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Understanding Business Model Construction Regarding Neuron Structure: Synapsis

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Abstract

Neuroscience is getting more attention for management and organization studies in the literature. It is widely used in different fields such as organizational behavior, marketing, leadership, strategic management, finance, and human resources. Business model construction is analyzed regarding the neuroscience approach in this study. To discover the connection between them, three propositions are presented in the study. The proposed propositions regarding literature studies are explained. The proposed propositions aim at establishing a successful business model taking into account neuron structure and synapsis process. This study will shed light on lights relationship between elements of the business model regarding synapsis in neuroscience. It will be used as a guide to sustain the success of the business models. Also, the study will fill the gap in business model studies in neuroscience.

Keywords

Business Model, Neuroscience, Synapsis, Ecology Theory

1. Introduction

The nervous system plays a critical role in the human body due to the transmission of messages to the brain thus it provides to activate organs of the body (Hall, 2005). In other words, it triggers organs of the body under brain control. Neuroscience which is related to the nervous system is effectively used for organization and management studies (Healey & Hodgkinson, 2014; Brown, Colville, & Pye, 2015; Matusz, Dikker, Huth, & Perrodin, 2019; Lindebaum & Jordan, 2014). Neuroscience has been more attention to improve management and organization studies in the literature such as organizational behavior, marketing, strategic management, leadership studies, human resource management, etc. (Öberg, 2023; Ward, Volk & Becker, 2015; Waldman & Balthazard, 2015).

Regarding Cristofaro et al. study, the biggest majority of the neuroscience papers is related to conceptual with 52 percent, the second majority is empirical studies with 39 percent in selected 23 papers. Also, the authors indicated that there is an average of two publications about neuroscience in management in a year (Cristofaro, Giardino, Malizia, & Mastrogiorgio, 2022). Jack et al. pointed out there was an increase in publishing neuroscience papers from 2000 to 2015 (Jack, Rochford, Friedman, Passarelli, & Boyatzis, 2019). Also, the authors indicated that the number of articles in management journals citing at least one neuroscience article has increased year by year.

For the sustainable business model, adaptation plays a critical role (Nosratabadi, Mosavi, Shamshirband, Zavadskas, Rakotonirainy, & Chau, 2019). For adaptation, there is a need for an uninterrupted connection between elements of the business model and innovation to handle changing conditions (Evans, Vladimirova, Holgado, Van Fossen, Yang, Silva, & Barlow, 2017). At this point, the nervous system provides a coherent view respect with to ecological theory. In the nervous system, neurons create a perfect connection via synaptic vesicles. They convey information seamlessly from one to another (Waymire, 1997). The uninterrupted connection provides the integration of business model elements. Thus, they do their functions regarding inputs from another element in a coherent way.

For the evaluation process in ecology theory, the Myelin sheath speeds up transformation information between neurons (Biology). From the business view, key performance indicators (KPIs) accelerate understanding of the performance of each element to achieve defined goals (Domínguez, Pérez, Rubio, & Zapata, 2019). Gates presented a paper about the business considering the speed of thought during the digital era. The author mentioned that a digital nervous system eliminates wasting resources including saving time with respect to eliminating non-value-added work (Gates, 1999).

In summary, when neurons collect signals and transmit them to the brain to make decisions (Dangermond & Goodchild, 2020) elements of the business model via defined key performance indicators inform decision-makers of the business to discover the performance of the business. Herein, there are obvious analogies between the nervous system and the business model. The nervous system provides a comprehensive vision to understand for distribution and processing of information in a holistic view (Dangermond & Goodchild, 2020). The advantages of engaging between business models and nervous systems for the advancement of understanding of business models are as follows:

- provides sustainability of the model,
- prepares the ground for the innovation of the model,
- increases performance via key performance indicators,
- provides an understanding of the importance of the connection between elements,
- adapts to changing conditions.

Although there are different studies about neuroscience in different management and organization fields (Healey & Hodgkinson, 2014; Brown, Colville, &

Pye, 2015; Matusz, Dikker, Huth, & Perrodin, 2019; Lindebaum & Jordan, 2014; Senior, Lee, & Butler, 2011; Beugré, 2018), there is a lack of studies on the business model association with neuroscience. This study aims to fill the gap in discovering the relationship between business model elements regarding the nervous system. The paper looks for answers questions below.

1) Could the business model elements be associated with neurons in the nervous system?

2) Does the sub-criteria of elements behave like synaptic vesicles?

3) Could the relationship between business model elements be associated with the synapsis process?

To answer the questions, three propositions are presented in the fourth part of the study. The proposed propositions are explained regarding literature studies. The paper is structured as follows. Literature studies are conducted in two ways such as organization studies with neuroscience and business models with neuroscience in Section 2. The nervous system is analyzed in detail from a cell nucleus to the synapsis process in Section 3. In the fourth part, the relationship of the business model with the nervous system is analyzed with proposed propositions. Finally, the conclusion and discussion are presented in Section 5. Also, future insights are presented in the last part.

