

## Business Model Canvas in the entrepreneurs' business model: a system approach

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### Abstract

**Objective:** To describe the association of the four main areas of the entrepreneurs' business model with the Business Model Canvas from a systems approach.

**Methods:** Quantitative approach, non-experimental design with descriptive and correlational scope; the sample consisted of 181 entrepreneurs; the instrument used was the questionnaire.

**Results:** The chi-square test showed that there are dependency relationships between the four business areas and the Business Model Canvas (BMC); in addition, there is a positive and significant association between (1) customer interface and the BMC (0.609); (2) product and BMC (0.540); (3) infrastructure management and BMC (0.671) and (4) financial aspects and BMC (0.658). Therefore, the study showed that the four main areas of the entrepreneurs' business model are significantly associated with the nine modules of the Business Model Canvas.

**Conclusion:** Despite the positive and significant association of the areas with the BMC, micro and small business entrepreneurs should seek greater positioning in the market, strengthen their value proposition to be competitive in the market, greater resource planning and key partners, and finally, train and be part of financial inclusion and education.

**Keywords:** business model canvas; business model evolution; business model; small enterprises; entrepreneurs; information systems.

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### 1. Introduction

General systems theory and systems theory have broad applications. In this regard, the main contributions of systems theory are: (1) it emphasizes technology and the environment, and (2) it explains organizations as open systems.<sup>1,2</sup> Furthermore, technology has strongly influenced

the functioning and development of organizations since the Industrial Revolution, especially with the emergence of computers in the mid-20th century, which allowed organizations to manage their processes and collaborate with larger organizations quickly and reliably.<sup>3</sup> Additionally, systems provide a holistic view that organizations or societies can represent.<sup>4,5</sup> Therefore, technology is a tool that aids organizations' internal and external processes to interact with the external environment. Moreover, organizations are

considered open systems because they belong to larger economic and societal systems.<sup>6</sup>

General systems theory expanded to all sciences and influenced management. In this regard, small businesses constantly strive to find innovative solutions tailored to a globalized and changing market. They seek creative solutions for value creation and developing new business concepts capable of restructuring existing markets. Therefore, the Business Model Canvas (BMC) is a tool for generating innovative ideas.<sup>7,8</sup> Furthermore, business management within micro, small, and medium-sized enterprises must be stronger in different business areas. Hence, one of the business planning models that can be applied to these businesses is the BMC to make small businesses more sustainable over time.<sup>9</sup> On the other hand, the BMC is a tool for analyzing and designing business models and solving organizational digital transformation problems.<sup>10,11</sup> Additionally, the BMC, primarily used in the private sector, provides a basis for designing a canvas for public entities.<sup>12,13</sup>

The main proposal of the Business Model Canvas (BMC) is to display the business model in its constituent parts and understand the business holistically.<sup>14,15</sup> The BMC, developed by Osterwalder and Pigneur (2010), is a tool composed of nine interrelated blocks that describe and present a business model comprehensively.<sup>16–18</sup> In other words, the BMC is a simple-to-apply tool designed to add value and contribute to business success.<sup>19,20</sup> Therefore, the BMC is a new analytical framework to define, design, understand, innovate new business models, and enhance the understanding of existing business models.<sup>18,21</sup>

The nine elements of Osterwalder and Pigneur's BMC can be represented through four factors: (a) customer interface, (b) product, (c) infrastructure management, and (d) financial aspects. However, it is important to note that not all business models can be divided into these four dimensions (Keane et al., 2018). Thus, to confirm the association of the four factors of the business model with the nine elements of the Business Model Canvas, the research problem was formulated as follows: What is the association of the four main areas of the entrepreneurs' business model with the Business Model Canvas? The research objective is to describe the association of the four main areas of the entrepreneurs' business model with the Business Model Canvas. Finally, the research hypothesis was formulated: the four main areas of the entrepreneurs' business model are significantly associated with the nine modules of the Business Model Canvas from a systems perspective.

