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Transitioning corporate models and processes towards sustainable practices and adopting a circular economy approach

abstract

The upper management of many firms is increasingly prioritizing the ramifications of rapid global warming, depleting resources, and the escalating loss of entire ecosystems. The onus of resolving the ensuing issues is entrusted to political or social entities. Nevertheless, the growing consciousness among consumers and the general public regarding price fluctuations and scarcity issues in the supply of raw materials, along with the adherence to corporate laws and the value chain, are exerting mounting pressure. In this regard, the sustainability of a company serves as a competitive advantage. This initiative is strategic and presents substantial opportunities for growth. The circular economy, which is an eco-friendly kind of economics, integrates both ecological and economic advantages. Adopting circular business models, which deviate from linear consumption and prioritize sustainable decoupling of economic growth from resource use, is crucial for the advancement towards a circular economy. Linking commercial interests with ecological forms of the economy is a necessary condition for initiating a process of reevaluation. It is a subsidiary corporation. Within the literature, numerous methodologies exist for developing novel circular business models that incorporate sustainability considerations.

Keywords: business models, systemic transformation, sustainable business practices, circular economy

1. introduction

The involvement of businesses in sustainable development has been expressly acknowledged, however there is less knowledge regarding the level of engagement of different business sectors with the SDGs [1]. Sustainable development encompasses the utilization of resources, human progress, and commercial transactions [2]. The existing linear business models, which have restricted resources and limited capacity, are incapable of recycling trash. Consequently, the global environmental issue has not only declined, but has been steadily increasing and worsening [3].

Finland issued the world's inaugural national roadmap to a circular economy [4], which offers a significant chance to establish sustainable prosperity and achieve a thriving carbon-free circular economy within the next 5-10 years. Research and development focused on transitioning business models to a circular economy and sustainable development is highly significant and can provide valuable insights for governments, shareholders, firms, and startups. This modification should be implemented across three distinct tiers: the macro level encompassing cities, provinces, regions, and nations; the medium level comprising networks and eco-industrial parks; and the micro level involving individual enterprises and consumers [5].

In addition, in the current intricate and ever-changing business landscape, organizations must adapt and update their business models in order to remain competitive. It is necessary to reinvent the process by which corporations generate value and comply with SDG ideals. The linear industrial paradigm should transition into a model characterized by reduced use of raw materials and enhanced recycling practices. Crucially, the transition to sustainable systems can be undertaken at the corporate level [6-7].

Henry et al. [8] argue that new business models enable the shift from a linear economy to a circular one. The majority of research focuses on the cyclical nature of the economy, with less emphasis on the essential variables required for the transition, such as the alteration of business models. The research on circular economy, sustainability, and business model innovation is still in its early stages. Despite 10 years of effort [9], little consideration has been given to incorporating sustainability into the company model. Hence, further research and inquiries are required in this domain.

Furthermore, European countries have experienced an annual growth rate of over 10% in the utilization of renewable energy. This accounts for nearly one-fourth of the global consumption of renewable energy. It is worth noting that the primary objective of most European countries is to enhance the production of renewable energy [11]. The European Union has set a target to achieve carbon neutrality and mitigate the effects on the climate by 2050. Finland is recognized as one of the top countries in terms of utilizing renewable resources [12]. Nevertheless, scholars in the energy sector have seldom examined associated business models. Social, environmental and economic objectives, such as greater energy security, job creation and reduced greenhouse gas emissions, are difficult to explain under current frameworks, and a new paradigm is needed to facilitate transition sustainability.

2. Circular economy

Circular economy refers to an economic system that aims to minimize waste and maximize the use of resources by promoting the reuse, recycling, and regeneration of materials. Transitioning the economy from its current linear model to a cyclical model would

yield substantial financial savings of hundreds of billions of dollars for the EU, while simultaneously mitigating the detrimental effects on the natural environment [13,14]. The circular economy (CE) has gained significant attention as a prominent and contemporary push towards sustainability [15-16].

The concepts of sustainability and circular economy (CE) are of significant importance to governments, investors, enterprises, and civil society. Sustainability entails achieving a harmonious synthesis of economic productivity, social inclusivity, and environmental resilience to promote the well-being of both present and future generations. The concept of sustainability and circular economy (CE) gained prominence in the 2010s [17]. To attain a more efficient and productive economic system, it is necessary to restrict, decelerate, and intentionally halt the movement of resources and energy [18]. The primary objective of advocating for a circular economy is to decouple environmental stress from economic expansion and well-being. The primary objective of the circular economy is to minimize resource consumption, energy usage, and waste generation by ensuring the continuous reintegration of consumed resources into the economic system. All resources involved in the economic cycle must be effectively managed as perpetual renewable resources.

