

# A New Perspective in the Evolution of Innovation Models Through Literature Review

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**Abstracts:** The new competitive scenarios in an economic environment characterized by globalization require constant adjustment of business strategies to generate new forms of managing organizational resources to promote innovation and the development of distinctive skills, and consequently achieve greater levels of competitive advantage and economic growth. This entails that companies must recognize the strategic value of innovation and incorporate innovation models into their management practices. This paper describes the last decade's evolution from a wide diversities of approaches regarding innovation models found in the review of the literature to determine how businesses may incorporate innovation models as a source of competitive advantage. A review of the literature was conducted by using the Scopus database to synthesize and analyze existing publications, particularly the conceptual frameworks in the innovation models proposed by researchers. The results obtained demonstrate the existence of key elements proposed for the development of innovative models, and the need to implement cyclical, ecological and dynamic innovation models to strengthen innovation management improving firms' adaptability in the technological environment. This paper his paper contributes to a growing body of literature and providing insight into how the joint of a new typology of innovation models creates a new perspective and provides an interesting and useful combination of conceptual frameworks for the development of innovation as a continuous process in management innovation models in organizations.

**Keywords:** Innovation, Models, Management, Perspective, Evolution.

## 1. INTRODUCTION

In the last decades, innovation models have been considered as a key factor in the global innovation landscape to respond quickly to changing markets by developing innovative products and services through the use of internal and external resources and capabilities. Therefore, in order to manage innovation, it is first necessary to understand what the implementation pathway looks like from the start with production, continuing through activation into a product or service that is marketable for business growth [1]. Despite all the improvements through the empirical research involving innovation processes, achieving a true capitalization of creative ideas in innovations has remained an elusive goal for many organizations for different reasons, among them, a lack of specialized professionals, economic resources, and lack of time to invest in long-term projects, and especially predicting knowledge risk in real-time [2, 3]. Therefore, innovation is considered part of business strategy that entails the organizations to respond proactively to market changes, globalization of economies, short product cycles and aggressive competition [4].

Nowadays, innovation management has become a significant factor in the world of business, particularly among organizations immersed in the knowledge-based economy [5]. Furthermore, the key factor in the field of innovation is to discover how businesses can develop innovative solutions for their products, processes and services [6]. According to the proposal given by Padmore et al., [7], a model of innovation has to keep some key elements of the cyclical model, with special emphasis on the chain-link model. The model describes the system from the perspective of the business, and according to the authors, it must have the following properties: (1) Flexible, but symmetrical in terms of structure, facilitating the generalization or specialization; (2) Simple, allowing those who create and implement policies to visualize their role in the system and; (3) Quantifiable, thus facilitating associations between businesses and different innovation process.

Following the line of literature review, and based on the ideas by Velasco *et al.*, [8], it has been brought to light that gaps and questions exist regarding the evolution of all the innovation models in the literature on innovation management. Thus, some authors have even concluded that to date no generalizable model of the innovation process has been developed, otherwise questioning the existence of such a model and posing it as unlikely [9, 10, 11]. Also, it becomes evident that research requires consolidation to strengthen the theoretical field, as well identify some characteristics to have a better idea how to incorporate new practices on the organizational level and promote the generation of knowledge. Hence, the use of tangible and intangible assets involves leaders having to keep in mind innovation activities to generate high-impact innovative processes through the use and application of tools, mechanisms and techniques that allow them to face the challenges of the competitive environment. In addition, the innovation Systems (IS) in the field of innovation are reflected in the corresponding participation of a wide range of interrelated agents and institutions to generate synergies or save costs within a group of companies and clusters of a particular region [12].

In this context, it is evident how businesses face various challenges in the global innovation scenario, such as the ability to respond quickly to market changes by developing innovative products and recognizing internal and external resources in order to reduce the amount of innovating time, which affects organizational performance. Research studies highlight the role of the organizational leader as being of vital influence for the process to be conducted continuously [13, 14, 15]. Then, innovative management practices must be sufficiently flexible to permit the development of dynamic skills in the companies, including the skill required in developing products; the ability to make strategic decisions; and the capacity to manage partnerships [16]. Besides, the top management has to lead the structure and strategy and encourage the development of activities related to innovation practices providing resources, and administrative and communication tools to the entire organization to facilitate the innovation process drives innovation management practices.

In academic literature, some authors have developed several models for achieving innovation, thus, some strategic alternatives for managing innovation have been already proposed [17, 18, 19, 6]. Another method of achieving innovation is defined by Chesbrough [2003] who considers innovation to be an independent process beyond the traditional boundaries of the organization toward an open innovation model. On the other hand, Osterwalder and Pigneur, [20] describe the strategy of innovative business models, with a series of methodologies through nine block activities related to each other which facilitates and provides a clear way to design and evaluate the innovation of business and value creation.

