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An Assessment on the Necessity of Continuous Innovation Ecosystems Via Multidisciplinary Smart Specialties Approach

Araştırma Makalesi /Research Article

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ABSTRACT: *Smart specialization, one of the newest paradigms, provides new insights and priorities to entrepreneurs and companies by supporting economic and technological activities and strengthening existing scientific and industrial specialization models. This study argues that a multidisciplinary approach to innovation and smart specialties from economics, religion, and business domains should be applied to evaluate the smart specialization strategy and development process, a new system within regional innovation, and sustainable development approaches. Therefore, in this article, holistic innovation modeling is carried out by focusing on the definitions of innovative regional development strategies and necessary policies, and by considering the basic elements of the smart specialization strategy related to innovation and sustainable development.*

Keywords*: Innovation, Smart specialties, Multidisciplinary approach, Sustainable development*
JEL Codes: *C13, M11, M110*

Çok Disiplinli Akilli Uzmanliklar Yaklaşimi Yoluyla Sürekli Inovasyon Ekosistemlerinin Gerekliliği Üzerine Bir Değerlendirme

ÖZ: *En yeni paradigmalardan biri olan akıllı uzmanlaşma, ekonomik ve teknolojik faaliyetleri destekleyerek ve mevcut bilimsel ve endüstriyel uzmanlaşma modellerini güçlendirerek girişimcilere ve şirketlere yeni anlayışlar ve öncelikler sağlamak şeklinde tanımlanmakta ve yeni yüksek potansiyele sahip ekonomik faaliyetlerin seçilmesine, dinamiklerin harekete geçirilmesine ve kaynakların daha verimli alanlara yönlendirilmesine odaklanmaktadır. Bu çalışma, akıllı uzmanlaşma stratejisini ve kalkınma sürecini, bölgesel yenilik kapsamında yeni bir sistemi ve sürdürülebilir kalkınma yaklaşımlarını değerlendirmek için inovasyona ekonomi, din ve iş alanlarından akıllı uzmanlıklara dayanan multidisipliner bir yaklaşımın uygulanması gerektiğini savunmaktadır. Bu nedenle bu makalede, yenilikçi bölgesel kalkınma stratejilerinin tanımları ve gerekli politikalar üzerinde durularak akıllı uzmanlaşma stratejisinin yenilik ve sürdürülebilir kalkınma ile ilgili temel unsurları ele alınarak bütüncül bir yenilik modellemesi yapılmaktadır.*

Anahtar Kelimeler*: Yenilik, Akıllı uzmanlıklar, Çok disiplinli yaklaşım, Sürdürülebilir kalkınma*
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1. Introduction

The concept of smart specialization has gained momentum across international organizations such as the Organization for Economic Co-operation and Development (OECD, 2013), evolving in response to challenges encountered in designing innovation policies at a European scale. Local entrepreneurs have harnessed smart specialization to concentrate information resources on economic specialization, draw insights from past experiences, engage entrepreneurs, drive regional transformations, and allocate roles within each region (OECD, 2013). Over time, this concept has proliferated globally and undergone further refinement. Visionaries like Foray (2012) have advocated for regional and cross-border studies, asserting that "the smart specialization approach necessitates transcending geographical boundaries." By the conclusion of 2017, it had found acceptance among European Union candidates, neighboring nations, Australia, and South America, with its adoption facilitated by its requirement for accessing various funding opportunities. For instance, a pilot study in the Brazilian State of Pernambuco continues to explore fields such as fashion, textiles, and value-added automotive components (S3 Platform, 2017). Additionally, studies beyond the European Union and its immediate neighbors have emerged, including investigations in South American countries like Brazil, Peru, and Chile. Turning our gaze to Oceania, discussions on smart specialization occurred during the "Rethinking Regional and Regional Science in Australia" conference held in Melbourne in 2015 (RSA, 2015).

Since Kuhn's seminal work (1962) on paradigm shifts within the realm of scientific knowledge, the pace of technological and scientific advancements, as well as the influence of capitalist developments on our lives, has experienced exponential growth. Nonetheless, the cumulative nature of scientific and technological progress, which has the potential to bring about revolutionary changes in our lives, remains unchanged. Presently, we confront the dizzying speed of intricate and interconnected transformations in various facets of our lives, encompassing innovation, technology, politics, morality, and economics. Moreover, the advent of Industry 4.0 and the emergence of smart cities grounded in artificial intelligence, deep learning, and quantum computing have propelled us into a new global order with far-reaching implications for humanity's future. Much like the changing seasons and the transition from day to night, theories and paradigms are succeeded by new assumptions and hypotheses, supplanting existing paradigms and doctrines with novel ones. This ceaseless process is the result of interdisciplinary efforts aimed at comprehending the ever-evolving realms of knowledge. Furthermore, our perception of the present continually shifts in response to the relentless march of time, evolving information, cutting-edge innovations, and daily advancements in science, all of which consistently yield new solutions for emerging risks and opportunities across the realms of business, government, and academia.