The concept of circular economy (CE) is frequently regarded as a method to attain sustainability [19].

3. Recurring business models

Although it is a current trend, epochal economics is built on old principles, therefore it makes sense to classify it. It encompasses definitions, the beginnings of the movement, and its core ideas. A circular economy was perhaps initially conceptualized in a report by the Ellen MacArthur Foundation as "an industrial system that is restorative or regenerative by intent and design" [13]. This entails actively seeking and generating prospects to transform the notion of "end of life" into a cradle-to-cradle scenario, transitioning from the use of non-renewable resources to renewable energies, replacing harmful chemicals with their complete eradication, and eliminating excessive waste. The achievement of outstanding design in materials, goods, systems, and business models is facilitated [13]. The concept of circular economy offers a fresh outlook on resources, energy, value generation, and entrepreneurship [14].

Linder and Willander provide a definition of a circular business model as "a business model that relies on the economic value that remains in products after they have been utilized to create new products" (p. 2). The reference is Mentink [20]. A circular economy is defined as an economic system that operates with closed material loops, whereas a circular business model refers to the strategic approach that an organization employs to generate, deliver, and collect value inside closed material loops. According to him, circular business models do not necessarily have the primary goal of balancing ecological, social, and environmental demands. However, they can nonetheless contribute to sustainability objectives simultaneously [20]. Nevertheless, an alternative method is also endorsed in the academic literature.

Prior studies indicate that business models possess attributes that can result in long-term competitive advantage and exceptional financial performance [21]. Nevertheless, endeavors to capture business models and evaluate their influence on company outcomes have predominantly relied on qualitative approaches, often employing one or more case studies, but with little capacity to extrapolate findings (Malone et al. 2006; Zott and Amit 2007). The range of numbers is from 22 to 23. However, Morris et al. (2006) [24]. Some individuals have suggested a methodology that takes into account 18 distinct variables that can be utilized throughout a diverse range of organizations from various sectors, with all 18 variables encompassing all recognized decision-making areas. Nevertheless, this comprehensive approach may be unnecessarily complex, especially when it comes to identifying typical models that are applicable to a specific variable in an industry. Moreover, nuanced variations in industry and market frameworks, competitive dynamics, environmental circumstances, and cost structures pose challenges when attempting to compare models across different industries. By doing study inside a certain industry, researchers can concentrate on the most pertinent aspects that contribute to the development of sustainable business models. This approach allows for the identification of the top models in that particular industry and facilitates the comparison of their performance. While there may not be universally applicable business models that span across all industries, it is possible to identify clusters of companies with similar business models within specific industries.

4. Approaches to circular business models

Implementing a circular economy necessitates the adoption of inventive business models that either supplant current models or seize fresh prospects. These models are recognized as a primary obstacle to the effective establishment of a circular economy [25]. Ranswood et al. examined six potential methods for generating circular value: short cycle, long cycle, cascade, pure circle, immaterial services, and on-demand manufacturing.

Nineteen circular business models are classified based on these potentialities. These circular business models encompass and bolster the majority of sustainable business model archetypes that are improved by circular business models to promote sustainability [26].

Pironi et al. present an extensive analysis of the evolution of the circular business model in their literature study [27]. This article methodically identifies and contrasts 92 strategies for the sustainable and circular advancement of business model innovations. The analysis highlighted additional research requirements in the following domains:

- Examining the interconnectedness of a business model as a whole system.
- Creation of realistic methodologies and techniques for systematic analysis of material movement between different companies.
- Incorporation of human behavioral factors.

Boken et al proposed various directions for further research to facilitate the implementation and optimization of circular business models. In conclusion, future research should focus on developing novel circular business models that are best suited for businesses and can facilitate the transition to a circular economy by effectively supporting organizational reforms and replacing existing dominating business models. O assistance [28]

The research requirements arising from the existing literature indicate a notable similarity and highlight the current research gap in the integration of circular business collaboration. This integration aims to leverage synergy and symbiotic effects, while also enhancing the networking potential of environmental and economic benefits. Moreover, it is imperative to analyze the ways in which cutting-edge technology and digital ecosystems facilitate the adoption of circular economic models that are environmentally beneficial. Converting a conventional business model into digital ecosystems with circular business models is a significant challenge for firms, and existing strategy patterns offer limited assistance.