The current study analyzes the evolution of research on innovation models conducted by researchers and practitioners over the past decade. A deep Systematic Literature Review (SRL) method was conducted in this study by using the Scopus database covering full-text journals. This paper aims to highlight some different aspects, key points in common and the most frequently employed frameworks to strengthen the literature and generate new ideas and developments that might guide managers to incorporate new elements for improving innovation management. Thus, it is intended to answer the following research questions: What are the most important approaches in the last decade of evolution in innovation models?

This paper is structured as follows: first, an introduction to the topic of innovation models is made, which emphasizes the importance of the more significant academic studies that have been conducted until now and poses the research questions. Following the theoretical background, the methodology is described. Then the findings are explained, followed by a discussion and conclusions are presented. Finally, suggestions for future research indicate areas of opportunity for generating new conceptualizations in the field of innovation models.

## **2. THEORETICAL BACKGROUND**

### **2.1. Innovation Models**

From a theoretical perspective, a wide variety of approaches concerning innovation models were found in the review of the literature. Given that, the term “innovation models” has no common definition; due to many organizations taking different resources and skills according to the context and the specific needs of customers and

markets. Innovation is the introduction of a new good or production process, the creation of a new market, the use of a new raw material or the implementation of an innovative structure in a market [21]. Nevertheless, a model is defined as a proposal of a simplified external representation of a complex system for providing a solution to some known problem [22]. In this context, Pidd [23] defines a model as an internal and external representation that involves a part of reality, and it is seen by individuals who want to understand, change, manage and control some part of reality. Saren [24] offers a broader perspective on innovation models, which includes five types or categories, namely: Departmental stage models, Activity stage models, Decision stage-models, Conversion process stage-models and Response models. Consequently, innovation models are useful in that they aid management teams by providing a framework for action to face problems that need to be managed.

In this context, recent reviews of the literature, conducted by Zartha et al., [25] define “innovation models” and “innovation management models” should be treated as synonyms. Moreover, to manage innovation, it is first necessary to understand how is the path for implementation from the beginning with production, continuing through activation and materializing in a commercial for business growth [1].

Therefore, the current study defines innovation models as implementation through a set of activities and processes toward the achievement of continuous innovation results, beginning with creative processes, the conceptualization of goods and services, continuing with production and finally when the result is adopted by the market in the commercialization stage.

## 2.2. Review of the Innovation Models

In the academic field, there have been diverse approaches to evaluating innovation models. The first work of research into the innovation process occurred in the 1950s and 1960s, during the development of economies and the continuous growth of businesses that led to the conceptualization of new ways to develop products, essentially under a simple unit progression, which was represented as simple sequential linear models focused on research and development activities (R + D). Since the studies by Rothwell [13, 26] concerning innovative industrial processes, five generations of innovation models were defined in a timeline established for each of them. Table 1 describes the evolution of vertical and horizontal processes that strive to achieve more flexibility and efficiency in the manner in which they manage innovation activities to respond to market changes.

**Table 1. Innovation Model Generations**

| Type of Generation              | Period                   | Characteristics  |
|---------------------------------|--------------------------|--|
| First: Technology-driven model  | 1950s to mid-1960s       | -Great economic growth due to industrial expansion and new technological opportunities through research and development.<br>-The model is born into specific activities defined as input in basic science until the generation of new products for commercialization defined as output   |
| Second: Market attraction model | Mid-1960s to early 1970s | -Manufacturing employment remains static while activities of manufacturing productivity increases.<br>-Increase in industrial concentration; new products are introduced, which are mostly based on existing technologies, a model based on identifying market needs and concluding the sale of goods.                                 |
| Third: Innovation-linked model  | Early 1970s to mid-1980s | -High inflation rates and saturation of demand, adoption by businesses of consolidation and rationalization strategies.<br>-This model adopts the innovation process of studies on broad and systematic markets, starts with ideas and needs and continues toward many sectors and markets   |
| Fourth: Integrated model        | Early 1980s and 1990s    | -Concentration on businesses and the main technologies, greater strategic importance and evolution of technologies in general and strategic emphasis on technology accumulation.<br>-A new focus is on manufacturing, with a growing number of strategic partnerships among businesses for the integration and development of synergy. |

|                                   |                     |   |
|-----------------------------------|---------------------|---|
| Fifth: Systems and networks model | Beginning mid-1990s | -Concentration on the accumulation of technology with an emphasis on the ability to respond to the market as a principal factor. Businesses seek to apply integrated manufacturing and product strategies showing greater adaptability and flexibility. |
|-----------------------------------|---------------------|---|

Source: Author’s own work adapted from Rothwell [13]

Hence, each model is characterized for arising a response increasing complexity and rhythm of industrial–technological change in each period. Due to the innovation model evolution, products were essentially imposed upon the markets [27, 28, 29]. In the same stream of research, Rogers [30] and Schon [31] present a proposal of a few principles necessary for incorporating a system of innovation including age, educational background, gender, cognitive style and creativity of individuals. Edwards [15] also recognized that individuals are those who exercise the primary leadership role that facilitates innovation.

