adequately capture the dynamic nature of customer relationships and market shifts, which often require more agile strategies.

Some scholars argue that the fixed architecture of the BMC can lead to overlaps and a simplistic "box-ticking" exercise that may fail to reflect the complexity of certain business models (Verrue, 2014). Relying on a static framework can result in missed opportunities for innovation and adaptability, as businesses may focus too much on fitting their activities into predefined boxes rather than exploring disruptive possibilities (Coes, 2014).

This highlights the need for complementary tools and methodologies that can address these limitations – such as Lean Startup principles or agile methodologies, which emphasize iterative development and responsiveness to market feedback (Ching & Fuvel, 2013).

Furthermore, integrating the BMC with frameworks that promote experimentation can greatly enhance its effectiveness for student users. For example, incorporating design thinking alongside the canvas can foster a culture of empathy and innovation, helping students better understand user needs and problems. This synergy not only encourages creative problem-solving but also aligns with the dynamic nature of modern markets, where adaptability is critical (Coes, 2014).

Additionally, as micro and small enterprises increasingly adopt these tools to navigate competitive environments, the canvas can serve as a foundational element for developing more robust business strategies that account for ongoing market fluctuations and internal challenges (Fritscher & Pigneur, 2015).

Finally, the BMC's emphasis on visual representation may overlook deeper strategic insights that require more detailed analysis (Diderich, 2020). Despite these limitations, the BMC remains a widely adopted framework due to its clarity and structured approach to innovation and business model assessment.

1.2. The Lean Canvas

The Lean Canvas represents a strategic management instrument meticulously crafted for nascent enterprises and entrepreneurs, facilitating the development and validation of their business models. This tool is an adaptation of the Business Model Canvas, specifically modified to address the distinctive challenges encountered by startups – most notably, ambiguity and the need for swift iteration. Developed by

Ash Maurya, the Lean Canvas is intended to identify and address key assumptions, risks, and customer needs in a concise format.

The primary goal of the Lean Canvas is to provide entrepreneurs with a structured framework for designing, testing, and refining their business models. It helps startups pinpoint the core problems, solutions, and metrics, enabling them to make data-driven decisions with minimal resources (Mahendra, 2022; Razabillah & al., 2023). It facilitates the development of a value proposition that resonates with customers, ensuring the business model aligns with market needs (Marthasari & Asfiah, 2024; Pricillia & Ramadhan, 2024). The Lean Canvas consists of nine essential components:

Table 2: The Lean Canvas according to Ash Maurya (2012)

<table>
<tr><td rowspan="2">Problem

Identifies the main problem experienced by customers that the business aims to solve</td><td>Solution

Outlines the proposed solutions to the identified problems, explaining how the product or service meets customer needs</td><td rowspan="2">Unique Value Proposition

Articulates the unique benefit or value the product or service offers to customers, clearly distinguishing it from competitors</td><td>Unfair Advantage

Highlights any competitive advantages that are difficult to replicate, giving the business a distinct edge in the market.</td><td rowspan="2">Customer Segments

Defines the specific groups of people or organizations the business intends to serve</td></tr>
<tr><td>Key Metrics

Defines the critical performance indicators that will be used to measure the business's success.</td><td>Channels

Describes the methods and paths through which the business will reach and deliver its value proposition to customers</td></tr>
<tr><td colspan="3">Cost Structure

Lists the key costs associated with operating the business, including both fixed and variable expenses.</td><td colspan="2">Revenue Streams

Identifies the ways in which the business will generate income from its customers</td></tr>
</table>

Source: Prepared by the authors.

1.2.1. **Key features of the Lean Canvas**

The Lean Canvas, developed by Ash Maurya, is a strategic management tool specifically designed for startups and entrepreneurs to develop and validate their business models.

The Lean Canvas emphasizes a customer-centric approach and encourages entrepreneurs to test their assumptions through experiments and feedback loops. This iterative process helps refine the business model, ensures it aligns with market needs, and increases the chances of success in a competitive environment.