1. Initial deliberations

Under the prevailing linear economic model, there is a looming threat of irreversible harm to our natural ecosystem, and there is a growing consciousness among individuals regarding these realities.

Hence, the objective of this model is to transform the firm by considering shifts in customer behavior and legislation, diminishing reliance on resources, and securing competitive advantages. With the objective of achieving this goal, we have created a framework that adopts a systems approach to drive change. This framework facilitates the development of unique circular business models and integrates them into a cohesive ecosystem.

An envisioning of the digital ecosystem as a facilitator for circular business models.

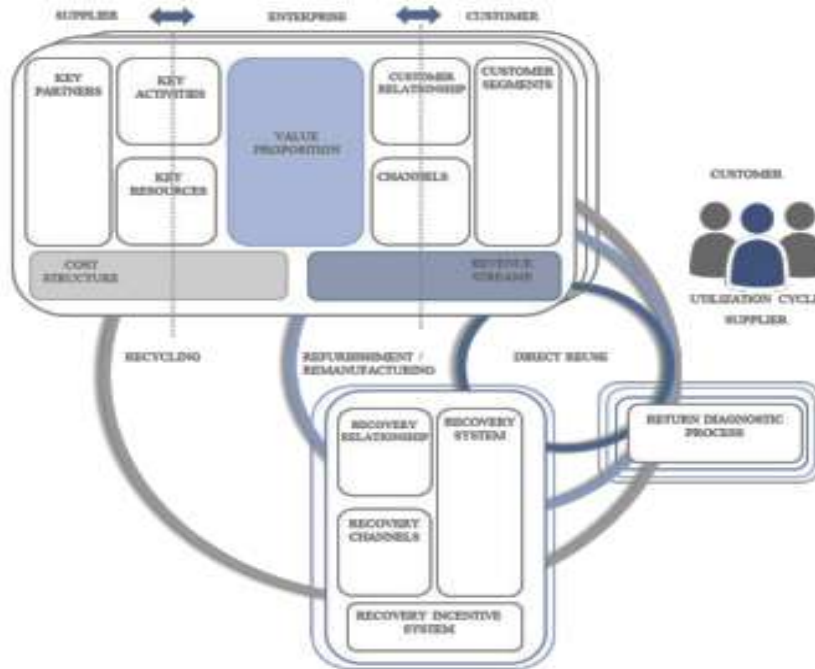
The ecosystem approach is useful as it enables a shift towards a new framework of economic collaboration [29], elucidating the interconnectedness of various corporate activities and technology, with innovation as the focal point. Transforms into [30]. In order to establish circular business models, it is crucial to shift the focus from a narrow view of supply chains to a holistic view that emphasizes the value generation of various players within an ecosystem [30].

Hence, it is imperative for organizations to have a broader outlook and comprehend that products and services have a profound impact on the entire lifespan of a corporation. Within a digital ecosystem, organizations and independent individuals engage in collaborative efforts, anticipating mutually beneficial and harmonious outcomes from their work. A digital platform that effectively facilitates these partnerships is essential to the core of a digital ecosystem. The digital platform facilitates the interaction and coordination of multiple partners within a network, resulting in mutual benefits for all participants. Digital ecosystems are necessary to facilitate circular business models because to the intricate nature of two-way information and material flows, the growing number of partners involved in a circular economy, and the need for inter-company and inter-industry interaction. Digital ecosystems facilitate the coordination of interconnected activities and technology, leading to the emergence of novel ideas and strategies in the creation of circular value networks. Nevertheless, digital ecosystems have the capability to not only facilitate the execution and handling of circular business models, but also have a significant impact on their growth and advancement. The digital platform enables the participation of various stakeholders, including suppliers, customers, value creation partners, and social actors, in the development of circular business processes. This involvement can take place through crowd-building areas, for instance.