### Previous Studies

The Business Model Canvas is a tool that assists in designing business models for companies; however, each BMC is an independent representation.<sup>22</sup> Therefore, an ontology and a more practical and visual framework are needed to design and evaluate a business model. Thus, the ontology of the business model has become the BMC, which is currently used by professionals worldwide.<sup>23</sup> In other words, to help design a more dynamic aspect of a business model, three levels of maturity are proposed: (1) the BMC

guides novices to obtain and build coherent models, (2) the BMC allows experts to evaluate the interaction of the elements of the business model, and (3) the BMC enables more experienced individuals to create multiple versions of their business models.<sup>24</sup>

Considering the importance of logistics in humanitarian operations, logistics service providers have become more prominent; however, only some of these companies have the capabilities and mechanisms to offer adequate services. Therefore, the operations of logistics services were explored using the Business Model Canvas. Similar and different viewpoints were obtained in the mapping against the BMC, and the results provide novelty to advance the understanding and use of the BMC in humanitarian logistics service operations.<sup>25,26</sup>

Current trends could have implications for the future of the port business ecosystem, specifically the port of Barcelona, Spain. Therefore, the Business Model Canvas is a framework tool used for the study. The results indicate that they should: (1) develop sustainable green energy hub models, (2) develop intermodal logistics hubs, and (3) promote emerging industries to become a customization hub that adds logistics value to the cargo transiting through the port.<sup>27</sup>

The business model in contract farming in Thailand was identified to improve the integration of small farmers into the banana value chain. The Business Model Canvas was used for the analysis, and surveys were conducted with small producers and in-depth interviews with key informants. The results showed that the business model of the private company that contracts a group of farmers is more effective in terms of net income for small farmers. In other words, an agribusiness company should be linked with small farmers.<sup>28–30</sup>

To understand the business model of microenterprises in the informal sector adopted by poor urban women in India, the Business Model Canvas was used, and 63 micro-entrepreneurs were interviewed. The results showed that the business model of micro-entrepreneurs focused on key partners, resource planning, customer orientation, and sales promotion. Additionally, given the limited studies focusing on the BMC of women micro-entrepreneurs, similar studies are recommended in other metropolitan megacities in India.<sup>31</sup>

Suranto and Nurlaela (2021)<sup>32</sup> analyzed the impact of applying entrepreneurial learning through the Business Model Canvas on improving students' learning achievement and entrepreneurial intentions. They conducted a quasi-experimental study in two courses, applying the BMC to one. The results demonstrated that entrepreneurial learning achievement through the BMC is higher than in the control group. Therefore, using the BMC can significantly improve entrepreneurial learning achievement.

Keane et al. (2018)<sup>33</sup> evaluated how entrepreneurs and managers represent the nine modules of the Business Model Canvas by Osterwalder (2004). They surveyed 108 entrepreneurs and 63 Irish managers. The results suggest that the mental representations of the BMC can be bidimensional, meaning that the nine modules can be

divided into two dimensions. Furthermore, they can differ between entrepreneurs and managers. Thus, the study expands the scope of the BMC at an individual level and highlights the differences in self-efficacy between entrepreneurs and managers.

As the number of small businesses in the market with the same type of business increases, competition rises, leading to economic losses and even the bankruptcy of small businesses. Therefore, strategies must be implemented to face competition, and one of them is using the Business Model Canvas. However, before utilizing the BMC, small businesses must recognize their position as market leader or follower. Thus, based on their market position, they should prepare a marketing mix to confront tough competition.<sup>34-36</sup>

The competitiveness of companies is often associated with their ability to create value. Therefore, the Business Model Canvas is one alternative among many to define the value proposition of different business models. Thus, the concept of value creation and business models has been complemented with a survey on the BMC, emphasizing the value proposition in a software engineering company.<sup>37-40</sup>