The post-World War II era witnessed several prominent trends. Firstly, especially since the 1960s, the boundaries separating various disciplines within the social sciences have become increasingly porous. Nevertheless, there remains a degree of resistance to this ambiguity in institutional terms (Wallerstein, 2004). Secondly, the intellectual distinctions between areas of study focused on the Western World and those focused on the non-Western World, or more accurately, the separation of these areas, have gradually eroded. This distinction previously led to the formation of distinct disciplines and even faculties. However, we now observe that this distinction is gradually fading away. In ancient times, it was understood that comprehensive knowledge could only be obtained by drawing from a diverse array of expertise. Aristotle (1952), for instance, emphasized that an educated individual should not confine themselves to a single field but should instead draw from the vast wellspring of knowledge and skills found across various domains (Değirmenci, 2017).

In order to grasp the interplay of variables in the equilibrium of the new world order defined by cyber-capitalism, scientific reasoning, and paradigms that engender unique phenomena, in-depth exploration is essential. However, before delving into intricate subjects, it is prudent to pose fundamental questions to illuminate our understanding:

- Does the accumulation of knowledge through new paradigms signify the ultimate perfection of humanity in the course of human capital development with smart expertise?
- Does there exist a pinnacle of human perfection that marks the end of history, rendering new paradigms for development and formulation of a wholistic innovation model?

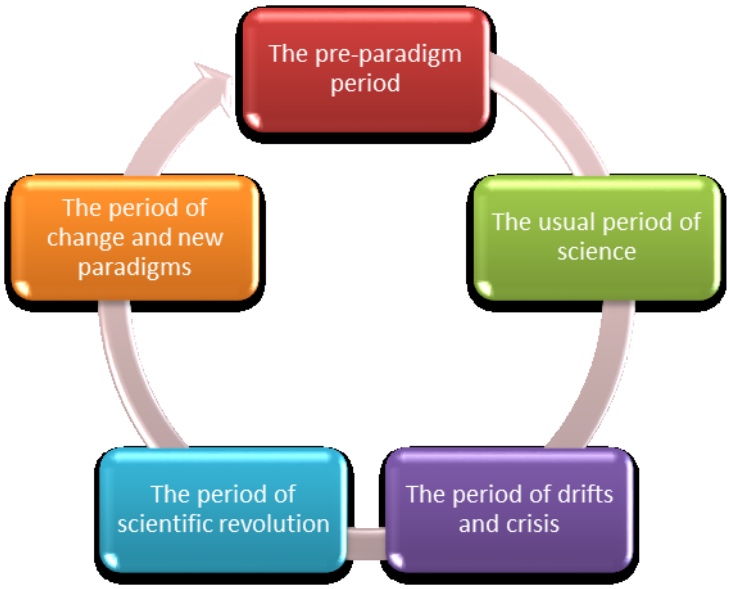
To provide well-founded responses within this study, grounded in the latest literature, we commence with a theoretical foundation, problem formulation, methodological delineation, exploration of the concept of smart specialization, and discussions on the paradigm of continuous innovation, culminating in a conclusion.

2. Theoretical Base

The concept of scientific crises resulting from paradigm shifts was introduced by Thomas Kuhn in 1962. Kuhn's seminal work, "The Structure of Scientific Revolutions," has been widely discussed and referenced in academic literature. The emergence of postmodern paradigms has been observed subsequent to other scientific revolutions, encompassing diverse and conflicting transformations that invalidate previous paradigms. Even in the field of healthcare, new paradigms sometimes introduce alternative treatment approaches, refuting and discrediting former curative methods. This type of revolution involving paradigm shifts, historical negation, disregard for past knowledge, and advancement of human understanding poses intriguing questions. Moreover, it prompts an examination of

how these developments align with the framework of Divine knowledge. From a Divine perspective, the embodiment, creation, and pursuit of scientific knowledge are deeply rooted in a Divine name. Within the realm of this name, numerous veils and manifestations can be explored across different disciplines, either denying or attempting to grasp its essence to the fullest extent. Initially, a new paradigm is met with significant resistance from the scientific community that adheres to the old paradigm. However, as the new paradigm garners increasing support from the scientific community, it eventually supersedes the old paradigm, leading to a scientific revolution (Smith, 2010; Jones & Johnson, 2018; Brown, 2021).