Development patterns of business models for the circular economy

The model's development is rooted in the main business model canvas [31] and is designed with rotational value creation structures at various levels, irrespective of the company or industry. It incorporates the concept of an ecosystem as a facilitator to disrupt the prevailing linear economy's reliance on sales and raw material extraction [32]. This enables the identification of circular value creation mechanisms. The ideas can be categorized into five modules. The diagram below illustrates the specific regions of the business model canvas that are impacted by varying levels of recovery, as indicated by distinct colors. When directly reusing something, it is important to take into account the design of income streams, along with other patterns of customer connection.

To rebuild the cascade, one must modify the value proposition of the model and customer models during the process of circular value creation. When multiple organizations participate in circular value creation, it is imperative to establish a framework for the interaction between the partners during the restructuring and renewal processes. The recycling of materials into secondary raw materials represents the most basic kind of circular value generation. The replacement of primary raw materials with secondary raw



materials has an impact on the patterns of supply and largely impacts the structure of costs.

Figure 1. An exemplar for constructing circular business models

Integration of value streams in both horizontal and cross-functional directions.

In the future, it is imperative to adopt a more holistic approach when considering business models, particularly those that deviate from the traditional linear consumption model.

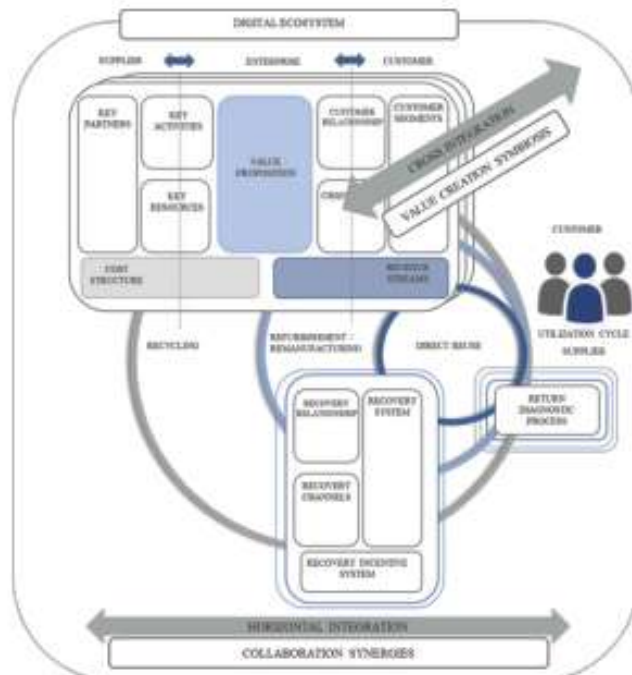


Figure 2. An exemplar for formulating circular business models

The approach incorporates horizontal integration to foster collaboration and mutual integration, enabling the exploitation of sector-independent symbiosis and generating synergistic effects. This ensures that new forms of cooperation in circular value creation networks are not limited by firm or industry borders.

Channels for the process of recovery

The "Recovery Channels" module is an essential component in the creation of circular business models. It outlines the company's methods of communication and engagement with consumer groups that return products, parts, and secondary raw materials to suppliers once they have reached the end of their usage cycle. Recovery channels encompass both direct and indirect methods, which involve many stages such as parts awareness, evaluation, repurchase, reverse logistics, and post-recovery services. Efficient communication is a crucial determinant of success for recovery pathways. Digital ecosystems have the capability to manage and potentially enhance these intricate information streams inside circular business models. AI algorithms enable the early detection of future changes and enhance the accuracy of demand and yield forecasting in value-added circular networks.

System for promoting and encouraging recovery

The "Recovery Incentive System" module facilitates the identification of novel approaches to attract and allocate resources for the recuperation of utilized items and materials. The incentives for companies include enhanced consumer loyalty, decreased procurement expenses, and heightened manufacturer accountability, leading to compliance with regulatory and sustainable marketing standards. Customers can reap the advantages of financial incentives as a motivation for returning items or by utilizing payment models depending on consumption. Additionally, they can see a decrease in trash amounts and the subsequent expenses of disposal. Within this module, it is crucial to establish the allocation of return costs and the involvement of partners in both environmental and economic advantages. Algorithms in digital computing platforms may assess intricate cost/benefit ratios in circular business models, ensuring that potential advantages are distributed evenly among all partners involved through the synergy of industrial symbiosis.

