

## Developing a Model for Evaluating Business Model Innovation of Startups

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### Abstract

**Purpose:** The purpose of this research is to design a model for evaluating digital innovation and transformation in startup business models.

**Method:** The methodology of this research is descriptive-exploratory and employs a qualitative approach. The thematic analysis was employed to study digital innovation and transformation in startup business models. The participants in this research were academic and industrial experts with a background in research and executive work in lean startups. Initially, a purposive sampling method was used to select the samples, and this was later extended using the snowball method. Ultimately, the researcher conducted 14 expert interviews to collect data. The data obtained from the interviews were reviewed and analyzed using coding based on theme analysis. Initially, codes were extracted from the text of the interviews. These codes were aggregated into more general codes, which were further studied and integrated into components. From these components, relevant

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dimensions were proposed, leading to the presentation of a model based on these dimensions and extracted components.

**Findings:** The results indicate that the digital Innovation and transformation evaluation model for startup business models includes six main dimensions and 19 sub-themes. The proposed model consists of the following dimensions: "monitoring and analysis of market needs" with three components, "evaluation of product development costs" with three components, "digital innovation and transformation in the business model" with four components, "coordination and integration inside and outside the organization" with two components, "evaluation of learning ability and absorption of organizational knowledge" with three components, and "organizational resources and capacities" with four components.

**Conclusion:** Based on the research findings, it is suggested that managers in the technology field understand the importance of lean startups. The indicators in the proposed model may be considered to help prepare and empower startups to improve their products and services. Each proposed dimension can be seen as a management skill necessary for the success of lean startups. Managers may create the appropriate conditions to integrate all of company capabilities.

**Keywords:** Evaluation, Innovation, Digital Transformation, Business Model, Startups.

## **Introduction**

Due to the intensification of competition and the increasing possibility of copying business ideas, having a logical and robust business plan has become essential. Without such a plan, firms risk faltering and frequently changing direction. Therefore, a significant share of the success of companies, especially knowledge-based companies and startups, is related to the design of their business models (Lenarduzzi & Lunesu, 2018). This is crucial for survival in rapidly changing markets. With today's fast-paced innovation cycle and high-pressure environment, relying solely on product and process innovation is insufficient; innovation is required in various areas of business. Consequently, researchers' focus on business innovation and the conversion of technological innovation has grown in recent years to help companies gain more competitive advantages (Zhang et al., 2016). Accordingly, business model innovation is a main priority for managers in terms of creating a competitive advantage and achieving superior performance. Typically, companies that focus on business model innovation tend to experience faster growth in operating profit compared to their competitors (Velu, 2015).

Grabouska (2015) points out that, given the sporadic changes in a dynamic and often rapidly competitive environment, the models used in business solutions are not permanent. Innovation in business models is an undeniable necessity for flexibility, increasing a company's ability to compete strongly, seeking new demand opportunities, reorganizing operations, and maintaining and developing a competitive position. To achieve and sustain innovation, a correct understanding of innovation is needed, which is achieved when innovation is measured and evaluated (Jensen & Webster, 2009).

However, there is not necessarily a general agreement on the evaluation of innovation, and each proposed model emphasizes different aspects (Rejeb et al., 2008). Bouncken and Fredrich (2016) highlight that business model innovation involves more systematic change than product or process innovation, encompassing changes in the customer value proposition, value creation, and value capture.

Casadesus-Masanell and Zhou (2013) state that business model innovation involves finding new areas and ways for a company to create and attract value to its shareholders. It focuses on innovating and defining value propositions for customers, suppliers, and partners. Knowledge-

based companies and startups, due to their role in economic dynamism, employment, and technological progress, are especially scrutinized worldwide for their innovation potential.

The longevity and continuous improvement of performance of these companies are closely tied to innovation. According to Blank (2013), startups have high growth potential but often lack a business model and face budget and funding challenges, leading to high failure rates. Harvard Business School research cites that over 75 percent of startups fail to commercialize their products. Recently, lean startups have emerged, utilizing specific business models tailored to market demands and needs. Lean startups employ a process called validated learning to evaluate consumer interest (Ghezzi & Cavallo, 2020).