Figure 1: Required Phases of Paradigm Shifts



Source: Developed by the author

Paradigms are the pillars of a standard body of knowledge in every scientific domain, demonstrating its internal coherence with assumptions and central hypotheses. Therefore, knowledge is ever being renewed by new information that produces new paradigms. The integrity and coherence of paradigms are affected by new information requiring and indicating different aspects of existing definitions, beliefs, and theories. This is an innovation that causes scientific crises of dominant paradigms. While trying to be as objective as possible, sociological, religious, and cultural factors and thus subjective factors are influential in creating scientific knowledge. Again, in the development of scientific knowledge, trends of the era and the foresight of scientific authorities and schools are also the guiding determinants. Based on an ecosystem view of innovation management and in-depth case studies of firms, a novel paradigm of innovation management-Total Innovation Management (TIM)- is put forward in some research (Xu *et al.,* 2020).

3. Research Problem and Method

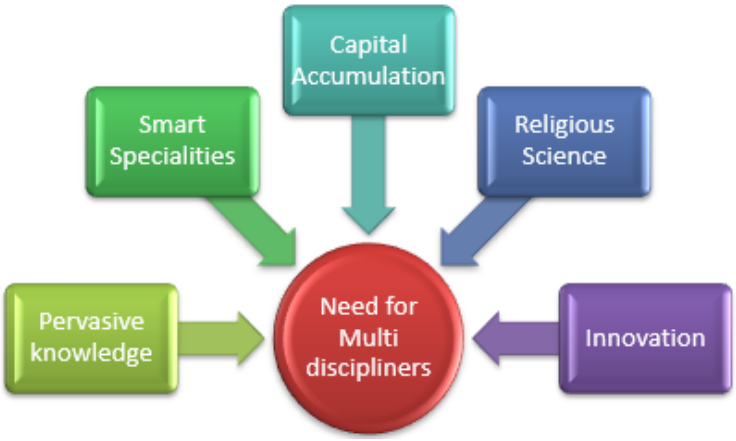
This study employs a multidisciplinary approach to investigate the interplay and potential complementarity of various disciplines, assuming minimal communication between them (Hanisch & Vollman, 1983). It is important to note that the concept of interdisciplinarity utilized in this research is a contemporary notion closely associated with the modern understanding of universities. Interdisciplinarity emerged as a response to the increasing disciplinary divisions observed in the Western World during the 19th century (Klein & Newell, 1998: 3). However, the aforementioned definition primarily addresses the functions of interdisciplinarity rather than explaining its methodological characteristics. Merely utilizing ideas and methods from different disciplines does not automatically qualify as interdisciplinary research. To achieve interdisciplinarity, it is essential to integrate the knowledge, concepts, tools, and rules of multiple disciplines, thereby harnessing their combined analytical power, which surpasses the sum of their individual contributions. This methodological maneuver strengthens the interdisciplinary nature of research (Değirmenci, 2017). In the context of interdisciplinarity, this can be achieved by navigating and comparing the cognitive and theoretical frameworks of different disciplines and applying their methodological principles to the areas under investigation. Bradbeer (1999) identifies three primary benefits of interdisciplinary approaches: working interdisciplinary, leveraging opportunities offered by different domains, and synthesizing various fields.

In the case of interdisciplinarity, the objective is to unite diverse disciplines into a coherent whole, rather than merely bringing them together. However, criticisms have emerged regarding the seeming paradox of "interdisciplinary fields becoming disciplinary" (Abbott, 2001). This perspective characterizes academia in increasingly apocalyptic terms, with English Language professors engaging in anthropology under the guise of cultural studies and economists dabbling in sociology under the label of family economics. Geertz (2005) observes a similar phenomenon, describing recent years as marked by disciplinary disorganization, wherein everything becomes entangled in a state of confusion. Kelley (1997) argues that we cannot escape disciplinary approaches since our thinking is shaped by a set of disciplinary traditions. According to Değirmenci (2017), interdisciplinary paradoxically strengthens the position of disciplines at the center of the modern knowledge problem. Consequently, while interdisciplinarity establishes its paradigm and discourse, it operates within an academic language that is influenced by disciplinary boundaries and shaped out of necessity.

The advent of cyber capitalism has provided individuals with seemingly boundless freedom. However, the evident dangers, risks, and uncertainties associated with cyber capitalism pose significant threats to individuals' privacy, security, and freedom. In this context, cyber capitalism influences language, religion, race, country, nationality, and geography.