2. Literature Review

Literature studies were conducted from two perspectives which are neuroscience with organization studies including behavior, leadership, and management, and neuroscience with business model. Although there is an increasing number of neuroscience studies in the literature, there is a lack of focus on presenting concrete advantages of using neuroscience methods (Lindebaum & Jordan, 2014). In the business model science studies, case studies were presented using neuroscientific principles (Shahand, van Duffelen, & Olabarriaga, 2015; Cai & Ni, 2022). However, there is still a need to focus study on elements of the business models regarding neuroscience approaches. From this point, this study aims to fill this gap regarding focus on snaps in the nervous system.

2.1. Organization Studies with Neuroscience

To understand neuroscience approaches to organization studies, Healey and Hodgkinson analyzed organizational neuroscience to discover the relationship between management and organization studies and neuroscience. The authors indicated literature claims based on philosophical and ethical grounds (Healey & Hodgkinson, 2014). Brown et al. presented a study about making sense in organization studies. The authors wanted to discover how people enact their realities. They replied following questions, respectively. How is sense made through discourse? What is the effect of politics and power on sense-making? Analyzing the nature of micro and macro sense-making, the relationship between sensemaking and identities. Lastly, what is the role of sense-making in decision-making and change

management (Brown, Colville, & Pye, 2015)? Matusz et al. asked a question to find out neuroscience applications in the real world. They want to investigate cognitive functions and underline brain mechanisms in real-world environments. The authors indicated that there are differences between real-world neuroscientific approaches and real-world neuroscience research. In addition, they summarized the similarities between them Matusz, Dikker, Huth, & Perrodin, 2019).

From organizational behavior study views, Senior et al. studied organizational behavior taking into account Organizational cognitive neuroscience (OCN). The aim of the study is to find out the brain's effect on organizational behavior. A research framework was presented with research questions. In the last part of the study, a wide range of techniques were presented that were used by organizational researchers (Senior, Lee, & Butler, 2011). Beugre proposed a study about the neuroscience of organizational behavior. The study includes the nature of organizational neuroscience, methods of organizational neuroscience, the neural basis of decision-making, the neural basis of innovation and creativity, and the neural basis of leadership. The author advocates that organizational neuroscience is a multidisciplinary field including neuroscience, neuroeconomics, cognitive psychology, social cognitive neuroscience, and organizational behavior (Beugré, 2018). Lindebaum and Jordan criticized neuroscientific methodologies in organizational behavior and management studies in their studies. They avoided presenting general statements by asking research questions. The authors gave practical information for behavioral changes in the study (Lindebaum & Jordan, 2014). Changing organizational behavior was handled with a neuroscience-based approach by Rock. The author used principles of neuroleadership to change organizational behavior and proposed a framework that consists of priorities, habits, and systems. The author advocated that by using neuroscience methods, organizations can sustain lasting behavioral change (Rock, 2018).

From a leadership perspective, Parra et al. proposed three-dimensional Serious Games (3DSGs) under an evidence-centered design (ECD) framework using organizational neuroscience-based eye-tracking measures to capture behavioral signals regarding leadership skills. According to the results, neuroscience measure methods enable an objective assessment to achieve high validity (Parra, Chicchi Giglioli, Philip, Carrasco-Ribelles, Marín-Morales, & Alcaniz Raya, 2021). Waldman and Balthazard presented a new lens to discover leadership processes in organizations. The authors aimed to show the potential advantages of using neuroscience approaches over traditional methods. Findings showed that effective and not-so-effective leaders can be distinguished neurologically. Also, they proposed using neurofeedback techniques to help develop leadership qualities in people (Waldman & Balthazard, 2015).

2.2. Business Model with Neuroscience

Based on neuroscience methods, Zhou and Wang presented the innovation of platform economy regarding a business model driven by BP neural network and

artificial intelligence technology (Zhou & Wang, 2022). In the study, business-to-business e-commerce company competitiveness was evaluated by the BP neural network algorithm. Results showed that keeping innovation face during time provides to enterprises meeting the needs of customers and the market. Cai et al. investigated the relationship between the sharing economy and the new business model regarding the BP neural network. Results showed that with the development of society and technology, the sharing economy has got faster and faster. For this reason, enterprises need to adjust their model regarding changing conditions (Cai & Ni, 2022).

From a technology view, Yao presented a study about the design of the brand business model based on technology applications such as big data and the Internet of Things. To understand consumers' needs, the author developed a support decision method to analyze conducted a survey with 400 people. According to the results, consumers preferred a simple and minimalist style for brand design (Yao, 2022). Rajab and Sharma analyzed the Neuro-Fuzzy System (NFS) for tackling different real-world problems in different business domains. They indicated NFS was widely used in finance, marketing, distribution, business planning, information systems, production, and operations from 2005-2015. In addition, they presented innovative methodologies in NFS to deal with different business problems (Rajab & Sharma, 2018).