According to Ries (2011), a pioneering theoretician, this methodology prioritizes experimentation over detailed planning, customer feedback over assumptions, and iterative design over traditional methods. The “Build-Measure-Learn” loop entails creating a product prototype, testing it, measuring results and customer feedback, and subsequently adjusting the business idea and model accordingly. A key distinction between startups and established companies lies in the fact that startups actively search for the right business model, while established companies operate within a pre-defined one.

Edison et al. (2015) state that lean startups have five rules:

- Entrepreneurs are everywhere: Anyone can be an entrepreneur, regardless of their job or student status.
- Entrepreneurship is management: Startups encompass not only product development but also business development.
- Valid Learning: Entrepreneurs must rigorously test and validate their hypotheses to establish a sustainable business.
- Build-Measure-Learn: This cycle is the core process of a startup.
- Innovation Accounting: Entrepreneurs must empirically track and measure innovation progress to enhance outcomes.

Considering these issues and the importance of evaluating innovation in business models, as well as the existence of comprehensive research on lean startups, authors aimed to identify factors and indicators affecting the creation of an innovative business model in lean startups. This research sought to provide startups and technology companies with findings to exploit market opportunities, secure their survival in complex business environment, and achieve a competitive advantage. Despite having several models, there is a lack of a comprehensive model that

focuses on strategic goals and covers key issues for evaluating business model innovation. The researcher aimed to address this gap by developing a model for evaluating business model innovation in startups.

### **Literature Review**

Ghezzi and Cavallo (2020), in their study (agile business model innovation in digital entrepreneurship: lean startup approaches) stated that digital startups often leverage their value architecture and business model. Recently, lean and agile principles have been introduced to support digital entrepreneurs in business model innovation. However, the theoretical and practical relationship between business model innovation and startup approaches in dynamic digital environment is rarely explored. Findings showed that startup approaches can be used as agile methods to innovate business models in digital entrepreneurship. These findings are structured into propositions designed to guide the development of a research program integrating processes and methods.

Bortolini et al. (2018), in "startup, a comprehensive historical review" stated that startups implement pragmatic strategies based on academic learning for effective entrepreneurship. They highlighted various methods and tools that help entrepreneurs formulate hypotheses about business model, product development, and continuous improvement, as well as make rapid decisions on iterations and risk assessments.

Lenarduzzi and Lunesu (2018), in "lean strategies: a sequence of user-centric innovation processes" compare lean strategies such as lean design, lean innovation, lean manufacturing, lean thinking, lean Six Sigma, and startups. The research highlights that, akin to other lean strategies, startups adopt a user-centered approach and adhere to the Build-Measure-Learn cycle to target customers effectively.

Shimasaki (2018), in "the story of molecular laboratories: lessons in effective startup investment" acknowledges that biotech companies use the startup approach to commercialize products through repetition and validated learning. This approach significantly improves capital efficiency and the likelihood of success for biotech companies.

Yang et al. (2017), in "search and execution: a test of entrepreneurial cognition behind the startup model," indicated that startups primarily engage in search and execution activities, focusing on learning, discovery, and strategic actions.

York and Dans (2014), in "customer development, innovation, and

decision making in startups" argued that the customer development model relies on hypothesis testing. They emphasized the importance of monitoring the environment, gathering information, and evaluating conjectures for accurate decision-making.

Ebrahimi Nejad and Dehghani Soltani (2015) highlighted that strategic planning, R&D, resource allocation, marketing, and learning capabilities significantly improve innovation performance in knowledge-based companies.

Tavakoli et al. (2016) provided a conceptual model for evaluating technological innovation capabilities in knowledge-based companies, indicating that management has the most positive effect on technological innovation capabilities.

Khodami and Osanloo (2015) evaluated customer knowledge management ability to create innovation in business models, showing that improving capabilities in customization and decision-making conditions can enhance innovation and sales.

A review of prior research revealed that, while substantial work has been conducted on various aspects of business model innovation and lean startup approaches, a notable gap exists in comprehensive studies specifically addressing the evaluation of innovation and digital transformation within startup business models." Therefore, it is necessary to conduct detailed research in this field to inform future studies and practical applications.