Analytical reasoning

Through our extensive study, we have devised a model that expands upon the existing business model canvas in order to create business models that are specifically tailored for circular economies. The content encompasses a comprehensive examination of digital ecosystems, which serve as facilitators of intricate networks that generate circular added value. Additionally, it explores their role in generating novel concepts for circular business models. Through our practical study with enterprises, it became evident that incentive systems, such as synergies and industrial symbioses, play a crucial role in expediting the circular economy. Both horizontal and cross-industry integration facilitate novel collaborations and the development of circular shared value propositions.

Constraints

At present, original equipment manufacturers (OEMs) possess the ability to implement circular business models due to their advantageous closeness to their clients.

Nevertheless, a solitary company is incapable of executing sustainable circular business strategies.

Instead, the primary emphasis should be on the shared value proposition for both customers and partners, as well as the necessary processes involved.

Hence, it is crucial for organizations to establish circular processes not just for their own business model, but also for the business models of other companies engaged in the complete product or service development process. In order to achieve this objective, it is necessary to create organizational structures that go beyond the limits of individual companies and facilitate the holistic advancement of circular business models that are also aligned with digital ecosystems. The created model facilitates a systematic approach to constructing a circular business model; however, it lacks options for processes, technologies, or design principles that are appropriate for digital ecosystems. Examining potential circular business models and ecological patterns can assist in refining and implementing them. At present, there is an insufficiency of computer models to articulate the possible advantages in contrast to linear economics. Quantifying the economic profit potential of circular business models can facilitate the growth of value-added circular networks and motivate partners to adopt sustainable economic practices.

Corporate sustainability

A comprehensive analysis of 190 scientific papers conducted by academics at Oxford University revealed that socio-economic and corporate governance elements have a direct correlation with enhanced operational outcomes, reduced capital expenses, and increased stock price performance in corporate sustainability. The economy prioritizes fulfilling its commitments to customers and

society, and takes proactive measures to ensure these are upheld. Assessing the sustainability of a project or initiative is crucial, and the value statement can provide a quantifiable measure of its social, environmental, and economic impact. Companies strive for innovation to generate economic, social, and environmental benefits [34].

Furthermore, enhancing the economic and ecological efficiency of companies results in increased value and enhanced competitiveness. In order to transition firms from traditional models to sustainable business models, innovation is imperative [35].

Zhang et al. (2014) assert that sustainable practices can yield both economic and environmental advantages. The development of sustainable management and performance in a company presents an opportunity for business growth. Therefore, incorporating sustainability components into the business model can greatly benefit organizations. Running (2000) suggests that this can be achieved through social technological innovations and creating an environment conducive to sustainability. Government policies should align with economic developments to enable the attainment of lasting competitive advantages. Collaboration among companies, the government, and other institutions is crucial for achieving a sustainable society. This collaboration results in the development of sustainable technologies and the enhancement of environmental and social performance of companies [37]. The interaction between governments, industrial sectors, and companies facilitates the integration of companies and enhances their sustainability performance [38].

The primary metrics used to assess the economic aspect

Accurate assessment of the sustainability process and its incorporation into corporate reporting can be accomplished by emphasizing the primary performance indicators. Conventional financial performance metrics may not adequately address the needs of sustainability development and associated endeavors. Organizations should consider their individual circumstances and requirements when determining the significance of key performance indicators. To establish the primary measures of financial performance, it is crucial to provide shareholders with suitable scales for assessing sustainable performance. The primary metrics used to assess the economic aspect encompass both financial data and traditional non-financial data, which are disclosed in financial statements and analyzed by managers"[38]".

Designing a business model

The staff model has presented an exceptional approach to rival other business strategies. Unlike Sturwalder's business model, the staff method examines each service as an individual entity and as a network of companies that deliver it. Analyses the service, furthermore, the team effectively addresses the technological design challenges associated with the services that contribute to the implementation and advancement of urban information and communication technology. The staff method encompasses a range of fundamental design considerations and key variables for success that pertain to services, technology organizations, and the financial aspects of business models. The design of critical issues in the field of services is influenced by concepts from the service field, marketing and sales services, as well as user experience theories. These concepts include the ideas put forth by Gernros (1992), Wargo and Lach (2004), Granros (2007), Kettler (2000), Edwardson and colleagues (2006), and Payne and Gilmore (1999). The technology domain plays a role in defining the design of critical issues at various levels, such as infrastructures, platforms, applications, and software within organizations. These designs are necessary to support the delivery of services within organizations. Barney (1991) and partners (Pfeiffer and Salanik, 1978; Topkett et al., 2000) are in competition with each other. Regarding the breadth of finance, this encompasses investment strategies (Rankman, (2000)) as well as pricing and income models. Should be taken into consideration. The concepts in the model are derived from theories originating from other fields. This method is a pragmatic approach to address design issues and achieve desired outcomes, which has been extensively employed in several real-world scenarios. Haghigi has been applied in various sectors including telecommunications, information and communication technology, media, e-health, and energy (see to a review by Bowman et al., 2008 [39]).