Regarding a neuroscience case study, Shahand et al. proposed the business model canvas on science gateways sustainability taking into account the case study of a neuroscience gateway (Shahand, van Duffelen, & Olabarriaga, 2015). The authors pivoted the business model canvas for the neuroscience gateway. From this point, this study will be a guide for other science gateways to develop and pivot during time their business models.

From the principle perspective, Heydenfeldt asked if are neuroscientific principles relevant in efforts to manage change successfully. In the study, using the change management perspective, human behaviors were analyzed in the business area regarding neurological insights to produce creative and successful solutions (Heydenfeldt, 2010).

Cucino, Passarelli, Di Minin, & Cariola (2022) explained the role of neuroscience in different disciplines in **Figure 1**. According to **Figure 1**, neuroscience is interconnected with leadership and entrepreneurship in business management. Most scholars argue that the use of neuroscience entrepreneurship studies is considered in its own right (Arvey, Zhang, Avolio, & Krueger, 2007). For the leadership perspective, it can be defined by the organizational neuroscience study of (Hannah, Balthazard, Waldman, Jennings, & Thatcher, 2013). Regarding Nofal, Nicolaou, Symeonidou, & Shane (2018) study, neuroscience is seen as a biology of the business framework. At this point, the business model under the business framework connects the nervous system regarding biological structure. Shearer (1958) proposed a study that indicated within general system theory, the human body can be viewed as a business enterprise because of its communication system.

The author indicated that the human nervous system can be used to explain the communication system of enterprises. Faghih, Bavandpour, & Forouharfar (2017) proposed a similarity between living organisms and organizations. From this perspective, they advocated that finding analogous malfunctions will be a guide to discovering the diagnosis of organizational symptoms. Also, the authors associated the neural system behaving like an organization such as its predefined function in a perfect manner.

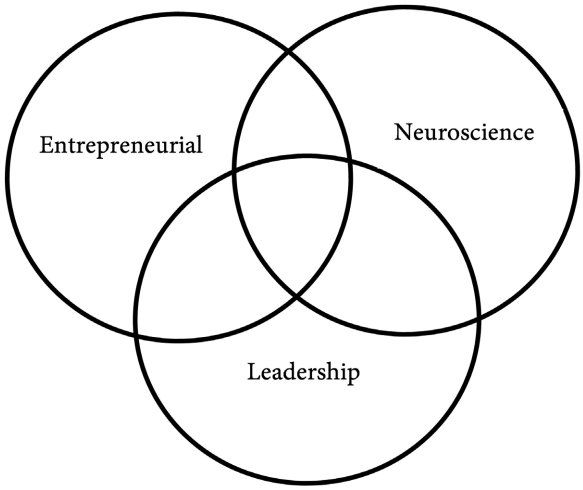

Figure 1. The role of neuroscience (Cucino, Passarelli, Di Minin, & Cariola, 2022).

3. Nervous System

The neural system helps to maintain and control the living organism according to the peripheral stimulus. It provides communication between organ systems within the body (Gibbons, 2019). The nervous system can be seen as an orchestrator of organisms' functionality to ensure optimal functioning (Sabina, Zakhrokhon, & Gulamovna, 2024). The nervous system is composed of two main regions that are central nervous system (CNS) and the peripheral nervous system (PNS). When the CNS includes the brain and spinal cord, the PNS contains the remaining parts of the CNS (Sabina, Zakhrokhon, & Gulamovna, 2024).

PNS function is to carry information via stimuli by sensory receptors from the internal and external environment to the CNS. The PNS contains both somatic and visceral nerve fibres. When somatic nerve fibres are related to conscious movements and sensory interaction regarding external signs, visceral ones are called automatic nerve systems because of control unconscious movements (Bazira, 2021). Regarding the studies, the autonomic nervous system covers both CNS and PNS, and they act together synchronously (Banerjee, Das, & Mukherjee, 2023). In summary, information is analyzed in CNS that sends the signals to the target organ via PNS.

The relationship between PNS and CNS is summarized in **Figure 2**. The signals are taken by sensory receptors in the first phase. They are conveyed via afferent neurons through PNS to the CNS in the second phase. The CNS analyzes the in-

formation within the synapse using inter-neurons in the third phase. The results of the analysis are conveyed via efferent neurons using axons in the fourth phase. Lastly, muscle gets the signal and acts regarding it.