## **Method**

The methodology of this study is descriptive-exploratory, and the research method is based on a qualitative approach. The researcher employed theme analysis to examine the variable under investigation: the evaluation of innovation and digital transformation in the business model of startups.

In terms of purpose, this research is classified as applied research. The primary research population consists of academic and industrial experts with experience in research and executive work in the field of lean startups (see Table 1). To select the samples, a purposive sampling method was initially used, followed by the snowball method. It is important to note that, data saturation determined the sample size. This means that if no new data are obtained in three consecutive interviews, the data will be considered saturated, provided that at least ten interviews have been analyzed (Francis et al., 2010). Ultimately, the researcher

conducted 14 interviews.

**Table 1. Characteristics of experts participating in the research**

| Row | work experience | Job Type           | Education     | Dedicated code | Interview duration |
|-----|-----------------|--------------------|---------------|----------------|--------------------|
| 1   | 12              | Startup Manager    | PhD Candidate | A1             | 40 minutes         |
| 2   | 10              | Startup Manager    | PhD           | A2             | 50 minutes         |
| 3   | 9               | Startup Manager    | Master        | A3             | 35 minutes         |
| 5   | 10              | Startup Manager    | Master        | A4             | 55 minutes         |
| 6   | 13              | University faculty | PhD           | A5             | 60 minutes         |
| 7   | 19              | University faculty | PhD           | A6             | 40 minutes         |
| 8   | 20              | University faculty | PhD           | A7             | 35 minutes         |
| 9   | 11              | University faculty | PhD           | A8             | 40 minutes         |
| 10  | 19              | University faculty | PhD           | A9             | 50 minutes         |
| 11  | 16              | University faculty | PhD           | A10            | 40 minutes         |
| 12  | 29              | University faculty | PhD           | A11            | 40 minutes         |
| 13  | 11              | University faculty | PhD           | A12            | 45 minutes         |
| 14  | 18              | University faculty | PhD           | A13            | 35 minutes         |
| 15  | 13              | University faculty | PhD           | A14            | 55 minutes         |

The research utilized documentary studies and exploratory interviews with experts to identify the dimensions and indicators for evaluating innovation in startup business models. It is worth noting that the interview questions were designed and edited in coordination with several experts. The interviewee participated in 45 to 60 minute interviews, during which their opinions were recorded.

Given the tools and qualitative nature of the research, the validity of the qualitative data was consolidated using the criterion of member

validity in the Newman validation method. Member validity occurs when a researcher returns field results to participants for their evaluation of adequacy. The study is considered valid for members when participating individuals recognize and understand the researcher's description in a way that accurately reflects their social reality. To measure reliability, several interviews were selected, re-conducted, and coded at specified intervals. The codes from the two intervals were compared, and the reliability of the retest interviews was calculated to be 0.77, indicating consistency in coding.

After conducting exploratory interviews with experts, the collected data were analyzed using the thematic analysis. Theme analysis is a method for identifying, analyzing, and reporting patterns (themes) within data. This method organizes the data and describes it in detail. The theme analysis process begins when the analyst identifies patterns of meaning and topics of potential interest. This analysis involves a continuous interplay between the data set, the encoded summaries, and the emerging analysis.

To perform this analysis, initial codes were first extracted from the interview texts, and aggregate codes were created from these initial codes. By examining and synthesizing these categories, components were identified and subsequently grouped into relevant dimensions, forming the final model.

### Findings

In this section, based on the thematic analysis, the codes extracted from the interviews were integrated into similar categories and, consequently, into the main themes related to the dimensions and components affecting the evaluation of innovation and digital transformation in business model of startups. The interviews were conducted with 14 participants, and the results are presented in Tables 2 and 3.