Studies carried out during the past decades have given greater relevance to defining and synthesizing the development chronologically, including some conceptual elements focusing more on business innovation models and network systems. Cooper [32] presents innovation as a process within a system defined as the Stage-Gate System. The model arises as a response to the number of mistakes of the industry in attempting to convert ideas into innovations, to have the ability to reach a commercialization step and therefore to provide the value creation and the generation of sustainable competitive advantages. (Figure 1).

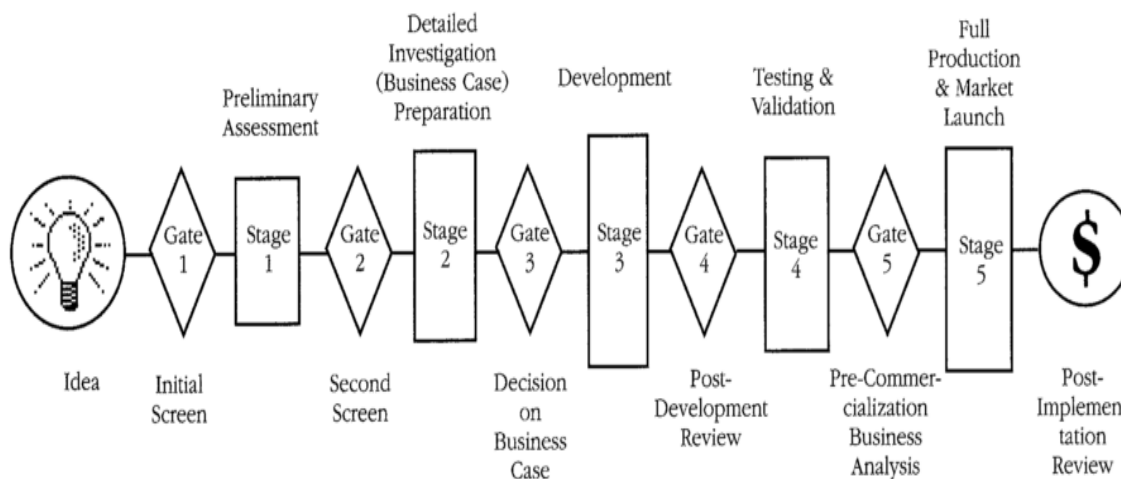
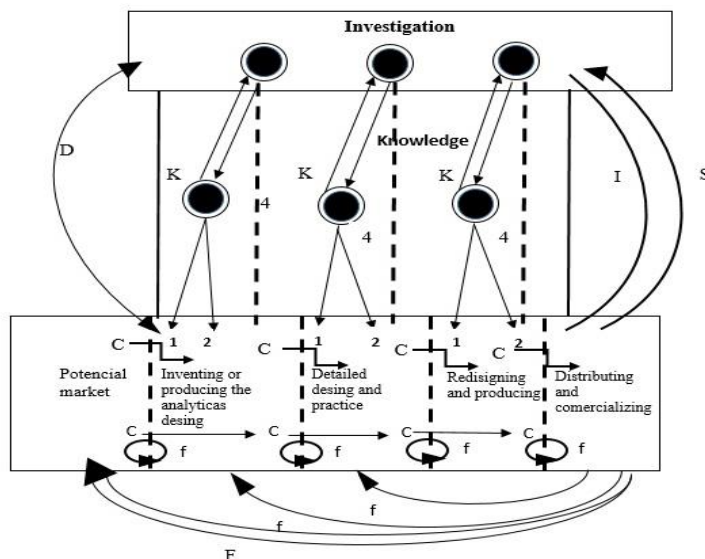


Figure 1. The Stage-Gate innovation model by Cooper [32].

Theoretically, the author illustrates the system of innovation as a set of processes, which may be managed by using a simple conceptual and operational methodology as a sequential plan for managing the creation of a new product and for improving the effectiveness and efficiency of results. In the Stage-Gate model, the process is divided into several steps or workstations, a quality control point exists between gates, which allows for the evaluation of potential and quality before proceeding to the next step to complete the pre-established requirements. This model also requires discipline and establishes a sequential pathway that facilitates the development of innovative products with a wide of applications among industries.

Other lines of research have been made to introduce a non-sequential process in innovation management, which involves a transformation from a regular lineal process to a circular and iterative model [33]. One of the best-knowns is the chain link, proposed by Kline and Rosenberg [34], which includes recommendations to innovators regarding internal and external searches for knowledge. The main characteristic of this model is related to the explanation of the various interactions necessary for achieving success in the innovation process (Fig. 2).