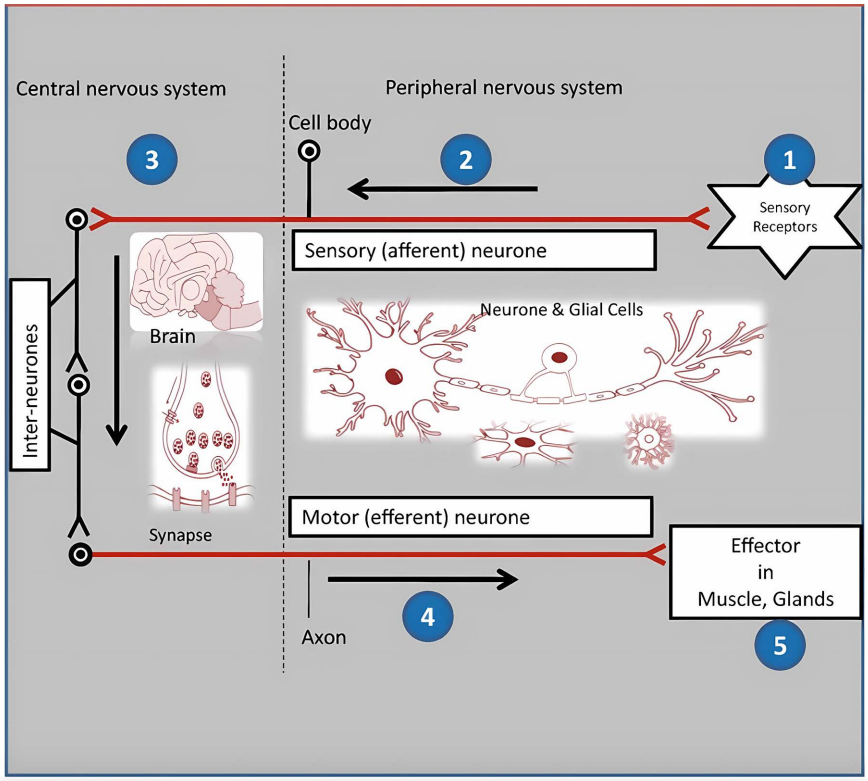

Figure 2. Relationship between PNS and CNS (Banerjee, Das, & Mukherjee, 2023).

The nervous system is analyzed by taking into account the understanding of nerve cells in other words neurons. The structure of a neuron cell is shown in Figure 3 which is summarized as follows. The nervous system consists of neurons also they are called nerve cells (Brodal, 2010). A neuron includes a cell nucleus, synaptic vesicles, dendrite, axon, and myelin sheath. The nucleus's function is to preserve genetic information and control the activities of the cell. Synaptic vesicles are small sacs, located in the cytoplasm of neurons. They contain various proteins necessary for neurotransmitters. Neurotransmitters are substances that are used to communicate between neurons and target tissues during the process of synaptic transmission (neurotransmission). The neurotransmitters are released from nerve endings into the synaptic cleft (Waymire, 1997). Thus, they alert target tissues. Produced electrical or chemical signals via neurotransmission are carried with axons. Each nerve cell has an axon. It will be covered with a Myelin sheath which helps to increase the speed of conduction of the nerve impulse. The myelin sheath is created by Schwann cells in the peripheral nervous system. Another element of a neuron is the dendrite, it contains many lots of branches that are known as dendritic spines. Dendritic spines work for synaptic contacts using tremendous increases in the surface area. In summary, they help to convey neurotransmission

from one nucleus to another one. After all these activities, synapsis occurs. The synapsis is the chemical junction between axon of the one neuron and the dendrites of another neuron. It provides to convey a message from one cell to another cell (Khan Academy; Biology).

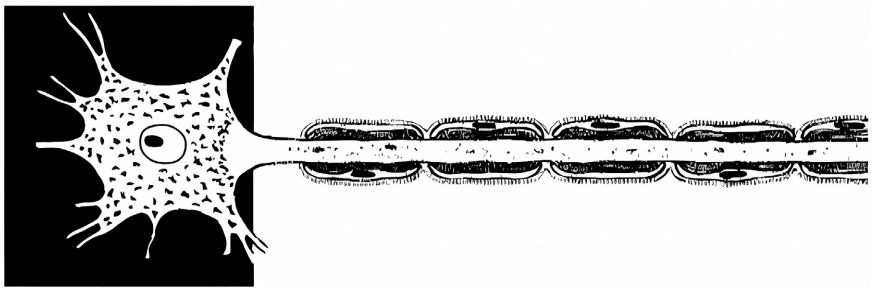

Figure 3. Structure of the nerve cell (Hall, 2005).