**Table 2. Basic topics included in the text of the interviews along with the relevant codes**

| The person interviewed | Basic themes taken from the text of the interviews | Dedicated code to basic themes |
|------------------------|--|--------------------------------|
|                        | Execution processes of the prototype product       | 1-1                            |



|               |   |     |
|---------------|---|-----|
| First one     |   |     |
|               | Accurate identification of customer needs in prototype construction                           | 1-2 |
|               | Initial product design based on identified needs  | 1-3 |
|               | Make a product evaluation team  | 1-4 |
|               | Procurement of quality raw materials in production design                                     | 1-5 |
|               | Prepare a comprehensive business plan along with providing indicators, criteria and standards | 1-6 |
| Second person | Target market size measurement  | 2-1 |
|               | Identify business differences compared to competitors   | 2-2 |
|               | Measure the ease of product entry into the market   | 2-3 |
|               | Make multifunctional product development teams  | 2-4 |
|               | Pay attention to market needs   | 2-5 |
|               | Pay attention to the connection with the network of investors and venture capital funds       | 2-6 |
|               | Take advantage of synergistic opportunities between similar startups                          | 2-7 |
|               | Use the services of experienced trainers  | 2-8 |
| Third person  | Identify and monitor applicant investors  | 3-1 |
|               | Identify and monitor market needs   | 3-2 |
|               | Review the entire production chain to sell the product  | 3-3 |
|               | Make product evaluation teams   | 3-4 |
|               | Pay attention to the quality of internal and external communication                           | 3-5 |
|               | Obtain continuous and continuous feedback from customers                                      | 3-6 |
| Fourth person | Existence of applicant and investor   | 4-1 |
|               | Prepare a comprehensive plan of product or service specifications                             | 4-2 |
|               | Attention to needs assessment   | 4-3 |
|               | Transparency of the entire production to sales and marketing of the product                   | 4-4 |
|               | Determine the necessities of a start-up business project                                      | 4-5 |
|               | Accurate aristocracy over what customers want   | 4-6 |
|               | Forecast the capital required for mass production of the product                              | 4-7 |

|                |  |     |
|----------------|--|-----|
|                | Constant information and communication with the startup environment                                  | 4-8 |
|                | Monitor market competitors   | 4-9 |
| Fifth person   | Pay attention to the idea from the customer's point of view means the value offered to the customers | 5-1 |
|                | Investigate the ability to earn profits and sustainable income from the created business             | 5-2 |
|                | Identify areas for growth and market penetration   | 5-3 |
|                | Make and employing creative and innovative teams   | 5-4 |
|                | Pay attention to the coordination and integration of all parts of the startup                        | 5-5 |
|                | Attention to synergy and coordination with stakeholders  | 5-6 |
| Sixth person   | Move towards taking advantage of market opportunities and needs                                      | 6-1 |
|                | Identify and monitor product marketing opportunities   | 6-2 |
|                | Identify changes in customer needs   | 6-3 |
|                | Get constant feedback from customers   | 6-4 |
|                | Evaluate the time required to test the product in the market   | 6-5 |
|                | Investigate possible errors in attracting customers  | 6-6 |
|                | Adapt the business model to the needs of the market  | 6-7 |
|                | Active and coordinated participation with stakeholders   | 6-8 |
| Seventh person | Pay attention to innovative startup strategy   | 7-1 |
|                | Pay attention to innovative new product development processes  | 7-2 |
|                | Pay attention to the type of communication and cooperation inside and outside the organization       | 7-3 |
|                | Ability to learn from previous experiences   | 7-4 |
|                | Ability to learn from the environment  | 7-5 |
|                | Integration and coordination between departments in the organization                                 | 7-6 |
|                | Accurate understanding of market opportunities and needs   | 7-7 |
|                | Pay attention to the appropriate information infrastructure in startups                              | 7-8 |
|                | Identify and monitor research and development costs  | 7-9 |
|                | Evaluate the effective relationship with partners and startup supply chain                           | 8-1 |