Various elements of the business model

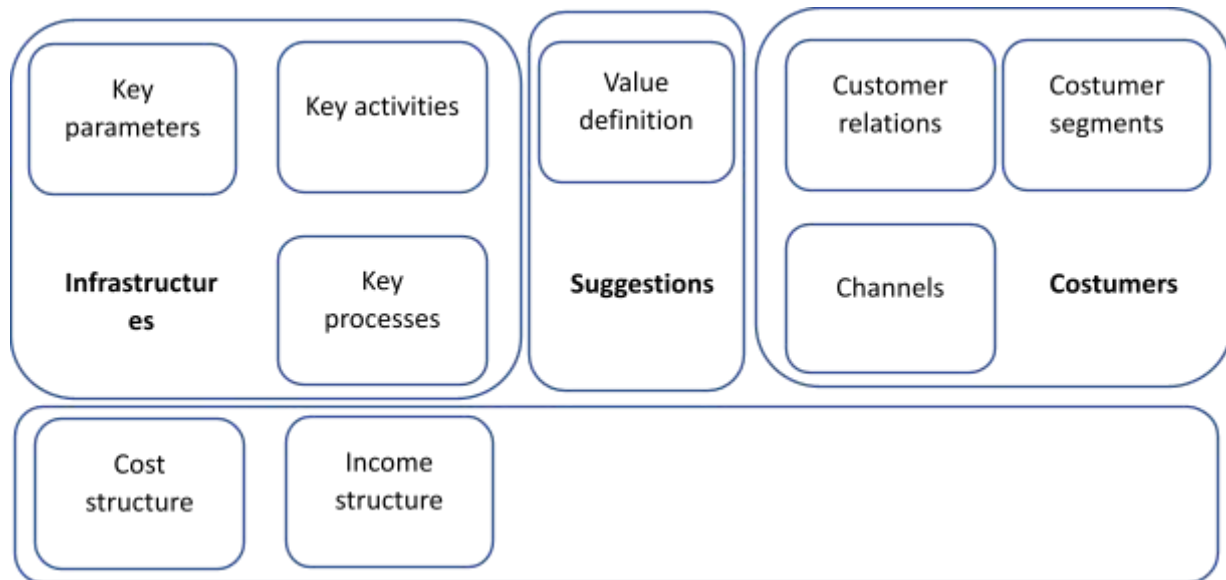
To gain further clarity, it is advisable to refer to the business model map. This map is derived on Aster Walder's comprehensive interpretation of the business model, enabling companies to experiment with many alternatives inside their business by utilizing the nine components of the business model. The components are completed.

- Target audience

The term "value" refers to the worth or importance that is assigned to something based on its qualities, usefulness, or significance.

- Customer communication
- Methods of communication
- Essential assets

- Primary collaborators
- Primary tasks or actions
- Financial framework



- Revenue source

The diagram below illustrates all of these elements in a schematic and juxtaposed manner "[40]."

Figure 5-2 displays the many components of a business model [40].

Alterations to the business model

The basis of the changes that are generated in the business model are the inherent dynamism of the business model. The genesis and basis of these dynamics are split into three primary types, which are:

- ⇒ Business model changes
- ⇒ Implementation of strategy
- ⇒ Key characteristics

Each of these three groups has different subsets as shown in the table below. [41].

Table 1. Different facets of the underlying dynamism of the company model [41].

| Business model changes | Strategy implementation | Key features |
|--|--|--|
| New services/products | Strategic development processes | Identify business opportunities |
| New markets/customers | Growth strategies | Experience using new business opportunity ideas |
| Changes in the value chain | Development across business model dimensions (product lines, customer segments, distribution channels, value creation activities and geographic markets) | Purchase and allocation of all kinds of resources (human, financial, intangible, etc.) |
| Changes in the way value is produced | Various policies and measures related to quality | method of leadership |
| changes in how to perceive the value of changes in the income model) | Various policies and measures Related to the cost structure | Characteristics of organizational culture |
| Changes in key activities | | Interaction of business owners |
| Changes in key resources | | |
| Changes in the cost structure | | |

Changing the business model

With the foundation of any commercial enterprise, a business model is applied either openly (objective, legislative) or covertly (mental, developmental) [42].