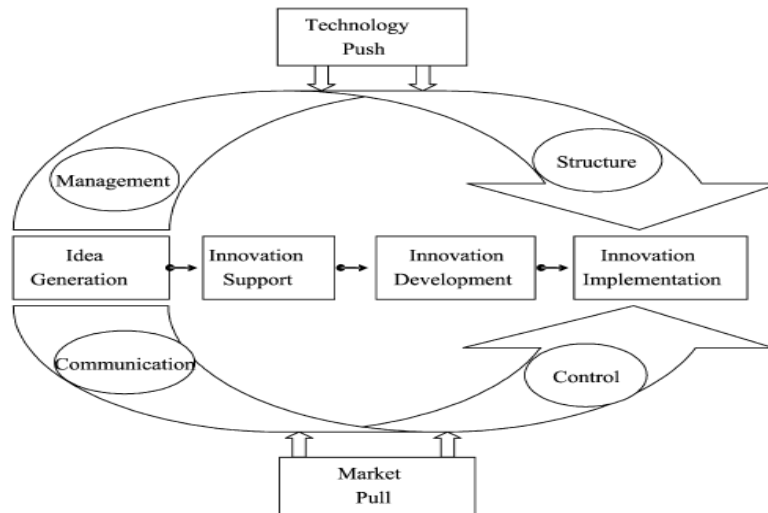
**Figure 2.** Chain-Link integrated innovation model by Kline and Rosenberg, [34].

The Chain-linked model showing information and cooperation paths. The symbols in the arrows correspond to C = central chain of innovation; F = feedback loops; f = particularly important feedback.

According to some authors, such as Bessant and Dodgson [35], this model is receiving increasing recognition among businesses. However, it must be noted that this model does not explain what drives the innovation motor and why some companies achieve more successful innovations in contrast with others. It also fails to analyze organizational learning, nor identifies the key characteristics of the organizational environment, that become more relevant in later proposed models analyzed in this study.

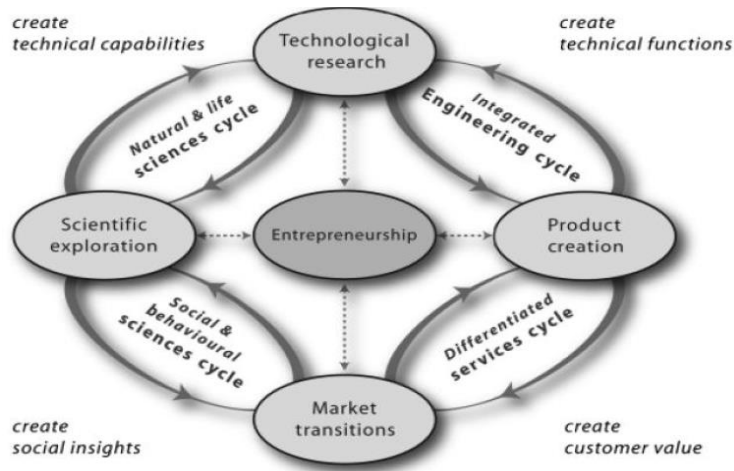
Further research explorations given by Marinova and Phillimore [36] have linked a timeline following the proposal by Rothwell [26]. These studies distinguish six generations of innovation models in the following order: (1) First generation – Black Box Model – this model defines innovation as an important economic activity for businesses. However, it does not explain the characteristics of research and development and argues that “businesses and industries that spend a relatively large amount on research and development (R + D) may tend to have relatively progressive management and have a vision for the future” [37]. (2) Second generation – Linear Model – this model integrates two innovation models proposed by Rothwell [26]. It considers innovation to be a series of steps organized under a sequence of activities, with the goal of technologies can be adopted by the markets; (3) Third generation – Interactive Models – this model does not consider innovation to be a sequential process but rather a circular and iterative chain-link process, as was described in the previous section. (4) Fourth generation – Systems Model – this model challenges the hierarchical barriers and includes institutions beyond the boundaries of the organization; thus, innovation is understood as a system with a strong emphasis on interactions, interconnectivity and synergy among companies.(5) Fifth generation – Evolutionary Model – this model defines the main aspects of innovation as consisting of certain elements such as variety, process selection, reproduction and succession, aptitude and adaptation. Some concepts related to this model are as follows: technological imperatives [38], innovation pathways [39], technological trajectories [40, 41, 42], and technological [43, 44] and techno-economic paradigms [45, 42].(6) Sixth generation – Innovation Media – this model highlights the importance of the geographical location of the business to generate knowledge according to Bramanti and Ratti [46], in which innovation is achieved using a combination of general knowledge and specific competencies.