### Related Theories

The nine modules of the BMC are "a common language for describing, visualizing, assessing, and changing business models".<sup>41</sup> Furthermore, "a business model describes the rationale of how an organization creates, delivers, and captures value".<sup>41</sup> Moreover, "the speed at which innovative business models are transforming the business landscape is unprecedented, and it is time for entrepreneurs, executives, consultants, and academics to understand the impact of this extraordinary evolution".<sup>41</sup> Therefore, "innovation in business models consists of creating value for companies, customers, and society, i.e., replacing obsolete models".<sup>41</sup> The present study used the nine modules of Alex Osterwalder and Yves Pigneur's Business Model Canvas. These nine modules have been divided into four main areas as proposed dimensions by Keane et al. (2018):<sup>33</sup>

1. Customer interface, which includes: (a) market segments, (b) channels, (c) customer relationships
2. Product, which includes: (a) value propositions
3. Infrastructure management, which includes: (a) key resources, (b) key activities, and (c) key partnerships

Financial aspects, which include: (a) revenue streams and (b) cost structure.

## 2. Methods

The foundation of quantitative methodology lies in constructing and measuring variables, dimensions, and indicators. In other words, data must align with these factors. The quantitative approach is focused on measuring variables and their relationships, which need to be verified to test hypotheses and validate theories.<sup>42</sup> Additionally, the strategy used to gather information and address the research problem is through research design.<sup>43</sup> On the other hand, non-experimental research does not control variables. Non-

experimental research is descriptive as it mentions the characteristics of the study object.<sup>44</sup> Moreover, the non-experimental design in the quantitative approach is cross-sectional when the research is conducted simultaneously. Cross-sectional studies can be exploratory, descriptive, correlational, or explanatory.<sup>43</sup> Finally, association hypotheses are formulated in correlational studies.<sup>43</sup> Therefore, the research used a quantitative approach, non-experimental design, and descriptive and correlational scope to test the hypothesis, i.e., the theory or the association of dimensions with the variable.

The population consisted of entrepreneurs from different sectors linked to International Business students at a private university in Peru. The research was conducted on a convenience sample of 181 entrepreneurs, owners of micro and small formal enterprises with more than one year of operation. The identified ventures were in the following sectors: (1) commerce: 33%; (2) manufacturing: 33%; (3) services: 13%; (4) agricultural: 11%; (5) construction: 6%; (6) transportation: 2%; (7) telecommunications: 1%; (8) tourism: 1%; and (9) fishing: 1%. Furthermore, out of the 181 identified entrepreneurs, 58% were males, and 42% were females. Finally, the average age of the entrepreneurs was 38 years for females and 39 years for males.

The technique used in the research was a survey, and the data collection instrument was the Business Model Canvas questionnaire, considering the Likert scale from 1 to 5, where: 1 represented never; 2 represented seldom; 3 represented sometimes; 4 represented almost always, and 5 represented always. The questionnaire was developed based on the nine Business Model Canvas canvas modules, a theory proposed by Osterwalder and Pigneur (2011).<sup>41</sup> These nine modules were divided into four areas:

1. Customer interface, which includes: (a) market segments, (b) channels, and (c) customer relationships
2. Product, which includes: (a) value propositions
3. Infrastructure management, which includes: (a) key resources, (b) key activities, and (c) key partnerships
4. Financial aspects, which include: (a) revenue streams and (b) cost structure

To ensure the instrument's reliability, a pilot test was conducted with 31 entrepreneurs with similar characteristics. Additionally, the questions were evaluated through exploratory factor analysis to eliminate less relevant questions. Thus, the final Business Model Canvas instrument consisted of 20 questions. The Kaiser-Meyer-Olkin indicator, according to the sampling, was 0.722, and Bartlett's test of sphericity was significant (Approx. Chi-square: 346.687; df: 190, Sig.<0.01). Furthermore, the Cronbach's Alpha of the instrument was 0.921. Finally, descriptive and inferential statistics were used for data analysis with SPSS software V.25.