|  |   |  |
|--|---|--|
| Eighth person  | Measure technological change in the field in which the startup operates   | 8-2                                    |
|  | Measure the activity of competitors in the field in which the startup is active   | 8-3                                    |
|  | The cost of startups in the field of research and development   | 8-4                                    |
|  | The extent of effective recruitment of capable and creative manpower  | 8-5                                    |
|  | The amount of investment in innovative activities   | 8-6                                    |
|  | Measure the degree of innovation of the product or service offered by the startup in line with the observed needs of the market | 8-7                                    |
|  | Attention to innovative culture based on continuous learning  | 8-8                                    |
|  | Select the appropriate model to suit the internal and peripheral conditions of the startup                                      | 8-9                                    |
|  | Estimate and evaluate the risk of developing the right product or service   | 8-10                                   |
|  | Ninth person  | Measure the startup innovation process |
| Type of business model used in startups  |   | 9-2                                    |
| Monitor and measuring feedback received from customers   |   |  |
| The ability of the organization to provide the information and knowledge needed to develop innovative products |   | 9-3                                    |
| The ability of the organization to gather information through communication with market stakeholders           |   | 9-4                                    |
| The amount of knowledge absorption capacity of the organization  |   | 9-5                                    |
| Pay attention to the context in which business model innovation in lean startups It happens there              |   | 9-6                                    |
| Cover startup research and development costs   |   | 9-7                                    |
| Pay attention to the requirements of the process of creating and sharing knowledge at the startup level        |   | 9-8                                    |
| Have a clear and coherent strategy to lead and direct innovation in business                                   |   | 9-9                                    |
|  | The amount of research and development costs  | 10-1                                   |
|  | Pay attention to the intensity of cooperation and relationship with the supply chain  | 10-2                                   |
|  | Demand monitoring like local and domestic customers   | 10-3                                   |

|                 |   |       |
|-----------------|---|-------|
| Tenth person    | Have a clear strategy to guide investment in innovative activities  | 10-4  |
|                 | Attention to internal and external integrity  | 10-5  |
|                 | Pay attention to the environment in which the company operates  | 10-6  |
|                 | The extent to which the company pays attention to learning and adapting to environmental conditions                       | 10-7  |
|                 | Special focus on customer needs   | 10-8  |
|                 | Product or service modifications based on feedback received from customers  | 10-9  |
|                 | Identify market opportunities   | 10-10 |
|                 | Ability to organize organizational resources  | 10-11 |
|                 | Attention to environmental characteristics (including market dynamics and legal infrastructure)                           | 10-12 |
|                 | Market planning and analysis  | 10-13 |
|                 | Empower startup employees   | 10-14 |
|                 | Pay attention to the knowledge absorption capacity of the organization  | 10-15 |
|                 | Pay attention to adaptation to environmental and indigenous conditions  | 10-16 |
| Eleventh person | The special face of the manager to the precise design of the feedback loop build-evaluation-learning                      | 11-1  |
|                 | Attention to flexibility and central learning   | 11-2  |
|                 | The amount of things learned in the field of innovation   | 11-3  |
|                 | Extent of customer feedback in startup level products   | 11-4  |
|                 | Monitor market needs and peripheral opportunities   | 11-5  |
|                 | Ability to absorb, create and share knowledge   | 11-6  |
|                 | Pay attention to the innovation process and the requirements for its application and implementation at the start-up level | 11-7  |
|                 | Discover the needs of customers   | 11-8  |
|                 | Get constant feedback from customers  | 11-9  |
|                 | Accurate understanding of available capacities, potentials and resources  | 11-10 |
|                 | Gather the necessary information from the environment with a focus on customers   | 11-11 |
|                 | Focus on product features by getting frequent feedback from customers   | 12-1  |
|                 | Pay special attention to the stages of the product  | 12-2  |