Building on a previous review of the literature of the most relevant conceptual models in the area of innovation, Bernstein and Singh [47], propose a process innovation model through a multiple case study research design in nine biotechnology companies in the Australian industry (figure3).



**Figure 3.** Bernstein and Singh's [47] integrated innovation process model.

The model puts forward some general ideas from the market pull and technology push models described by Rothwell [26] and also incorporates within their model a key set of organizational management constructs such as management, communication, structure and control. The cyclic innovation model (CIM) represents the processes in innovation by a circle of change. Changes in science (left) and industry (right), and changes in technology (top) and markets (bottom) are cyclically interconnected. CIM is differentiated from other models by asserting that innovation can be initiated in any of the four cycles (see figure 4).



**Figure 4.** Cyclic Innovation Model (CIM). Ford, Trott, Simms, and Hartmann [18].

CIM addresses the four nodes that are essential in any innovation process and studies the activities in the four cycles that connect these nodes. CIM also provides a platform to formulate specific challenges about each cycle, along the way of the innovation process. In this way, CIM covers the entire innovation process in a non-linear way. Another distinguishing feature of CIM is the emphasis on the role of entrepreneurs.

The Entrepreneur in the center of the model plays a crucial role in overseeing and managing the activities in the four cycles.

In the context of the evolution of literature in the line of cyclical models, using a case study Ford, Trott, Simms, and Hartmann [18], argue that many current contemporary innovation models fail to respond to the dynamics of modern business practice in competitive environments. Consequently, the authors state that linear models are a false representation of what happens in innovative environments. It also provides a platform to undertake specific

innovation challenges in each cycle, covering the entire innovation process in a non-linear way. Another distinctive characteristic of CIM is the emphasis on the entrepreneurial activity at the center of the model, which plays a vital role in directing the activities across the entire model.

### 3. MATERIALS AND METHODS

The SRL was conducted to strengthen the theoretical knowledge innovation models given by scholars and practitioners. First SRL aims to synthesize and analyze existing publications, and second, to have a broader view of the different models and conceptual frameworks particularly in the innovation models proposed by researchers. The specialized database used was Scopus as it covers full-text journals indexed on the Web of Science. Therefore, a search was carried out to identify articles in the literature published within a 10-year period restricted from 2014 to 2023.

The research strategy used to obtain the sample according to the established search criteria was only to include articles with titles containing keywords for literature search: "Innovation Models," or for syntax purposes, "Models of Innovation.". This decision was made to achieve a broader perspective that would result in a greater number of articles to have a more complete and detailed body of references. Consequently, it was determined to exclude those articles without a clear theoretical figure or conceptual framework containing an innovation model process. Furthermore, another criterion of exclusion was to take into account only papers as a result of empirical studies in different industries.

The decision above was justified to provide managers and organizations with a more practical visualization of different aspects and variables that might become reference points to be incorporated in the field of innovation management. Finally, we include articles with innovation models applied to specific contexts, including innovation models involving social networking, technological environments, triple helix governance and educational models. In the next section, the findings are explained in detail.

### 4. RESULTS

Based on the analysis of the main academic journals published between 2014 and 2023 period, and criteria defined in the search equation by using two search keywords "Innovation Models" and "Models of Innovation," a total of 468 publications were identified, with the United States, China and the United Kingdom being the countries with the most scientific publications referring to innovation models, while in South America Brazil and Colombia are the first to appear in the rankings, as illustrated in the figure 5.