## 2. Results

Table 1 presents the representation of the Business Model Canvas (BMC) in the business model of the 181 surveyed entrepreneurs. Among the total entrepreneurs, 34.3% had a basic representation of the BMC, 34.8% had an intermediate representation, and 30.9% had a high representation. In other words, regardless of the level of knowledge in the four

main areas of a business: (a) customer interface, (b) product, (c) infrastructure management, and (d) financial aspects, 34.3% had a basic representation of the nine modules of the BMC, 34.8% had an intermediate representation, and 30.9% had a high representation.

**Table 1. Frequency table of the Business Model Canvas**

	Frequency	Percentage	Percentage valid	Percentage accumulated
Basic	62	34.3%	34.3%	34.3%
Intermediate	63	34.8%	34.8%	69.1%
High	56	30.9%	30.9%	100.0%
Total	181	100.0%	100%	

**Source:** Own elaboration.

Table 2 shows the association between the customer interface area and the BMC; of the 100% of respondents, 34.8% have a basic knowledge of the customer interface area; that is, basic knowledge of their market segments, communication and distribution channels, and customer relationships; of these, 26.5% have a basic representation of the BMC, 6.6% have an intermediate representation, and 1.7% have a high representation. Likewise, of the 100%, 41.4% have an intermediate knowledge of the customer

interface area; of these, 7.2% have a basic representation of the BMC, 22.7% have an intermediate representation and 11.6% have a high representation. Finally, of the 100% of entrepreneurs, 23.8% have a high knowledge of the customer interface area; of these, 0.6% have a basic representation of the BMC, 5.5% have an intermediate representation and 17.7% have a high representation.

**Table 2. Association between the customer interface area and the BMC.**

		Business Model Canvas			Total	
		Basic	Intermediate	High		
Customer interface	Basic knowledge	Count	48	12	3	63
		% of total	26.5%	6.6%	1.7%	34.8%
	Intermediate knowledge	Count	13	41	21	75
		% of total	7.2%	22.7%	11.6%	41.4%
	High knowledge	Count	1	10	32	43
		% of total	0.6%	5.5%	17.7%	23.8%
Total	Count	62	63	56	181	
	% of total	34.3%	34.8%	30.9%	100.0%	

**Source:** Own elaboration.

Table 3 shows the association between the product area and the BMC; of the 100% of respondents, 37% have basic knowledge of the product area, that is, basic knowledge of the value proposition of their products or services, which serve to solve the problems or satisfy the needs of their customers; of these, 23.8% have a basic representation of the BMC, 12.2% have an intermediate representation and 1.1% have a high representation. Likewise, of the 100%, 37% have an intermediate knowledge of the product area;

9.4% have a basic representation of the BMC, 16% have an intermediate representation, and 11.6% have a high representation. Finally, of the 100% of entrepreneurs, 26% have a high knowledge of the product area; of these, 1.1% have a basic representation of the BMC, 6.6% have an intermediate representation, and 18.2% have a high representation.

**Table 3. Association between the product area and the Business Model Canvas**

		Business Model Canvas			Total
		Basic	Intermediate	High	

Product	Basic knowledge	Count	43	22	2	67
		% of total	23.8%	12.2%	1.1%	37.0%
	Intermediate knowledge	Count	17	29	21	67
		% of total	9.4%	16.0%	11.6%	37.0%
	High knowledge	Count	2	12	33	47
		% of total	1.1%	6.6%	18.2%	26.0%
Total	Count	62	63	56	181	
	% of total	34.3%	34.8%	30.9%	100.0%	

Source: Own elaboration.