|                   |   |       |
|-------------------|---|-------|
| Twelfth person    | cycle from idea generation to presentation to the market  |       |
|                   | Employ multi-functional product development teams   | 12-3  |
|                   | Attention to creating a learning-oriented culture to learn from the experiences of customers, competitors and ... | 12-4  |
|                   | Continuous monitoring of market opportunities and potentials  | 12-5  |
|                   | Predict market trends   | 12-6  |
|                   | Respond to feedback received from customers or considering their opinions   | 12-7  |
|                   | Pay attention to obtaining the opinions of all stakeholders at micro and macro levels                             | 12-8  |
| Thirteenth person | Pay attention to the type and level of innovation considered by the startup                                       | 13-1  |
|                   | Pay attention to market research costs  | 13-2  |
|                   | Pay attention to research and development costs   | 13-3  |
|                   | Company innovation policies and strategies  | 13-4  |
|                   | The ability to learn the company  | 13-5  |
|                   | Ability to absorb knowledge   | 13-6  |
|                   | Extent of cooperation with partners   | 13-7  |
|                   | Ability to analyze feedback received from the environment   | 13-8  |
|                   | The amount of investment of the company in innovative activities  | 13-9  |
|                   | Extent of presence in industrial clusters related to the activity and field of work of startups                   | 13-10 |
|                   | Special attention to customer-centric and customer-oriented   | 13-11 |
|                   | Understand and identify opportunities to reduce costs and make optimal use of resources                           | 13-12 |
|                   | Pay attention to innovation scheduling and successful change in business model                                    | 13-13 |
|                   | Identify value-creating and resource-wasting items in the innovative product development of the company           | 13-14 |
| Fourteenth person | Review and re-engineering of production processes   | 14-1  |
|                   | Reconfigure value creation in startups  | 14-2  |
|                   | Monitor customer needs  | 14-3  |
|                   | Continuous analysis of received feedback  | 14-4  |
|                   | Monitor customer needs  | 14-5  |

|  |   |       |
|--|---|-------|
|  | Pay attention to detailed planning  | 14-6  |
|  | Pay attention to the use of short and continuous learning cycles  | 14-7  |
|  | Understand market opportunities and needs   | 14-8  |
|  | Plan for market analysis  | 14-9  |
|  | Organizational readiness to absorb knowledge inside and outside the organization                                | 14-10 |
|  | Infrastructure and tools required for data mining   | 14-11 |
|  | Pay attention to the economic, cultural, political and technological environment in which the company operates. | 14-12 |
|  | Pay attention to the proper allocation of organizational resources  | 14-13 |

The aim of this phase was to provide a coherent interpretation of data. During the analysis, various codes and cases emerged, which were subsequently integrated. Initially, all factors extracted from the studies were codified, and then, some were grouped under similar concepts based on the meaning of the codes. This process led to the formation of classes containing similar subjects and concepts, from which classified themes and categories were developed. As a result of this process, 133 codes, 6 dimensions (factors), and 19 components were identified, as shown in Table 3.

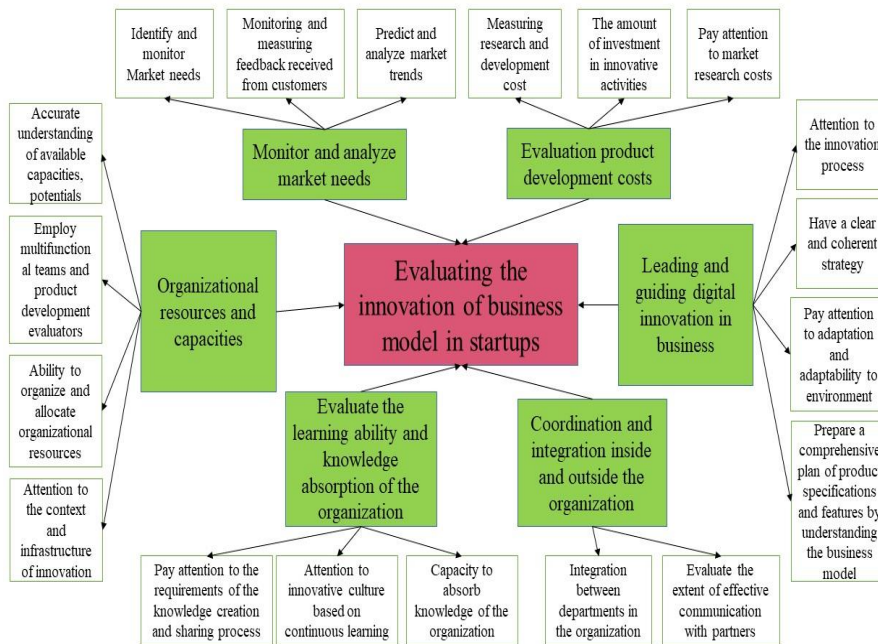
**Table 3. Compilation of Content Codes and Formation of Organizing and Comprehensive Themes**