When implementing an innovation process, institutional resistance often serves as a major obstacle (Bulut & Arbak, 2012). The existence of dedicated innovation teams within an organization can lead to conflicts with the rest of the institution during the implementation process (Govindarajan & Trimble, 2010). Members of the innovation teams may view themselves as distinct and privileged compared to employees involved in routine tasks, while the latter may accuse innovation entrepreneurs of lacking discipline and failing to fulfill their routine responsibilities. Govindarajan and Trimble (2010) refer to this situation as "innovation wars," which negatively impact the organizational climate and must be effectively managed to achieve success. Institutional resistance can result in various direct and indirect consequences, such as changes in production quantity and quality, increased tardiness among employees, layoffs, elevated employee turnover, and an uptick in work accidents due to carelessness (Eren, 2010)

Figure 2: Factors Requiring Multidisciplinary Research



Source: Developed by the author

Multiple domains and stakeholders need to collaborate to address the genuine challenges our cities face now and, in the future, (Clarke and Wolfson, 2020). We will try to flesh out the ins and outs of these new scientific crises affected and caused by the need for multi discipliners, innovative economies, behavioral economies, and the emerging cyber-capitalism as the new mode of production in separate areas of production our research reasoning and analysis below.

We have used a multidisciplinary approach based on the reasoning of literature knowledge in terms of paradigm shifts on smart specialties and essence of continuous innovation. When searched in the Scholar database with “smart specialties continuous innovation paradigm shifts” keywords, it is seen 19.500 publications in general but 0 articles that uses the keywords in the header. So, this study seems to be beneficial in adding value to the academic literature.

Since the socio-economic environment and ecosystems became so complex and made up of many different sub-environments, including natural, social, technical, spiritual, constructed, and cultural backgrounds, scientific studies tend to be

providing their values by the interdisciplinary examination of how biology, geology, politics, law, geology, religion, engineering, chemistry, and economics. This combination informs humanity's effects on the natural world and civilization. The main dimensions of knowledge in a discipline can be seen in the figure below.

Figure 3: Elements for Knowledge Areas

Source: Developed by the author

"*Interdisciplinary*" means combining two or more academic disciplines or study areas. It means to incorporate and encompass one or more domains as an interdisciplinary concept. Therefore, interdisciplinary assumes using a priori knowledge organization, structured according to traditional academic disciplines. We have three major approaches to interdisciplinary social science -- multi, cross, and trans-disciplinary. Multidisciplinary approaches are limited to the juxtaposing of fields --usually generated by the need to deal with some social problem. Cross-disciplinary approaches involve connecting and combining across disciplinary boundaries (Miller, 2008). The meaning of the term "interdisciplinary" has evolved in the following ways of multi-discipline, cross-discipline, and trans-discipline:

Multidisciplinary: Several experts from different disciplines work together on a problem; for example, an interdisciplinary team to examine the impact of fatty foods on heart disease may be composed of a collaborator, a cardiologist, a

dietician, and a statistician, who do not necessarily require them to integrate the perspectives of their disciplines to solve the problem.

Cross-disciplined: Looking at a discipline from another discipline perspective.

Trans-disciplinary: To deal with issues beyond any discipline by crossing or crossing several fields.

In the realm of celestial inquiry, we embark on a sacred journey, seeking to unravel the profound mysteries that have stirred the souls of humankind since time immemorial. These mysteries, encapsulated in questions of utmost significance, echo through the corridors of our intellectual pursuits:

- What is the essence of a human being?
- Whence does the human spirit originate?
- What destiny awaits the human soul?

Indeed, these queries represent the very heart of the human enigma, a puzzle that transcends the boundaries of any single scientific discipline. Throughout the annals of history, prophets, wise philosophers, and saintly souls have endeavored to provide solace to their brethren, offering insights into the path of human salvation. It is those who have found unwavering faith in their responses that have charted a course towards enlightenment and enduring happiness.