Moreover, the idea of focusing on a single value proposition allows the user to center their reasoning on one solution to one specific problem, which is particularly useful when operating with limited resources.

1.2.2. Limitations of the Lean Canvas

Despite its popularity, the use of the Lean Canvas has also faced criticism (Shepherd, D. A., & Gruber, M., 2020; Zenger, T., & Gambardella, A., 2020):

- **Customer-Centered Approach**: The Lean Canvas emphasizes understanding customer needs and problems, encouraging entrepreneurs to focus on their target audience and its specific pain points.
- **Iterative Testing**: It promotes a process of experimentation and feedback loops, allowing entrepreneurs to test their assumptions and refine their business models based on real customer data and insights.
- **Concise Format**: The Lean Canvas presents information in a simple, succinct format, helping entrepreneurs quickly define and communicate their business ideas without excessive detail.

- **Focus on Key Assumptions**: It encourages identifying and addressing the most critical assumptions and risks associated with the business – an essential aspect for startups operating in uncertain environments.
- **Unique Value Proposition**: The Lean Canvas stresses the importance of articulating a unique value proposition, clearly differentiating the product or service from competitors and highlighting its customer benefits.
- **Key Metrics**: It includes a section for defining key performance indicators (KPIs) that will be used to measure business success, ensuring effective progress tracking.
- **Problem-Solution Fit**: The Lean Canvas helps entrepreneurs articulate the specific problems they aim to solve and the solutions they propose, ensuring alignment between customer needs and business offerings.
- **Unfair Advantage**: It highlights the concept of an "unfair advantage," referring to unique competitive edges that are difficult for competitors to replicate, giving the business a strategic upper hand.

Overall, the Lean Canvas is a dynamic tool that helps startups navigate market complexities by promoting a structured yet flexible approach to business model development. Its focus on problem-solution fit, key metrics, and customer channels makes it particularly well-suited for rapid iteration and resource-efficient innovation.

1.3. Business Model Canvas vs Lean Canvas

The Business Model Canvas and the Lean Canvas share similarities but also exhibit distinct differences. The BMC is a more comprehensive tool that covers a wide range of business aspects, including key partners, key activities, and key resources (Sivakumar & Chawla, 2022; Piecework, 2023).

In contrast, the Lean Canvas is more focused, placing emphasis on problem-solution fit, key metrics, and customer channels, making it better suited for startups that need to quickly validate their business models (Mahendra, 2022; Marthasari & Asfiah, 2024).

Table 3: Comparison between the BMC and the Lean Canvas (self realized)

Aspect	BMC	Lean Canvas
Focus	Broad, covering all business aspects	Narrow, focused on problem-solution fit and key metrics
Complexity	More complex, suitable for established businesses	Simpler, ideal for startups and quick validation
Key Elements	Key partners, key activities, key resources	Problem, solution, key metrics, channels
Use	Suitable for all types of businesses	Specifically designed for startups

Source: Prepared by the authors.

The Lean Startup encourages iterative experimentation to reduce uncertainty and engage stakeholders (Bachmann et al., 2025).

Several case studies illustrate the practical application of the Lean Canvas across different sectors. Its implementation helped Talangin Startup determine future strategies and simplify business processes. It also enabled the startup to easily assess whether its products were accepted by the market and consumers (Pricillia & Ramadhan, 2024).

Let's Play Indonesia used the Lean Canvas to identify the need for a product development strategy, such as adding an exercise evaluation feature. It also helped them expand their customer segments and improve market penetration (Suryajaya & Pradana, 2023).

The Lean Canvas has been successfully applied in social enterprises to design innovative products and services that address social problems while ensuring financial viability (Marthasari & Asfiah, 2024).

It has also been used to create a sustainable business model for Building-Integrated Photovoltaics (BIPV) systems, promoting a green economy and reducing carbon emissions (Harianto et al., 2023).