| Comprehensive themes resulting from the aggregation of similar codes | Organizing themes                                      | Integration of basic theme codes   |
|--|--|--|
| Monitor and analyze market needs                                     | Identify and monitor market needs                      | 2-3,5-2,1-6,7-7,6-1,3-4,3-10,10-10,5-12,5-11,9-14,4-14,2-1,8-10,1-12,12-13,3-6,9-4 |
|  | Monitor and measuring feedback received from customers | 4-6,6-4,10-9,9-3,11-9,11-8,11-11,12-7,8-12,13-8,14-5,13-11,11-4,3-6,5-1,1-3        |

|  |  |  |
|--|--|--|
|  | Predict and analyze market trends  | 12-6,14-10,10-13,6-2,5-3   |
| Coordination and integration inside and outside the organization           | Evaluate the extent of effective communication with partners and the supply chain  | 8-1,10-2,5-6,9-5,13-7,13-10,7-3,6-8,10-6,8-4,3-5,4-1,3-1,2-6,2-7 |
|  | Integration and coordination between departments in the organization               | 7-6,10-5,5-5   |
| Evaluation product development costs                                       | Measure research and development costs   | 7-9,9-8,10-1,13-3,8-4  |
|  | The amount of investment in innovative activities                                  | 6-8,13-9,13-1,11-1,13-13   |
|  | Pay attention to market research costs   | 13-2,8-3,8-2,2-3,2-2,2-1,6-5,8-7,8-10,6-6,13-14                  |
| Evaluate the learning ability and knowledge absorption of the organization | The capacity to absorb knowledge of the organization                               | 9-6,9-4,10-15,13-6,14-11,13-5,7-4,7-5                            |
|  | Attention to innovative culture based on continuous learning                       | 8-8,11-3,10-7,12-4,14-8,11-2                                     |
|  | Pay attention to the requirements of the process of knowledge creation and sharing | 9-9,11-6   |
| Organizational resources and capacities                                    | Accurate understanding of available capacities, potentials and resources           | 11-10,14-12,1-5,2-8,10-14,4-7                                    |
|  | Employ multifunctional teams and product development evaluators                    | 12-3,3-4,5-4,2-4,1-4   |
|  | Ability to organize and allocate organizational resources                          | 14-14,10-11,8-5  |
|  | Attention to the context and infrastructure of innovation                          | 9-7,7-8  |
| Leading and guiding digital innovation in business                         | Attention to the innovation process (from idea generation to market presentation)  | 9-1,12-2,11-7,7-2,4-4,1-1,14-1,14-3,3-4,6-14                     |
|  | Have a clear and coherent strategy   | 10-4,9-10,13-4,7-1,4-5,5-2,9-2                                   |
|  | Pay attention to adaptation and adaptability to environmental conditions           | 10-16,10-12,14-13,8-9,6-7  |
|  | Prepare a comprehensive plan of product specifications and features by             | 2-4,6-1,7-14   |

|  |                                  |  |
|--|----------------------------------|--|
|  | understanding the business model |  |
|--|----------------------------------|--|

Considering the findings of Table 3 (qualitative analysis output based on the thematic analysis), six dimensions (factors) and 19 components can be proposed. Therefore, the proposed conceptual model of the research is as follows:



**Figure 1. Conceptual model**

After collecting and analyzing qualitative data using the theme analysis, the findings, as shown in Figure 1, led to the identification of six themes: "monitoring and analysis of market needs", "cost evaluation of product development", "leading and "guiding innovation and digital transformation in the business model", "coordination and Integration within and outside the organization", "assessing the ability to learn and absorb organizational knowledge" and "organizational resources and capacities". These themes, along with 19 components (sub-themes) are related to designing a model for business model for evaluating business model innovation within startup companies.