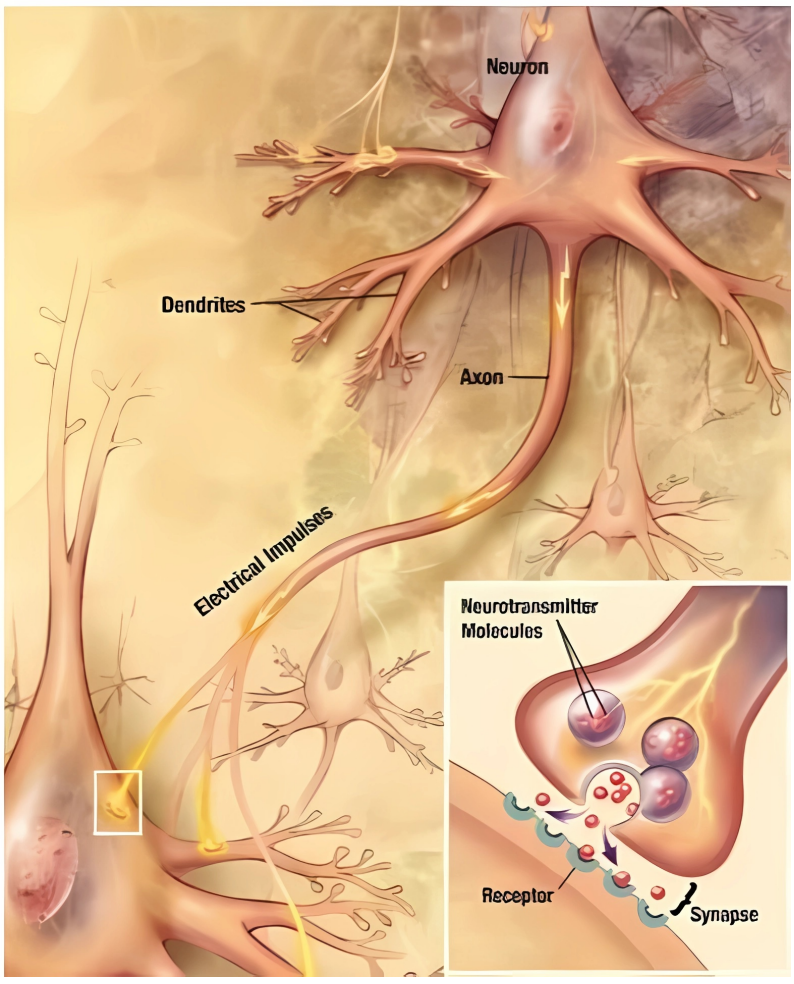

Figure 4. Illustration of synapsis process (Biology).

To take action for neurons, there is a threshold for inputs from other neurons (Biology). The synapsis process is presented in **Figure 4**. According to **Figure 4**, the nerve cell takes the signal from another cell's dendrite then it processes the

received signal with the cell nucleus. Neurotransmitters are produced by synaptic vesicles regarding taken inputs. After creating a new signal, it is conveyed with an axon to the nerve-ending point. Other cells take this signal with their dendrites via receptors that react to various forms of sensory information. Receptors are information processes placed for the nervous system (Brodal, 2010). With synapsis, the tissues can communicate with each other without any physical contact due to synapse cleft. Literature studies showed that synapse cleft is not empty space, it is filled with carbohydrate-containing material (Waymire, 1997).

The nervous system plays a critical role in living things due to carrying information between cells and it provides tissues to take action (Khan Academy). In the human body, thanks to neurons, people can see, hear, smell, feel, remember, and understand what is happening around the environment such as dangerous, risky, safe, etc. (National Institutes of Health). In some situations, answers from the body come in milliseconds which is called a reflex without thinking. Sometimes it may take time because of requires cooperation with different parts of the brain and involves conscious processes (Brodal, 2010). The neuron is the main element of the nervous system, and its basic functions are as follows (Khan Academy).

- Receive electrical and chemical signals,
- Integrated the received signal (whether pass away or not regarding threshold),
- Communicate signals to target cells such as another neuron, muscle, or glands.

Though there are different types of nervous systems which are central and peripheral ones, these are not included in this study due to being out of scope. This study aims to discover the working principle in general of the nervous system to associate business models in the organization.

4. The Relationship of the Business Model with Nervous System

For a better understanding of the business model structure with conceptualizing and the relationship between elements of the business model, the mechanism of the nervous system is examined. Also, literature studies are analyzed under the headings of management and organization studies regarding the ecology approach. Results show that there is a lack of studies explaining the association between business models and the nervous system. At this point, this study will shed light on the proposed propositions taking into account the ecological view.

This section is composed of two parts which are the methodological assumptions of the study and proposed hypotheses with definitions.

4.1. Methodological Assumptions

Osterwalder and Pigneur proposed a business model as a framework in nine blocks that are key partners (KP), key activities (KA), key resources (KR), value propositions (VP), channels (CH), customer relationships (CR), customer seg-

ments(CS), cost structure (CS), and revenue stream (RS) (Osterwalder, Pigneur, & Tucci, 2005) that are explained in **Table 1**. The framework is shown in **Figure 5** which can be designed in any business area. The business model helps to visualize business logic with a holistic view.