The Business Model Canvas (BMC), by contrast, is a comprehensive tool for understanding the interactions between all aspects of a business. It is ideal for launched projects or for companies aiming to optimize their overall business model. As a strategic management tool, it is well-suited to test the viability of an existing project or company, validate key business model assumptions through rapid experimentation, identify primary risks, and continuously adjust (Maurya, 2012).

This distinction is particularly relevant in the context of entrepreneurial education. Student entrepreneurs do not all share the same level of idea maturity or pedagogical goals. Therefore, the choice between BMC and Lean Canvas is not neutral: it determines not only how students structure their entrepreneurial thinking, but also the types of learning outcomes and experiential gains they achieve.

From this, the following question arises: How do students' uses and experiences differ depending on whether they used the Business Model Canvas or the Lean Canvas to structure their entrepreneurial project, and what benefits and limitations do they perceive in each tool?

Exploring this issue will help us better understand the pedagogical suitability of each tool, depending on the profile of the project holders, their level of advancement, and the learning objectives pursued in an academic context.

This line of inquiry leads us to a comparison between two groups of students who used either the BMC or the Lean Canvas within the incubator of the National Higher School of Management (ENSM). It enables an analysis of their perceptions, uses, challenges, and perceived benefits in each case, ultimately guiding conclusions about the most relevant tool in the Algerian academic and entrepreneurial context.

2. Methodology

This study aims to explore and compare the perceptions, uses, and limitations of two entrepreneurial modeling tools, the Business Model Canvas (BMC) and the Lean Canvas, within the context of student-led projects incubated at the National Higher School of Management (ENSM) in Algeria. It follows an inductive approach that seeks to better understand students' practices and decision-making processes in an academic setting.

The qualitative approach is particularly suitable for accessing the complexity of lived experiences, individual representations, and the students' logic of action (Paillé & Mucchielli, 2012). This method is especially relevant in educational support frameworks where tools are not merely used but also subjectively interpreted.

As stated by Miles & Huberman (2014), qualitative analysis is appropriate for examining emerging or under-documented practices, such as the comparative use of BMC and Lean Canvas in Algerian university training programs.

2.1. Population and data

The study is based on a targeted sample of nine project holders, all of whom are Master's students enrolled in an incubation program. The selected projects span a variety of sectors, including health, agriculture, tourism, urban planning, and digital technologies. All participants had been introduced to at least one of the two tools – either the Business Model Canvas or the Lean Canvas – through a pedagogical module or an incubation program.

Data were collected through semi-structured reflective interviews lasted between 30 and 40 mn each one. Which were guided by a framework consisting of six analytical axes:

1. Moment of tool usage
2. Understanding and appropriation of the canvas blocks

3. Perceived usefulness
4. Difficulties encountered
5. Comparison between BMC and Lean Canvas (if applicable)
6. Student recommendations

Data collection continued until thematic saturation was achieved, with no new codes emerging after the eighth interview. NVivo 12 software supported the iterative coding process and ensured traceability.

2.2. Data analysis

The analysis was conducted using an inductive thematic approach, following the guidelines of Braun & Clarke (2006). This method allows meaning categories to emerge directly from the participants' narratives, without relying on a fixed theoretical framework – making it particularly suited to exploratory studies on the use of educational tools.

Each interview transcript was read in full, then segmented into units of meaning based on the predefined interview axes (moment of use, appropriation, perceived usefulness, difficulties, comparison, recommendations).

An open manual coding process was applied to identify recurring expressions (e.g., "simple", "visual", "lack of data", "useful for structuring", "better suited for ideation"). These were then grouped into emerging themes such as intuitive appropriation, technical difficulties, or tool preference.

A cross-analysis matrix was constructed to compare:

- Feedback from students using the Lean Canvas *vs* the BMC
- Differences according to project development stage (ideation, structuring, testing)
- Possible effects related to the sector of activity (agriculture, health, digital, etc.)

This cross-analysis highlighted both regular patterns and atypical cases, revealing how tool usage was contextualized based on individual and project-specific factors.