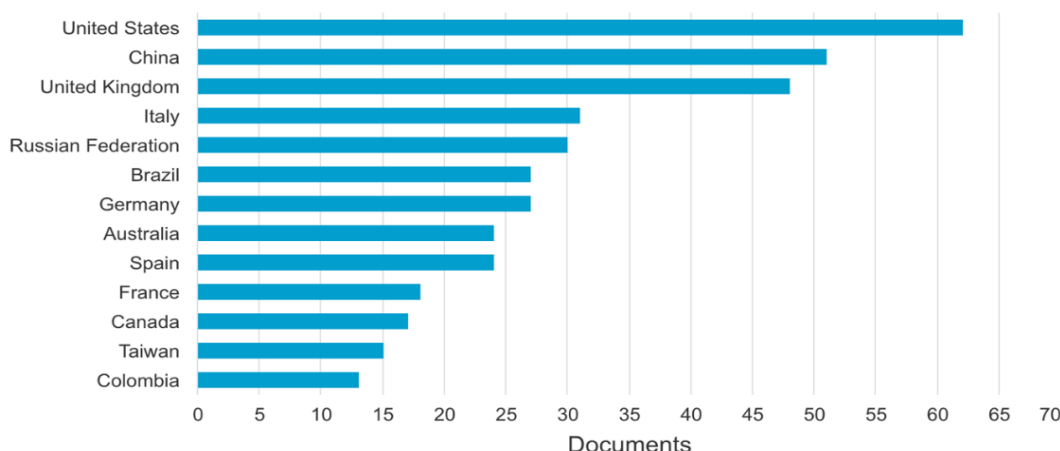
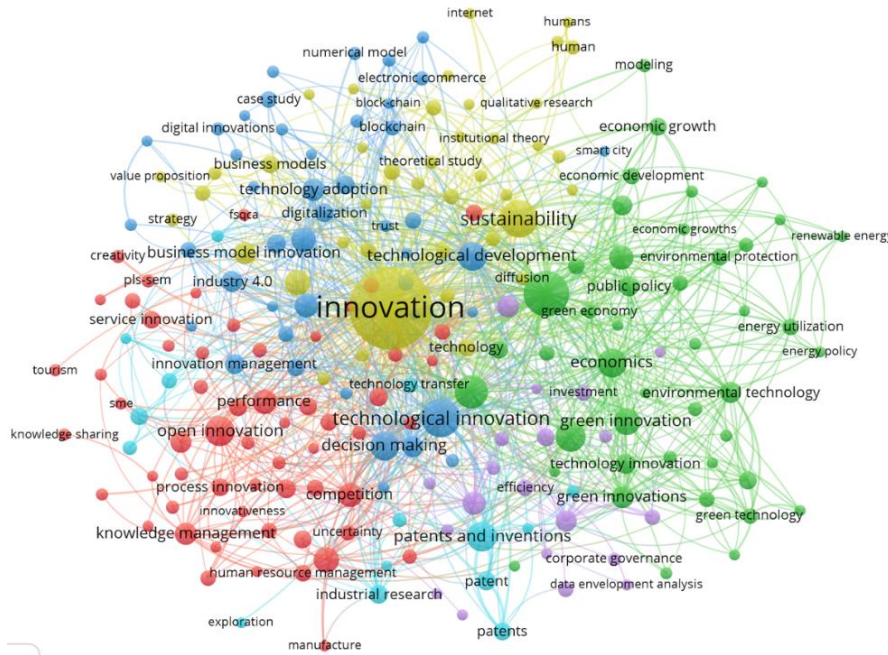


Figure 5. Results of documents found by country according to inclusion criteria

Next, to gather all the information from the summary and keywords of the articles found, the data was then exported to a CSV file. This data was then analyzed with the help of the VOSviewer software, which used algorithms and mathematical calculations to identify the words with the highest occurrence among the different articles found in the literature, as can be seen in figure 6.



**Figure 6.** Knowledge map segmented by year for innovation models

After a second filter was applied (“Business, Management and Accounting”) to include only research articles in the field of business, administration and accounting field, led to the result of 72 articles, 51 of which contained the first keyword (70.83%) and 21 of which contained the second (29.17%). The search was further refined by combining the two criteria mentioned above and analyzing the articles that remained relevant to the objectives of the study. Nine articles were finally identified (12.5%), which clearly defined innovation models and were selected for the review and integrated into the reference article body of knowledge used in the present study.

Table 2 shows a summary of the research articles included in the findings of the literature review, as well as the conceptualizations given by researchers in the innovation models field over the past decade.

**Table 2. Summary of innovation models**

| Authors                        | Conceptual Framework  | Key Variables   |
|--------------------------------|---|---|
| Figueiredo., <i>et al</i> [48] | The research examines the factors of the circular innovation model in the creation and transfer of private and public knowledge and innovation in high-risk environments in Portuguese small and medium-sized enterprises (SMEs). The study finds that knowledge creation presents the best return related to innovation. | 1. Knowledge creation 2. Knowledge transfer, 3. Public and private knowledge 4. Innovation management. 5. Risk          |
| Ting, [49]                     | Analyses a model of innovation diffusion in farmers in four rural villages in Perak, Malaysia. The results demonstrate that knowledge diffusion must be ensured and suggest strategies for researchers to transfer knowledge to farming communities using innovators through a social learning process.                   | 1. Collectivist community 2. Social acceptance 3. Innovators 4. Social learning theory 5. Model of innovation diffusion |
| Laud, Conduit and Karpen, [50] | This study examines the individual and social determinants that encourage members to generate novel ideas and then collaboratively advance these ideas through co-creation with other members under a co-creativity model based on open innovation.   | 1. Idea generation, (Co)creativity 3. Collaborative innovation 4. Cocreation model 5. Open innovation                   |
| Nikolova-                      | This paper analyses the relationships between technological,  | 1. eco-innovation activity 2. eco-  |