Since rapid changes in the economic, cultural, political and technological environment have led to the complexity of the environment of organizations, we notice that organizations no longer have stability and enterprises evolve dynamically. Business models are also a depiction of business at a specific moment. [43].

Domestic background

Khodayi [44]. In research, he explored innovation in the company model with a sustainable development strategy and leading issues. The result of this research showed that the implementation of the sustainable innovation business model faces a series of challenges that hinder the success of business model innovation in organizations due to the lack of adequate follow-up of ideas, lack of implementation of concepts and failure in the market. Business becomes. Helping managers by guiding and predicting the problems facing sustainable business model innovation leads to a higher adoption rate of sustainable business models and a better success rate of sustainable investments and startups. As a result, more profit for customers, greater value for stakeholders and economic growth will follow.

Jahrami, [45]. In research named innovation in business model (new component of competitive advantage). It indicated that bigger organizations have higher potential to capture value from innovation in business model while older companies show less flexibility for innovation in business model due to old age. Also, more expertise in the field of coalition and its longer length leads to a rise in ideas for innovation in the business model.

Borjawii Magdar and Hosseini [46]. In research, they evaluated the influence of open innovation and business model innovation on the performance of knowledge-based organizations. The statistical population of this research comprised managers and vice presidents of knowledge-based organizations. The data collection tool is a questionnaire and Cronbach's alpha method was used to measure the reliability, which reveals the excellent reliability of the surveys. Structural equation modeling and SPSS software were utilized to test the research hypotheses. The results of the research reveal that open innovation has a good and significant impact on business model innovation, and this affects the performance of knowledge-based enterprises headquartered in Bushehr Science and Technology Park.

Foreign background

Anderson et al. [47]. In research, they studied the relationship between business model innovation and value creation. In this research, a multi-sector business model has been built and its relationship with providing value for suppliers, buyers and the company's platform has been studied. The results of the research reveal that the innovation of the business model provides positive value for each class of suppliers, buyers and corporate platform and leads to competitive advantage.

Footer et al. [48]. In research after research, they explored the impact of entrepreneurial behaviors on business model innovation and investment performance. By examining the data gathered from 128 investment companies using partial least squares structural equation modeling, the efficiency of entrepreneurship for business model innovation has been determined according to different degrees of company growth. The results of the research demonstrated that entrepreneurial activity leads to business model innovation under the medium growth conditions of the industry. Also, the data demonstrated that business model innovation boosts investment performance.

5. conclusion

Changing the business model or the change in the business model has garnered the attention of many researchers. On the other hand, based on the findings of past study, managers of startups and small and medium firms pay less attention to information about the environment and rivals. However, the structure of the market and the degree of competition considerably determine the success and failure of businesses. It is crucial that firms establish circular processes not just for their own business model, but also for the business models of other companies involved in the full creation process of a product or service. To this purpose, organizational structures must be devised that transcend firm boundaries and enable the integrated creation of circular business models that are also connected to digital ecosystems. The created model offers an organized approach to the construction of a circular business model – however there is no choice of procedures, technology or design standards suitable for digital ecosystems. An examination of possible circular business models and ecosystem patterns can help refine and implement them. Currently, there is a paucity of computer models to represent the possible benefits compared to linear economics. A quantitative representation of the economic profit potential of circular business models can help to grow value-added circular networks and inspire the engaged partners for sustainable economic forms. During the research, it was revealed that both technical prerequisites and logistical structures are

Present are the existing linear economic forms with circular value generation structures. Therefore, thinking in economy, politics and society is of tremendous importance. The suggested paradigm for the development of circular business models can help generate new circular forms of cooperation facilitated by digital ecosystems. The focus of the concept is on expanding the usage of synergies and useful symbiotic effects throughout the life cycle of products, services and materials offered via horizontal and cross integration. However, these impacts are currently poorly understood and consequently seldom leveraged as competitive advantages.

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