Table 1. Business model elements (Osterwalder, Pigneur, & Tucci, 2005).

Element	Explanation
Key partners	Defines partnership of the company
Key activities	Defines arrangement of activities
Key resources	Defines competencies for activities
Value propositions	Defines type of products and services
Channels	Defines ways to get in touch with the customers
Customer relationships	Defines links between company and customers

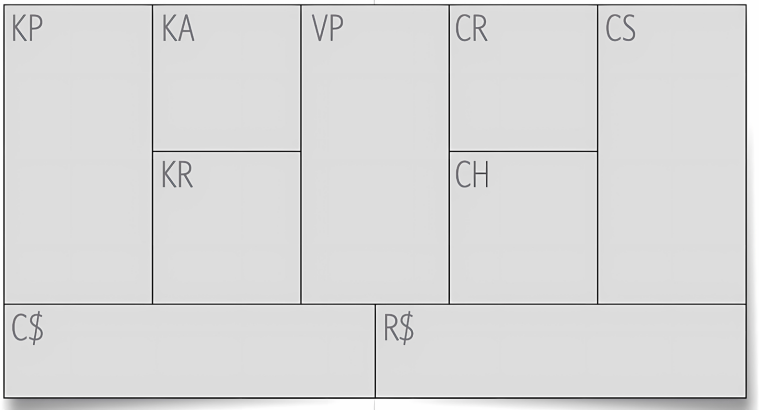

Figure 5. The business model framework (Osterwalder & Pigneur, 2010).

According to **Figure 5**, KP, KA, and KR are defined under activities, VP, CR, CS, and CH are structured under the value category, and CS and RS are formed under the monetary side. They interact with each other in harmony.

Ecology theory is effectively used to observe natural systems in business (Boons, 2009; Winn & Pogutz, 2013). It helps to understand how organizations work regarding a relationship-oriented approach (Abe, Bassett, & Dempsey, 2012). Regarding Hannan & Freeman (1989) study, organizations change over time because of the nature of the environment. The authors discuss that changes affect organizational forms with a cumulative effect on the company's history.

The neuroscience approach examines between humans and all other species in the literature. It depicts differences and similarities in living organisms (Saxe & Baron-Cohen, 2006). The approach discusses the other minds regarding domain-specific mechanisms in living things (Bloom & German, 2000; Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Tager-Flusberg, & Lombardo, 2013). Understanding human ability sheds light on organizational life and its performance (Healey & Hodgkinson, 2015). According to (Bhaskar, 1978), human actions can

change social systems thus internal and external environments shape companies via their business model.

How could we interpret the relationship between the nervous system and the business model? The aim of the paper is to answer this question by relying on the ecological approach in business management. Ecological methods are effectively used in different fields such as health, education, psychology, and management in the literature (Richard, Barthélémy, Tremblay, Pin, Gauvin, Boileau, & Le Luong, 2013; Green, Richard, & Potvin, 1996; Richard, Gauvin, & Raine, 2011; Fultot, Adrian Frazier, Turvey, & Carello, 2019). Even though the ecological theory has seven main principles, two of which are the interactions of organisms and the evolution of ecological properties are taken with a management view in the paper (Scheiner & Willig, 2008).

For interactions of organism principles, the nervous system has a unique function to convey information to the brain to make decisions (Fultot, Adrian Frazier, Turvey, & Carello, 2019). Regarding the ecological view, the nervous system is a seeker of stimulation rather than a processor. From the business model perspective, every element such as key partners, key resources, key activities, value, etc. has its own stimulation to act on another one like neurons (Osterwalder & Pigneur, 2002). For instance, when key partners change, key activities could be changed. When key activities have changed, the value proposition could be changed accordingly. Thus, communication of the business model structure is like nervous system communication regarding taking signals via neurons to transform action (Godfrey-Smith, 2016).

With the evolution of properties, the environment in business changes regarding internal and external issues, and companies adjust themselves to survive (Angelini, Carrino, Abou Khaled, Riva-Mossman, & Mugellini, 2016). At this point, the business model helps to align the business with a holistic perspective. With the innovation process, the business model could react to environmental changes or requirements. Regarding ecological views, it refers to the sustainable business model (Upward & Jones, 2016). Granstrand & Holgersson (2020) indicated that the innovation ecosystem is as a whole and its relationship with its parts can be handled with an ecological approach lens.

Methodological assumptions are summarized in **Table 2** regarding the nervous system in the ecological approach. When the first and second lines define the interaction between elements of the business model, the third one is related to the evaluation process of the model.

Table 2. Methodological assumptions.