### Conclusion

This research aimed to design a model for evaluating innovation in



startup business models using a qualitative approach. 19 components (sub-themes) related to these themes were identified, which examine and explain the themes of the proposed model as follows:

**Theme 1: Monitor and analyze market needs**

Identifying and monitoring market needs, monitoring and measuring feedback from customers, and forecasting and analyzing market trends are three sub-themes that make up this theme. The role of this theme in designing a business model innovation evaluation model in lean startups is important because lean startups are fundamentally value-driven and customer-centric. They aim to create a flow of activities that consistently eliminate non-value-adding processes, thereby creating value for the customer (Ghezzi and Cavallo, 2020). By using lean approaches, these companies seek to fit the market and the product to successfully achieve their product presentation goals. Thus, monitoring and analyzing market needs are crucial in designing an innovation evaluation model for a business model.

**Theme 2: Evaluation product development costs**

Measuring the costs of research and development, the amount of investment in innovative activities, and paying attention to market research costs are the three sub-themes that constitute this theme. The role of this theme in designing a business model innovation evaluation model in lean startups is significant. Unlike established companies with a fixed business model, startups are in search of the right business model (Ries, 2011; Blank, 2013). Therefore, evaluating and measuring product development costs are critical to active and continuous search, which is at the heart of the lean startup approach.

**Theme 3: Leading and guiding digital innovation in business**

Paying attention to the innovation process (from idea generation to market presentation), having a clear and coherent strategy, ensuring compatibility and adaptability to environmental conditions, and preparing a comprehensive plan of product specifications and features are the four sub-themes of this theme. The role of this theme in designing a business model innovation evaluation model in lean startups is crucial. According to Landrozi and Lonso (2018), the advantage of lean startups lies in testing generated ideas in the simplest way possible to determine whether they are effective. In a lean startup business model, the goal is to identify a need or problem, examine possible solutions, and focus on the scalability of the solution to sustain the business. This requires innovation management based on a clear roadmap and strategy.

#### Theme 4: Coordination and integration inside and outside the organization

Integration and coordination between departments in the organization and evaluating the extent of effective communication with partners and the supply chain are two sub-themes of this theme. The role of this theme in designing a model for evaluating innovation of the business model in startups is essential. Due to the customer-centric approach of startups, they aim to form agile and customer-oriented development teams that utilize customer feedback for new product or service improvements (Ries, 2011). This requires extensive communication and coordination, both internally and externally, with partners and main actors within supply chain.

#### Theme 5: Evaluate the learning ability and knowledge absorption of the organization

Paying attention to the requirements for creating and sharing knowledge, fostering an innovative culture based on continuous learning, and the capacity to absorb organizational knowledge are the three sub-themes of this theme. The role of this theme in designing a business model innovation evaluation model in startups is crucial. Blank (2013) states that due to tight competition, the growing role of science and technology, and the speed of technological change, all organizations, including startups, feel pressured to change rapidly. The lean startup approach helps them accelerate digital innovation and transformation, requiring continuous learning at all levels.

#### Theme 6: Organizational resources and capacities

Accurate understanding of available capacities, potentials, and resources, employing multifunctional teams and product development auditors, organizing and allocating organizational resources, and attention to the context and infrastructure of innovation are the four sub-themes of this theme. The role of this theme in designing a model for evaluating innovation in startups is vital. Lean startups focus on identifying and creating customer value while developing products or services by eliminating waste. This requires a proper understanding of organizational resources and capacities, which makes this theme key in designing a business model innovation evaluation model.

Based on the research findings, it is suggested that managers in the technology field understand the importance of lean startups. The indicators in the proposed model may be considered to help prepare and empower startups to improve their products and services. Each proposed

dimension can be seen as a management skill necessary for the success of lean startups. Managers may create the appropriate conditions to integrate all of company capabilities. Future research may examine the proposed model in other knowledge-based and technology companies to refine and expand it, ensuring a comprehensive model for digital innovation in businesses, particularly in knowledge-based companies and startups.

**CONFLICT OF INTEREST:** The authors declare that they have no conflicts of interest regarding the publication of this manuscript.

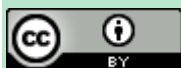
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