Religious scripture, a wellspring of wisdom, has addressed myriad questions and quandaries stemming from doubt and disbelief. Consider the following elucidations:

a) The relentless preoccupation with material concerns estranges humanity from the realm of spirituality, rendering us insensible to the profound truths of faith.

b) Analogizing the Creator to the created is a source of grave errors, tribulations, and denials. God, the Architect of the universe, transcends His creation, and His essence is not to be equated with His handiwork.

c) Recognizing that the human intellect, mighty though it may be, cannot fully grasp the essence of matters of faith due to their transcendent nature. We may acknowledge the existence of countless phenomena in the cosmos without comprehending the intricacies of their essence.

d) The sheer multitude of disbelievers and their unanimity in denying certain aspects of faith can perplex many. However, the significance and veracity of a belief do not hinge upon sheer numbers. Human beings have risen above other species in spite of being outnumbered by the latter.

e) Seeking counsel from those versed in spirituality is paramount. In matters embroiled in the contentious arena of knowledge, the pronouncements of those unacquainted with the discipline hold no sway, regardless of their prowess in other domains. An eminent engineer, for instance, lacks the authority to diagnose

and treat ailments as a medical practitioner would. The same principle applies to matters of the spirit. Denunciations from individuals distanced from spirituality, who have confined their understanding to the material and the tangible, hold no merit. In general, the luminaries among the 124,000 prophets, saints, and erudite scholars who have devoted centuries to matters of spirituality and faith are the true authorities. It is imperative to heed their words when exploring the realms of the spirit and matters of faith. Thus, reverence for expertise becomes indispensable in the quest for truth and reality.

In essence, the multidisciplinary approach assumes a pivotal role in the pursuit of wisdom, bridging chasms between diverse domains of knowledge as they intersect and interlace. As a requisite element of contemporary scientific accumulation, it serves as an indispensable instrument for dissecting every field, the universe, and the tapestry of life itself. No single field or academic discipline is inherently superior to another; they all constitute integral facets of the grand tapestry of human knowledge. Each field serves as a critical cog in the machinery of scientific progress, contributing to a harmonious whole and filling the interstitial spaces, thereby completing the intricate puzzle.

In this study, we have consciously adopted a multidisciplinary methodology, guided by an insatiable thirst for understanding. Our aim is to forge profound connections with other domains, unraveling the intricate tapestry of smart specialties and innovation. As we embark on this sacred journey, we are mindful of the interconnectedness of all knowledge, and we seek to unveil the profound mysteries that lie at the nexus of these multifaceted disciplines.

4. The Concept of Smart Specialties

Smart specialization stands as a pivotal pillar, vigorously advocated within the framework of the Europe 2020 Strategy. It emerges as an indispensable instrument to avert the dispersion of European Union research funds, channeling them towards focused research, innovation, and the judicious allocation of human and financial resources in sectors that exhibit heightened performance, socio-economic significance, or attractiveness to investors (Sandu, 2012). The operationalization of the smart specialization strategy has become a tangible reality, as regions and countries have diligently fulfilled the ex-ante conditionality requirements and corresponding action plans.

In the transition from theoretical design to practical implementation, early evaluation endeavors have commenced, scrutinizing the coherence of the smart specialization strategy. Through these initial assessments, insights have emerged into both the strengths and weaknesses inherent in the design of the smart specialization strategy, thereby stimulating reflections on prospective adaptation trends (Roberta & Henning, 2016). Notably, the paradigms of smart cities and smart specialization intricately intertwine with the burgeoning potential facilitated by the Internet of Things (IoT), augmenting the pace, cost-efficiency, and efficacy

of cyberspace development. This paradigmatic shift underscores the multidisciplinary fabric underpinning these innovations.

Functioning as a linchpin for regional development, smart specialization permits the integration of critical facets of vital functions and development. It fosters active collaboration and cooperation among diverse stakeholders in the developmental process, ultimately converging toward a shared vision. This approach envisions the creation of unique resources and opportunities predicated upon distinctive industrial and branch structures, firmly grounded in a robust knowledge foundation (Bublyk et al., 2019). Central to this approach is the initiation of a process that encourages regions to leverage their distinctive strengths and engage in research and innovation-centric activities.

Dominique Foray (2013) eloquently characterizes smart specialization as "a strategy that encourages investments capable of endowing regions with local capacities and regional comparative advantages in the future." Particularly in the context of burgeoning European economies, smart specialization entails pursuing growth through innovation within sectors that exhibit prowess in modernization and investment, all while harnessing the expertise of the region's denizens (Seetharaman, 2016). The European Union (EU) defines this strategy as an approach that envisions the development of regional assets in a manner that distinguishes them from neighboring or competing regions, with a specific focus on activities in which the region excels and exhibits competitiveness (S3Platform, 2016).