Business model	Nervous system
Elements	Neurons
Sub-criteria of elements	Synaptic vesicles
Key performance indicators (KPIs)	Myelin sheath

In summary, the ecological approach provides a framework for conceptualizing the business model with the understanding of interactions between elements of the model and the evolution of the elements by defined performance indicators respect with to changing conditions. They connect and influence each other via their sub-criteria. For instance, when a new key partner is added to the business model, from key activities to the monetary side, every element is affected directly or indirectly (Fritscher & Pigneu, 2014). Sub-criteria of elements are located under elements that represent synaptic vesicles due to providing the connection between elements such as neurons. For sustaining the success of the business model, key performance indicators such as cost of the product, profit per product, customer satisfaction, etc. (Amit & Zott, 2012; Brea-Solís, Casadesus-Masanell, & Grifell-Tatjé, 2015; Gilsing, Wilbik, Grefen, Turetken, Ozkan, Adali, & Berkers, 2021), act like myelin sheath in the nervous system.

4.2. Proposed Propositions

Hypothesis 1: Each element of the business model can be defined as neurons. The relationship of the elements can be described synapsis process in the nervous system.

Neurons form the most important building block of the nervous system for living things. Thanks to them, living things can smell, hear, feel, think, and more (National Institutes of Health). From the business model perspective, elements of the model are basic nines; key partners, key resources, key activities, value proposition, customer relationship, channels, customer segments, cost structure, and revenue (Osterwalder & Pigneur, 2010). When communication of the neurons is actualized with a synapse (Waymire, 1997), the relationship of the elements can be defined as synapsis due to carrying information from one to another. This process provides a base for business model innovation. The business models adjust themselves regarding internal and external changing conditions to survive (Mihailova, 2023; Saebi, Lien, & Foss, 2017; Tian, Coreynen, Matthyssens, & Shen, 2022). When adaptation is started, elements' structure changes with changing conditions. For instance, with the progress of digitization mobility as a service, demand response transportation is added to value offering for the transportation business model (Bischoff & Maciejewski, 2020). Regarding value offering changes, ITS companies are added to key partners and platform costs have been added to the cost structure recently (Burana & Erçek, 2022). In the same logic, the interaction between neurons can be described as a synapsis carrying information from one element to element to adapt business models in a changing environment.

Also, neural network theory helps to understand the working mechanism of business elements. The theory explains how neurons work together. Every neuron is connected to every neuron (Spitzer, 1999). Thus, they can produce cognitive functions like elements of business models. In summary, understanding the neuron-synapse analogy helps to discover how information flows within a business and how the organization can adapt to changing conditions regarding its experi-

ences.

Hypothesis 2: Sub-criteria of elements of the business model act like Synaptic vesicles. And the relationship between elements of the model can be defined as producing neurotransmitters.

When synaptic vesicles are located in the cytoplasm of neurons (Brodal, 2010), sub-criteria of the business model are located under main criteria such as activities, value, and monetary side (Osterwalder & Pigneur, 2010). The synaptic vesicles produce neurotransmitters to prove communication between neurons. With the same logic, sub-criteria create main criteria and allow it to fulfill its function such as behavior activity, value, or financial ones. For activity, element sub-criteria are called key partners, key resources, and key activities (Osterwalder & Pigneur, 2010). The interaction of these sub-criteria constitutes the main criterion of the business model. According to Schallmo & Brecht, (2010) study, the interaction between business model elements including sub-criteria was described. Also, the input and outputs of the elements were put forth by defining a self-sustaining feedback loop to create value for customers using resources and partners for making activities and distributing them via channels to get revenue (Grasl, 2009). Some authors such as defined it as economic logic (Magretta, 2002) or reinforcing components (Linder, 2000). The key point is the interaction between business model elements causes value creation. With the same idea, when synaptic vesicles produce neurotransmitters to provide communication between neurons, the relationship between elements of the business model can be thought to produce the neurotransmitter process to sustain the life cycle of the business model.

From the connectionism view, it is explained in organizational theory. The behavioral issue of interconnected networks of simple units like neurons and synapses in the nervous system (Gómez-Ramirez, 2014). This view aligns with analyzing business model elements and their sub-criteria as interconnected units that interactions bring about organizational behaviors.

Hypothesis 3: Defined performance indicators of business model elements can behave like Myelin sheath in neurons.

Nerve cells produce synaptic transmitters that connect to another cell via chemical processing (MacGregor, 2012). At this point, its main function is to speed up this process (Khan Academy). Myelin sheath provides fast transmission of electrical or chemical received from the previous neuron to another one. It is composed of protein-lipid that provides insulation for nerve cells (Hendelman, Skinner, & Humphreys, 2011).