|  |   |   |
|--|---|---|
| Alexieva, [51]                           | financial, organizational and information resources, research and development (R&D) activities and cooperation between 380 industrial enterprises in all sectors of the Bulgarian economy by applying a structural innovation model focusing on eco-efficiency and eco-innovation | innovation model 3. eco-efficiency<br>4. Innovation 5. human resources<br>6. resources  |
| Müller, Buliga and Voigt [52]            | The study analyzes the redesign of established innovation models in response to the emergence of Industry 4.0 from 221 German industrial enterprises, with separate data for small and medium sized enterprises (SMEs) and large enterprises.                                     | 1. Industry 4.0 2. Technological Opportunities 3. Innovation strategies 4. Absorptive capacity 5. Exploratory and exploitative innovation |
| Álvarez-Aros, and Bernal-Torres [17]     | Model based on the concept of open innovation with an integral focus. Perceives model of innovation as the result of a joint activity of the business through the interaction with people and the formation and development of differential business skills                       | 1. Human potential 2. Culture; 3. Strategy; 4. Structure 5. Information technology  |
| Xavier, Naveiro, Aoussat, and Reyes [53] | The model includes a description of the flow of processes, systems or factors that affect sustainability by systematizing various factors of eco-innovation, such as strategy, policy, eco-design and environment, among others.  | 1. Internal processes 2. Sustainability; 3. strategy; 4. Ecology type 5. Environment 6. Policies  |
| Villarreal and Calvo [54]                | They propose an extension to the Triple Helix model, incorporating the legislative institution, and including the role of international cooperation to accelerate the process of transferring scientific and technological knowledge generated by industry                        | 1. Open innovation 2. Triple Helix; 3. Strategy; 4. International cooperation 5. technology knowledge                                     |
| Ford, Trott, Simms, and Hartmann [18]    | Cyclical innovation model (CIM) based on the ideas of Berkhout et al., [6]. Innovation activities may occur simultaneously in cycles that connect four nodes. Emphasizes on the role of the intrapreneur.   | 1. Technological investigation; 2. Creation of the product 3. Market decisions 4. Scientific research                                     |

**Source:** Author's own work

The review of the literature revealed the evolution of the various innovation models mainly by the authors over the past decade. Based on the relevance to the objective, it was possible to establish theoretical implications to broaden the theoretical field and knowledge about innovation models and their impact on innovation management. Authors from this research also present different theoretical dimensions of innovation models in detail from the 1950s until the present.

## 5. DISCUSSIONS

The main purpose of this study was to identify the factors in the economic context that required the managers of the organizations to evaluate how they generated goods and services. To achieve this goal, it was necessary to rely on innovation models to face the specific difficulties in ten years of evolution. The starting point of innovation model representation began with linear models based on science and research, composed essentially of a systematic process. Then, it was necessary to break barriers through the cyclical and dynamic models, with the basic idea that innovation may originate from any point of the innovation system and even from the outside. Further attempts were made to classify a generational concept of innovation models proposed by Rothwell [26]. This Author focused on some characteristics of each evolutionary cycle and how the innovation models were the subject of research in the agendas of the researchers regarding, how every specific innovation process was necessary to generate new technologies and learning required to face technological changes in the industry.

In the same line of research, Marinova and Phillimore [36] who examined a timeline similar to Rothwell [13] conceptualized the innovation models in six generations before arriving at contemporary innovation models. They also highlighted the necessity of synergy among organizations to promote the development of collaborative strategies, alliances and exchanges based on the innovation cluster [55]. Therefore, analyses of the results of the present study also highlight the importance of having innovation models for organization renewal and should be regarded as a critical new trend among innovative industries. Although the positive effects of promoting innovation models for innovation management are well known, the research identified a current debate concerning which are the most important activities that directly influence innovation, in particular, those internal processes that affect the ability of a business to innovate [6]. However, the primary function of innovation management is not reliance on an explicit innovation model, but the organization must rely on knowledge, interconnection and communication

channels networks between each of the processes under interactive systems to achieve successful innovation. This agrees with the findings of Ford et al., [18] and Laud, Conduit and Karpen, [50] and confirms the importance of a contemporary innovation model that requires the integration of multiple functions and disciplines to help in the development of products, services and innovative processes through co-creation with stakeholders. Despite, there is a marked tendency to envision innovation in terms of linear models such as Stage-Gate in the innovation strategy, today's organizational dynamics and processes are not necessarily linear considering that in the organizational dynamics, not all processes and their respective phases are necessarily linear. Thus, it becomes necessary to foster knowledge creation and, knowledge transfers through, public and private knowledge helping innovation managers to use resources with deep learning to avoid risk in the innovation process [48].