Despite its origin within the European Union, the smart specialization approach has resonated globally, finding adoption in numerous OECD countries (Arslan Pauli and Dalgıç, 2015). OECD (2013) offers a regional-centric perspective, defining the strategy as one that concerns "industry at the regional level, which determines R&D investment expenditures and innovation policies, scientific and technological expertise, the fields of activity that will generate added value for the regional economy, and how this will impact regional growth and innovation." Smart specialization strategies are underpinned by foundational principles geared toward fostering economic development and creating future comparative advantages. Entrepreneurs and enterprises endeavor to refine their existing strategies by evolving their inputs and products, adopting new business models, and fostering innovation and sustainability (Foray et al., 2009).

The notion of smart specialization first entails the differentiation of a region's unique knowledge and local resources from other regions. Simultaneously, specialization unfolds based on intensive research and development efforts within specific activity or industry domains in the region (Kutgi and Maden, 2018). The realms of smart specialization and smart cities exemplify contemporary paradigms necessitating a multidisciplinary and interdisciplinary approach. In advanced European economies, the concept of smart specialization epitomizes growth through innovation, particularly in sectors characterized by modernization and

investment, and most importantly, sectors where local residents possess expertise. In recent years, the smart specialization strategy has become a prominent policy area within the European Union.

Smart specialization aligns seamlessly with the targets articulated in the Europe 2020 agenda, namely, the pursuit of resource efficiency, support for a green and competitive economy, and the promotion of inclusive growth with high employment rates, fostering economic, social, and subjective convergence. Consequently, smart specialization can be aptly defined as "the identification of an innovation-oriented development strategy grounded in the evaluation of each region's economic and competitive advantages." Hence, a profession rooted in scientific and strategic data becomes an imperative, necessitating strategic analyses encompassing sectoral and technological specialization.

The European milieu, where the concept of smart specialization emerged, bears testament to the surge in academic studies, practical applications, and policy encouragement. The Pre-Membership Cooperation II program, with Turkey among its beneficiaries, underscores the thematic priority accorded to smart specialization strategies in Regulation 231/2014. This thematic and regional emphasis extends to the European Commission's engagement with the Danube Basin, as elucidated within the European Union Strategy for the Danube Basin (2016). Each country or region bordering the Danube Basin has committed to formulating a strategy in at least one domain by 2020. In addition, collaborative pilot studies involving Serbia, Moldova, and Ukraine in partnership with the European Union have been initiated. A workshop convened in Chisinau, Moldova's capital, in April 2017 facilitated Danube Basin countries in embarking on joint efforts to delineate priority areas and intersectoral niches. Concurrently, within European Union member states, work persists on formulating smart specialization strategies anchored in regions classified under Level-2 scale in the Classification of Statistical Territorial Units. The legal binding inherent in these strategies bolsters their acceleration in member countries. As of November 2017, strategy development efforts had culminated in 120 regions, ushering in the commencement of the implementation phase. The structural funds allocated between 2014 and 2020, totaling approximately 67 billion Euros, are harnessed in tandem with these strategies (S3 Platform, 2017).

A multitude of exemplar systems and their respective implementation cases underscore the developed ecosystem and the tangible outcomes they yield:

- The Center-Val de Loire region in France has advanced in energy storage, biomedical materials, cosmetics, environmental engineering, and tourism.
- Finland has embarked on a national-scale journey towards smart cities, encompassing facets such as robot buses, climate-conscious urban planning, and intelligent transportation systems.

- Spain's Extremadura region is invigorating its agricultural technologies sector.
- The Emilia-Romagna region of Italy is spearheading developments in energy-efficient building technologies, food storage, and industrial mechanization.
- France's Alsace region has accentuated the green economy, health, and social innovation domains.

The twenty-first century has witnessed a surge in global value chains, encompassing a diverse array of sectors. The rapid expansion of global value chains, while temporarily disrupted during the 2008-2009 crisis, rekindled in 2017 (Greffi, 2019). The transformative impact of emerging technologies on global value chains remains a subject of debate, with digital technologies potentially shortening supply chains and encouraging production site diversification. The extent to which developing countries can harness these technologies for greater participation in global value chains remains an open question. Notably, high-tech sectors have stood out amidst the deceleration of global value chains post-2009.

The analytical methodologies underpinning multidisciplinary processes must be characterized by scientific rigor and quantitative precision. Smart specialization represents the preferred approach for a myriad of regions, whether they be affluent or impoverished, rural or industrialized. It has ascended to paramount importance in the domains of theory, empirical investigation, and policy formulation. The Organization for Economic Co-operation and Development (OECD) views smart specialization as a means to gauge the efficacy of public policy and framework conditions.