To enhance the credibility of the analysis, the identified themes were compared with established frameworks (Osterwalder & Pigneur, 2010; Maurya, 2012) and qualitative methodological guides (Miles, Huberman & Saldaña, 2014). Partial member-checking was also conducted with two participants to test the interpretive consistency of the findings.

3. Results

The analysis of student testimonies reveals nuanced yet consistent perceptions regarding the use of the Lean Canvas and the Business Model Canvas (BMC). The findings are presented across six thematic axes, with direct student quotes to illustrate key insights.

3.1. Timing of tool use

Students used the tools at strategic points in the development of their projects. The Lean Canvas was used very early, often during the idea generation phase:
"I started using the Lean Canvas as soon as we received the training. It allowed me to quickly structure the main ideas around my project." (E1). Conversley, the BMC was used at more advanced stages: *"I used the BMC during the structuring phase, before creating my business plan"*(E6). *"The BMC is better suited to the complexity of my project."* (E7). This reflects a general tendency to match the tool to the maturity level of the project.

3.2. Appropriation and understanding

Both tools were seen as accessible, though in different ways. The Lean Canvas is praised for its simplicity and clarity. *"Yes, it was very easy to use, the structure is clear, the blocks are well-defined and interconnected"* (E1). *"It's a very visual and simplified tool, perfectly suited to early-stage projects."* (E3). In contrast, the BMC requires more conceptual mastery:
"Thanks to training at the ENSM incubator, I clearly understood each block in relation to my project" (E6). Students highlighted the value of sector-specific examples and guided support to fully appropriate the tools. Institutional support – such as workshops and mentoring sessions – played a key role in easing comprehension and promoting meaningful use of both tools.

3.3. Perceived usefulness

All students stated that the tool they used helped them transition from raw ideas to a structured vision. The Lean Canvas enabled a rapid transformation of abstract ideas into tangible project frameworks *"Thanks to the Lean Canvas, I was able to move from a general idea to a concrete and structured vision"* (E1). *"It helped us concisely articulate the main problems faced by parents and healthcare professionals"* (E2). In turn, the BMC was seen as instrumental for strategic refinement and investor communication. *"It helped me clearly visualize the value chain, revenue streams, and cost structure"* (E7)*"It helped me identify my customers, partners, suppliers, and added value"* (E6). The most frequently cited useful blocks were the value proposition, customer segments, and revenue streams.

3.4. Difficulties encountered

Some components of both canvases were perceived as more complex. In the Lean Canvas, the most challenging elements were Unfair Advantage and Channels, due to a lack of market experience or clarity *"The 'Unfair Advantage' block was hard to complete. I lacked enough perspective"*(E5). *"We had several hypotheses for the channels, which made things unclear"* (E2). For the BMC, the main challenge was estimating "cost structure" and defining "key partners". *"The cost structure required financial estimates I didn't yet have"* (E6). *"The target audience was very broad at first. I struggled with customer segments"* (E7). The most challenging blocks were those requiring advanced strategic or financial data.

3.5. BMC *vs* Lean Canvas comparison

Among students who tried both tools. The Lean Canvas was favored at the beginning.*"The Lean Canvas is simpler, more direct, and much easier to use for early-stage projects"* (E1).*"It's quick to complete and can evolve over time"* (E3). While the BMC was preferred for structured projects.*"The BMC is very useful for a more mature project with an established economic model"* (E5)*"I think the BMC is accessible and easy to understand"* (E6).
Students who used both tools generally viewed them as complementary rather than substitutable. A progressive view emerged: start with Lean Canvas, then transition to BMC as the project matures.

3.6. Student recommendations

All participants recommended using a progressive and combined pedagogical approach, beginning with the Lean Canvas and transitioning to the BMC. The Lean Canvas at the start, and the BMC for formalization. *"The Lean Canvas is clearly the most accessible and relevant tool for students"* (E2). *"The BMC is more complete and better suited for a structured launch phase"* (E7). Some also proposed a combined use, depending on the phase of the project.