Table 4 shows the association between the area of infrastructure management and BMC; of the 100% of respondents, 34.8% have basic knowledge of the area of infrastructure management, that is, basic knowledge of the necessary assets or key resources for a business to function; basic knowledge of the activities or actions that a business must undertake to function; and basic knowledge of the strategic alliances that contribute to the functioning of the business; of these, 28.7% have a basic representation of BMC, 5.5% have an intermediate representation and 0.6%

have a high representation. Likewise, of the 100%, 32% have an intermediate knowledge of the infrastructure management area; of these, 4.4% have a basic representation of the BMC, 21.5% have an intermediate representation, and 6.1% have a high representation. Finally, of the 100% of entrepreneurs, 33.1% have a high knowledge of the area of infrastructure management; of these, 1.1% have a basic representation of the BMC, 7.7% have an intermediate representation, and 24.3% have a high representation.

**Table 4. Association between the infrastructure management area and the BMC**

		Business Model Canvas			Total	
		Basic	Intermediate	High		
Infrastructure management	Basic knowledge	Count	52	10	1	63
		% of total	28.7%	5.5%	0.6%	34.8%
	Intermediate knowledge	Count	8	39	11	58
		% of total	4.4%	21.5%	6.1%	32.0%
	High knowledge	Count	2	14	44	60
		% of total	1.1%	7.7%	24.3%	33.1%
Total	Count	62	63	56	181	
	% of total	34.3%	34.8%	30.9%	100.0%	

Source: Own elaboration.

Table 5 shows the association between the area of financial aspects and the BMC; of the 100% of respondents, 35.9% have basic knowledge of the area of financial aspects, that is, basic knowledge of the sources of income when customers purchase the product or service; basic knowledge of the costs involved in starting up the business; of these, 28.7% have a basic representation of the BMC and 7.2% have an intermediate representation. Likewise, of the 100%,

41.4% have an intermediate knowledge of economic aspects; of these, 5.5% have a basic representation of the BMC, 23.8% have an intermediate representation, and 12.2% have a high representation. Finally, of the 100% of entrepreneurs, 22.7% have a high knowledge of financial aspects; of these, 3.9% have an intermediate representation of the BMC, and 18.8% have a high representation.

**Table 5. Association between the area of financial aspects and the BMC**

		Business Model Canvas			Total	
		Basic	Intermediate	High		
Financial aspects	Basic knowledge	Count	52	13	0	65
		% of total	28.7%	7.2%	0.0%	35.9%
	Intermediate knowledge	Count	10	43	22	75
		% of total	5.5%	23.8%	12.2%	41.4%

High knowledge	Count	0	7	34	41
	% of total	0.0%	3.9%	18.8%	22.7%
Total	Count	62	63	56	181
	% of total	34.3%	34.8%	30.9%	100.0%

Source: Own elaboration.

Table 6 shows the association of the four main areas of the entrepreneurs' business with the nine modules of the Business Model Canvas. Therefore, the chi-square test showed that there are dependency relationships between the four areas of the business and the BMC, with a significance level of the chi-square test less than 0.05 (Sig.<0.01); this result confirms the hypothesis stated, in which it was

indicated that the four main areas of the entrepreneurs' business model have a significant association with the nine modules of the Business Model Canvas. In addition, the results are ratified by the contingency coefficient that showed a positive and significant association.

**Table 6. Chi-square test and symmetrical measures**

	Business Model Canvas				
	Pearson's square	Chi-	Asymptotic significance	Contingency ratio	Approximate significance
Customer Interface	106.490171		0.000	0.609	0.000
Product	74.382568		0.000	0.540	0.000
Infrastructure management	148.089135		0.000	0.671	0.000
Financials	138.059255		0.000	0.658	0.000

Source: Own elaboration.

## 2. Discussion

The study provides theoretical and practical knowledge to entrepreneurs, business owners, managers, executives, consultants, academics, and students because the Business Model Canvas is a tool that assists in designing business models for companies.<sup>22,45</sup> Furthermore, professionals use it worldwide.<sup>23,46,47</sup> Based on the results of the present study, a positive and significant association is demonstrated between the four main areas of entrepreneurs' businesses proposed by Keane et al. (2018)<sup>33</sup> and the nine modules of the Business Model Canvas. Additionally, the chi-square test showed dependent relationships between the four business areas and the BMC. Furthermore, there is a positive and significant association between (1) customer interface and BMC (0.609); (2) product and BMC (0.540); (3) infrastructure management and BMC (0.671); and (4) financial aspects and BMC (0.658). Therefore, the results confirm the hypothesized association, indicating that the four main areas of entrepreneurs' business models are significantly associated with the nine modules of the Business Model Canvas.