Additionally, this research provided empirical evidence concerning how managers have to face the challenges of finding a new way to implement better innovation practices based on cyclical and dynamic innovation models to anticipate the market and understand the internal skills that are closely tied to the cyclical processes to integrate resources, experiences, learning and thereby accelerating the abilities of the business to generate innovation continuously [19]. Nevertheless, it also involves focusing on internal characteristics and understanding the entire innovative process from a perspective that extends beyond the organization, with better practices in terms of the function of generating innovation along with the human capital and socially responsible practices in ecological ways.

The results reinforce the existing findings in the literature described by Nikolova-Alexieva, [51], who argues that the main function of an innovation model is not only to innovate in products, processes or services but also to manage innovation in the company, by creating partnerships with consumers and ensuring sustainable development by applying new methods to create value and trust in society. In the same way, it has been shown that people working in a community and belonging to a collectivist society, its members do not simply follow existing practices; individuals proactively seek new information to innovate [49]. Therefore, the leader of the innovation process must understand that the new competitive landscape requires a strategic view that is characterized by flexibility and a breakdown of traditional paradigms [56]. Moreover, in the business community there is a need to establish policies involving innovation, systems and strategies favoring collaborative work with communities, clients, governments, universities and innovation centers to generate new ideas, goods and services to compete in more demanding markets through eco-design and environment demands [52, 23].

The present work presents implications of a managerial nature; therefore, leaders of organizations must not seek to focus exclusively on the innovative process and rely on resources and skills, but also it is necessary to establish a strong culture, structure and strategy beneath the model of the intra-entrepreneur. An efficient organization must have intra-entrepreneurs capable of promoting ideas, implementing innovative processes and taking risks to integrate new processes and activities for innovation success [57]. These leaders should act as agents of change, promoting innovation according to modern management practices and novel innovation models. Hence, managers and practitioners must seek to manage innovation more efficiently, with self-directed innovation teams that generate the knowledge required for organizational learning innovation does not occur in isolation, it is the sum of many talents required to achieve it [54].

This study extends the current research especially from a new perspective of innovation models. Hereby, it is important to consider that, given the need for businesses to innovate in globalized economies, organizations must always provide the conditions necessary for leaders and teams of collaborators to develop a high level of innovation, as was argued by Álvarez-Aros, and Bernal-Torres [17], they state that an innovation model is the result of a series of routines that in a collaborative way in the company through the interaction of knowledge with people allows the development of differential competencies and skills to face the continuous changes in the markets. Hence, providing a more environment to generate knowledge for promoting individual and collective skills and competencies to react faster to changes in the environment than rival companies. As a whole, innovation models promote the continuous adjustment of the business strategy and thus contribute to the achievement of a better result in the development of innovative goods and services.

## CONCLUSIONS

This study integrates the most recent efforts on the part of researchers to understand the evolutionary process of innovation models over the past decade, to reinforce the theoretical field regarding the characteristics and the representations that are most common and widely accepted in the literature, for business leaders to gain a greater understanding that will help them to carry out more effectively the innovation activities required for innovation management.

Extending prior research, this study outlines key points to be considered for the development and implementation of innovation models in any organizations under a new perspective. Thus, it was possible to relate the key elements and variables that help to strengthen the field of knowledge on the theoretical level. In this context, it is of crucial importance that the organizations have a well-defined innovation model strategy, besides establishing an adequate structure aligned with the demands of innovation for promoting a culture of teamwork in innovation activities. Moreover, it has been evident that although in the previous three decades there was a marked tendency toward linear models, the current review of the past decade reveals a significant use of cyclical, ecological, dynamic and open innovation models for any type of organization and technology context helping to broaden the field of knowledge.

The results from this review show several insights concerning how businesses may strengthen the implementation of innovation models as a source of competitive advantage by incorporating new analytical elements. Thus, the current study was able to determine that if a company wishes to innovate more effectively, it must rely on the figure of the intra-entrepreneur as the leader and central axis for the model as a whole to function. Thus, the leader plays a central role in any innovation model, regardless of whether the design is linear, cyclical, ecological or open. It is through the leader that the vision of an organization may be guided and encouraged in full harmony with the interests of the followers and teamwork to manage innovation.

This article also recognizes the existence of several limitations. First, although many models exist with similar variables and representations, it is still difficult to demonstrate at the theoretical level that they may be generalized, given the context and particularities involving the resources and skills possessed by each business; second, the contribution to the understanding is still limited concerning how to implement business models in emergent companies with limited resources.

Future areas of research may contribute at the theoretical level in the field of innovation models knowledge through new research concerning how to incorporate innovation models that strengthen entrepreneurial and innovation ecosystems, due to the current tendency of governments to join forces and institutions to support the birth and strengthening of enterprises in the global economy. Academic research is missing the exploration of another interesting business field, specifically, the implementation of innovation models in spin-offs, nonprofit organizations and small technological businesses.

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