To measure the success of the business model, indicators should be defined (Dubosson-Torbay, Osterwalder, & Pigneur, 2002). Regarding the study, performance indicators can be defined under four main themes which are product, customer, infrastructure, and finance. For this aim, Kaplan and Norton proposed the balanced scorecard (BSC) approach which was proposed in a 1992 Harvard Business Review article (Kaplan, 2009). Using the BSC approach, firms reach the goal in a unified way taking into account four perspectives that are financial, internal

process, customer, and learning and growth. When the defined performance indicators measure in certain periods such as quarterly, annual, or even biannual bases are common (Eccles, 1991), it helps to align performance regarding defined targets. In summary, defined performance indicators for elements of the business model and assessment of them serve to get a firm's overall performance quicker than unstructured way. At this point, defined indicators can be likened to Myelin sheath in neurons.

The proposed hypotheses are formed in **Figure 6**. Each block of the business model such as key partners, key activities, key resources, etc. are represented as neurons in the nervous system. Each block connects others via synapses. Using myelin sneath speeds communication between neurons. **Figure 6** shows that there is a multidimensional information flow between blocks (Ouali, Mhiri, & Bouzguenda, 2016).

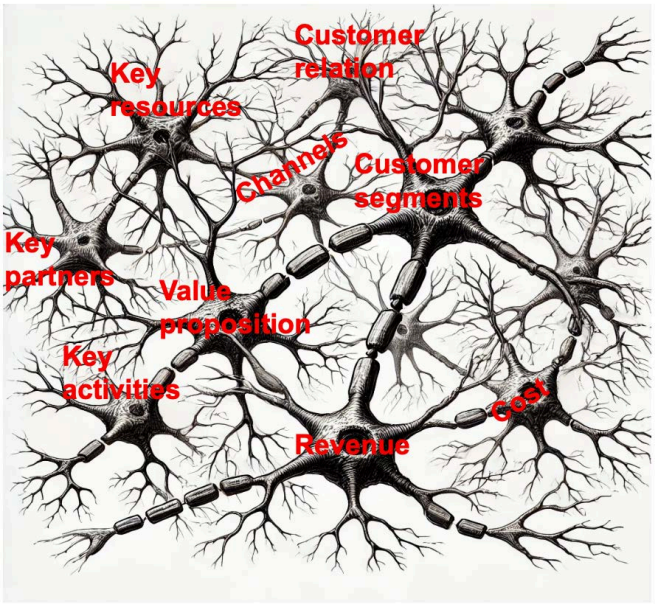

Figure 6. The proposed hypotheses are designed as the nervous system.

5. Conclusion and Discussion

The nervous system is analyzed with business model lenses. Neuron which is the main element of the nervous system, is compared to elements of the business model in terms of the working process. Though there are different neuroscience studies on management and organization (Healey & Hodgkinson, 2014; Matusz, Dikker, Huth, & Perrodin, 2019; Beugré, 2018; Parra, Chicchi Giglioli, Philip, Carrasco-Ribelles, Marín-Morales, & Alcaniz Raya, 2021; Waldman & Balthazard, 2015), there is a gap in business model studies in the literature. According to Cucino, Passarelli, Di Minin, & Cariola (2022) study of cellular and molecular neuroscience of signaling is getting more attention in the modern neuroscience approach. Its application to management and entrepreneurial issues will shed on lights about the decision-making process. Thus, it will contribute to conducting

an explanatory study in the literature.

In the literature, there are different studies about neuroscience in business management such as business ethics, finance, marketing, business planning, information systems, production, and operations (Rajab & Sharma, 2018). Academicians indicated that there is a richness of scholarly inquiry linking neuroscience and business (Robertson, Voegtlin, & Maaki, 2016). The authors advocated that innovation in neuro systems provides a way to deal with different business problems in various business domains (Rajab & Sharma, 2018). Also, Heydenfeldt pointed out that applied neuroscience methods can help change management by understanding human behavior (Heydenfeldt, 2010). From an organizational perspective, Fox and Kotelba made a contribution to the field of organizational neuroscience with industrial adaptive behavior using neuroscience constructs (Fox & Kotelba, 2022). From a technology perspective, with the rapid development of technology, artificial intelligence-based algorithms are being widely used as prediction models such as Neuro-fuzzy systems and artificial neural networks (ANN) (Rajab & Sharma, 2015).

In this study, the structure of neurons is examined regarding business model structure. While a neuron consists of a cell nucleus, synaptic vesicles, dendrite, axon, and myelin sheath in some situations, the business model consists of activities, value, and financial aspects including sub-criteria (Osterwalder & Pigneur, 2010). The interaction of business model elements resembled the synapsis process in the nervous system. Three hypotheses are proposed in the study to discover business model structure with neuroscience glasses. At this point, this study will shed light on the contribution of neuroscience to the business model. The literature contribution will fill the gap for business models with neuroscience studies. From a practical view, it presents the keys to the success of the business model.

In future work studies, the number of propositions will be increased with a detailed neuroscience study. And proposed propositions will be assessed with a quantitative study considering managers of the business model. The results of the study will be compared to the literature studies.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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