4. Discussion

The results of this study highlight distinct yet complementary uses of the Lean Canvas and the Business Model Canvas (BMC) by Algerian students engaged in incubation programs. The analysis allows us to interpret these patterns through three main lenses: the alignment with the project's stage of maturity, the pedagogical function of the tools, and their contextualization within the local entrepreneurial ecosystem.

4.1. A progressive use aligned with project maturity

Student testimonies confirm the notion of progressive tool usage:

- The Lean Canvas is widely used during the ideation phase, as it enables students to structure their ideas quickly and accessibly. Its entry point through the problem is consistent with the Lean Startup approach (Ries, 2011) and fosters an exploratory mindset.
- The BMC is favored during the advanced structuring phase, when a clearer vision and data are available. Its more systemic and descriptive framework (Osterwalder & Pigneur, 2010) is perceived as better suited for the complete formalization of a business model.

These findings align with Maurya's (2012) recommendation to use the Lean Canvas as a preliminary step before the BMC in validation-stage projects.

4.2. Differentiated pedagogical appropriation

Both tools serve as effective pedagogical instruments, though their perceived accessibility varies:

- The Lean Canvas is appreciated for its clarity, speed of execution, and focus on essential blocks (problem, solution, customer segments, value). It is viewed as a strong learning tool, particularly for beginners.
- The BMC, by contrast, requires a more advanced understanding of entrepreneurial vocabulary (e.g., key resources, partners, channels), but offers a broader strategic vision and full project structure.

This distinction suggests that both tools could be integrated sequentially into a pedagogical progression, tailored to varying levels of student autonomy.

4.3. Contextual adaptation to the Algerian entrepreneurial landscape

The analysis shows that students were able to contextualize their tool usage based on their sector (health, agriculture, digital, tourism) and local realities (e.g., data scarcity, diverse target groups, market uncertainty).

Difficulties with blocks such as unfair advantage, channels, or cost structure demonstrate that while these tools are generally useful, they often require methodological adaptations or targeted support in emerging contexts.

The case of Algerian higher education presents particular institutional and cultural contingencies that inform tool adoption. Structural constraints, and young incubation systems inhibit experimentation in favor of more formality such as the BMC. On the other hand, the socio-cultural value of resource improvisation and parsimoniousness highly resonates with the logic of the Lean Canvas. This contextual interaction supports that entrepreneurial education practice in emerging economies can't be borrowed from Western templates but needs to be hybridized adaptively (Mbeteh & Pellegrini, 2018) . Through the demonstration of how students move across structure and flexibility, this study adds to prior debates over contextualized entrepreneurship pedagogy. Such findings carry evidence about the necessity of institutional help mechanisms that permit iterative learning, local mentoring, along with reflexive pedagogy.

Finally, the pedagogical environment (courses, incubator, mentorship) played a crucial role in students' appropriation of the tools. This highlights the importance of a reflective and supportive framework to maximize the effectiveness of these tools in entrepreneurship education.

In practice, the findings propose the following progressive learning order: integrate the Lean Canvas in initial ideation sessions to align problems with solutions, and the introduction of the BMC in top-level incubation modules to attain systemic strategic thinking.

Conclusion

This research underscores the pedagogical significance of the Lean Canvas and the Business Model Canvas in entrepreneurship education. The research identifies a progressive usage pattern – from rapid ideation to systemic structuring – thereby validating theoretical propositions from lean-startup and business-model literature within the relatively unexamined Algerian higher-education context.

Methodologically, the research demonstrates the significance of qualitative thematic analysis in examining cognitive and behavioral learning outcomes within the domain of entrepreneurial education. In practice, it supports a gradual, flexible integration of both tools within curricular and incubation programs, tailored to project maturity levels.

Future research should enhance this study through multi-institutional comparative analyses, longitudinal follow-up investigations, and mixed method approaches to evaluate long-term entrepreneurial skills. This paper contributes to international discussions on context-aware entrepreneurship education and the growing significance of design-thinking frameworks in emerging economies by situating visual modeling tools within specific educational contexts.

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