The customer interface area and the BMC have a positive association. However, out of the 100% surveyed entrepreneurs, 76.2% have basic to intermediate knowledge of the customer interface area. In other words, they need to learn more about customer segments, communication and distribution channels, and customer relationships. Therefore, entrepreneurs need to seek a stronger market positioning. This result is consistent with

the study by Umar et al. (2018),<sup>36</sup> who indicated that competition rises as the number of small businesses increases, which can lead to economic losses or bankruptcy. Therefore, to face competition and before using the BMC, small businesses must recognize their market position and prepare a marketing mix strategy to confront tough competition.

The product area and the BMC have a positive association. However, out of the 100% surveyed entrepreneurs, 74% have basic to intermediate knowledge of the product area. In other words, they need to gain more knowledge of value propositions or how to address their customers' problems and needs. Therefore, entrepreneurs must strengthen their value proposition to compete in the market. This result aligns with the study by Vicelli and Tolfo (2017),<sup>39</sup> who indicated that the competitiveness of companies is often associated with their ability to create value, and the Business Model Canvas is an alternative to defining the value proposition of different business models.

The infrastructure management area and the BMC have a positive association. However, out of the 100% surveyed entrepreneurs, 66.8% have basic to intermediate knowledge of infrastructure management. Despite this result, it is the area with the highest knowledge (33.2%) among entrepreneurs because they naturally possess more knowledge of the internal aspects of the company.<sup>48-50</sup> In other words, they have greater knowledge of their key resources, activities, and partnerships. This result is consistent with the study by Mukherjee (2021),<sup>31</sup> who indicated that the business model of micro-entrepreneurs



in India focuses on key partners and resource planning, customer orientation, and sales.

The financial aspects area and the BMC have a positive association. However, out of the 100% surveyed entrepreneurs, 77.3% have basic to intermediate knowledge of financial aspects. In other words, they need to learn more about cost structure and revenue streams. Therefore, entrepreneurs must enhance their financial literacy and become part of financial inclusion and education. This result aligns with the study by Widjajanti et al. (2022),<sup>9</sup> who indicated that business management within micro, small, and medium-sized enterprises remains weak in various areas. Thus, the BMC is a tool that can be applied to make small businesses more sustainable over time.

The research allowed for the evaluation of the importance of the Business Model Canvas among entrepreneurs of micro and small enterprises linked to International Business students. Therefore, it provides primary information for entrepreneurs, business owners, managers, executives, consultants, academics, and students. However, it has yet to be evaluated in companies with similar characteristics, limiting the provision of sector-specific information on the representation of the Business Model Canvas in entrepreneurs' business models.<sup>51,52</sup>

The four main areas of a business model: (1) customer interface, (2) product, (3) infrastructure management, and (4) financial aspects, have a positive association with the nine modules of the Business Model Canvas. However, out of the 100% of surveyed entrepreneurs, 76.2%, 74%, 66.8%, and 77.3% have basic to intermediate knowledge of the customer interface, product, infrastructure management, and financial aspects, respectively. Therefore, entrepreneurs of micro and small businesses need to seek stronger market positioning, strengthen their value proposition to be competitive, engage in better resource planning and key partnerships, and enhance their financial literacy and inclusion. Moreover, this study lays the groundwork for future research to continue evaluating the importance of the Business Model Canvas in entrepreneurs' business models in different sectors and locations within the country, considering the four main business areas proposed by Keane et al. (2018).<sup>33</sup>

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