The inexorable urbanization witnessed in large cities, accompanied by rural-to-urban migration and shifting population dynamics, engenders profound transformations in urban life. This demographic shift begets increased demands for enhanced and expanded services, necessitating efficient resource allocation. Pertinently, urban challenges encompass issues such as pollution, natural resource depletion, carbon emissions, traffic congestion, noise pollution, and the management of domestic and industrial waste. Smart cities, bolstered by cutting-edge technologies, serve as a convergence point for diverse competencies, adopting a multidisciplinary approach that exploits technology synergies. The overarching objective is to improve the lives of urban residents, reduce energy wastage, and enhance the efficiency, effectiveness, and economy of urban services. Achieving these aims necessitates a concerted commitment to eliminating waste and abuse, thereby fostering sustainable urban environments. The concepts of smart specialization and smart cities underscore the imperative of holistic advancement, underpinned by scientific research and strategic planning.

In summation, smart specialties and intelligent cities mandate a comprehensive approach that amalgamates technical progress, research and development, and privacy considerations with robust security measures. The intricacy of these

systems precipitates the emergence of new domains of expertise and reinforces the indispensability of a multidisciplinary approach.

5. Continuous Innovation Paradigm

Within the existing literature, the predominant focus has gravitated towards delineating the organization and management of product development projects, often characterized as discrete endeavors (Boer et al., 2001). Contemporary business competition compels enterprises to augment their efficacy through harnessing synergy and fostering experiential learning in product innovation endeavors. Collaborative alliances with partners have emerged as a pivotal enabler for businesses to amalgamate and interlink their operations, thereby elevating their effectiveness and facilitating pursuits in both transformative and incremental innovation pursuits (Soosay et al., 2008).

Chan et al. (2017) ventured into exploring the ramifications of open innovation models and the distinctive attributes of team leaders on team performance. Their empirical study drew upon data collected from a cohort of 45 participants hailing from Taiwan's high-tech sector. The discerned outcomes of this research underscored the preeminent significance of innovation knowledge in delineating the efficacy of a leader's influence in the context of innovation.

West and Bogers (2017) ushered in a conceptual discussion on open innovation, extending their purview to scrutinize research conducted between the years 2003 and 2017. Notably, they proffered recommendations for novel avenues of research. These recommendations encompassed diverse study subjects, spanning the dynamics of information dissemination, investigations into both multinational conglomerates and small and medium-sized enterprises, network-based collaborations, crowdsourcing initiatives, and the evolution of innovation within the realm of services.

Kılıç and Ay Türkmen (2019) sought to unearth the extent of awareness and adoption of open innovation practices among enterprises, leveraging insights gleaned from the extensive open innovation literature. Their qualitative investigation entailed face-to-face interviews with businesses actively engaged in open innovation activities within the environs of Denizli. The findings underscored the widespread prevalence of open innovation initiatives on a global scale, yet posited that Turkey was yet to attain a commensurate level of integration.

Ezanoğlu and Dağlı (2020) accentuated the imperative of innovation ecosystems and sustainable development, premised upon competition. Such a framework mandates a comprehensive understanding spanning macroscopic, mesoscopic, and microscopic levels of economic analysis pertaining to innovation capability.

Innovation, heralded as one of the quintessential barometers of a nation's progress, is inexorably intertwined with the capacity to generate technological advancements, which subsequently propel the creation of innovative products,

services, and concepts, facilitating their exportation and fortifying international competitiveness. The profound nexus between innovation and bolstered competitiveness culminates in the enhancement of productivity (Satıcı, 2021). Thus, innovation is inexorably interwoven with the research and development endeavors steeped in interdisciplinary approaches, reflective of the ceaseless evolution and cutthroat competition pervasive in contemporary economies.

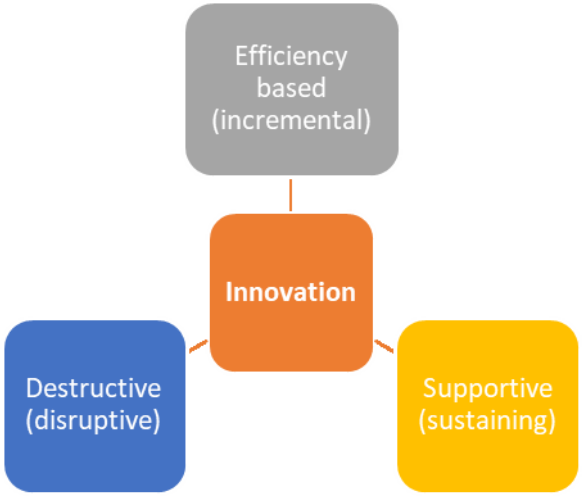
In the crucible of economic rivalry, businesses are compelled to periodically reinvent themselves, fostering diversity in their product repertoire. This endeavor inherently constitutes an innovative facet, one that beckons consumers and end-users with the promise of enhanced convenience, heightened savings, and augmented efficiency.

According to Schumpeter, "radical innovations" beget substantive disruptions, whereas "incremental (incremental) innovations" relentlessly propel the evolutionary trajectory forward (Schumpeter, 2012). Schumpeter's delineation of innovations encompasses five dimensions: (i) the introduction of novel products, (ii) the introduction of novel production methodologies, (iii) the advent of new market avenues, (iv) the unearthing and forging of fresh supply sources for raw materials and ancillary inputs, and (v) the unveiling of novel market structures within an industry.

The taxonomy of innovations, inspired by Schumpeter, finds its roots in the firm-based classification devised by the Organization for Economic Co-operation and Development (OECD) and EUROSTAT in 2005. This taxonomy recognizes innovations across four distinct domains, namely, product, process, marketing, and organizational innovations (Barış and Uzay, 2019). In light of this, innovation, as a primary driver of economic growth, bestows upon society a manifold of benefits. Ideas and discoveries underpin advancements in living standards, with innovation being the catalyst for elevated safety standards, enhanced healthcare, superior-quality products, and environmentally conscientious goods and services.

The dynamically evolving global landscape proffers myriad opportunities for enterprises. In this context, innovation serves as an invaluable compass, allowing businesses to nimbly navigate the precipitous changes that define our era. Shifting customer expectations, competitive dynamics, technological innovations, and legal frameworks collectively serve as fertile grounds for innovation, which, in turn, augments corporate profitability and substantively bolsters economic growth through the creation of employment opportunities. Globally, the trichotomy of innovation manifests across three principal forms.

Figure 4: Types of Innovation



Source: Developed by the author

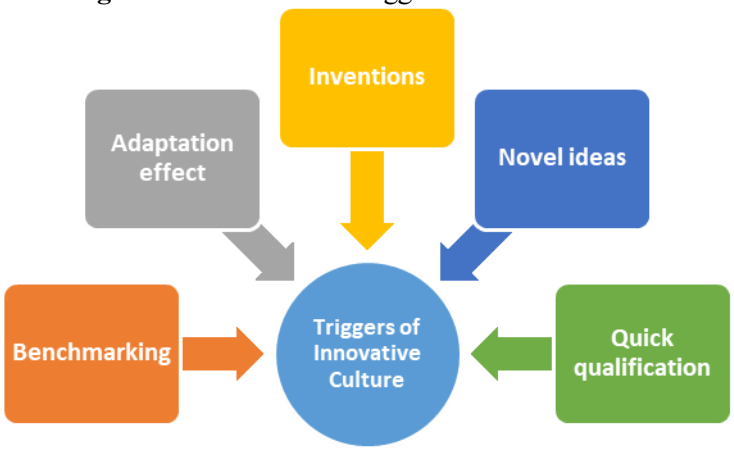
Productivity innovation focuses more on internal processes and indirectly on customer relations and price. The main feature of supportive innovation is to offer the better that are already selling to an existing customer with better support. The natural strokes come with a disruptive innovation that increases current customers, particularly those not previous customers. One may become the market leader, main competitors are shrinking, changed hands, or are about to go bankrupt due to disruptive innovations have achieved.

First, ideas and projected innovation should not be merely creativity, technology, or R&D work. If we put the efficiency innovation on a separate scale, it is the company's choice to determine whether an idea will be incremental or destructive innovation. However, if the innovation process is misconstrued and mismanaged, it cannot be overstepped from waste, time loss, and motivation. However, if we change our behaviors both individually and on an organizational basis, we can be successful innovators. Innovation is one of the keys to successful competition and quality continuity and is an indispensable tool on the road to sustainability. Sustainable innovation is seen in many different areas that make our life easier, protect the environment and serve society. Rapidly developing technology and R&D efforts are the essential advantages supporting the efforts in this field. Therefore, we must work hard to improve an innovative approach focusing on renewable green energy sources, active use of recycled materials, continuous education, production optimizations, resource, energy-saving, etc. Suppose innovative approaches are considered as merit and a quality function by society. In that case, there will be no hindrance in education, training, work, and other aspects of life to provide crucial elements of effectiveness, efficiency, and economy. However, some factors trigger the expansion of innovation, such as benchmarking, which often accelerates the spread of organizational innovation.

5.1. Triggers of Innovative Culture

The scholarly and practitioner literature has described the potential benefits of Design Thinking (DT) to develop innovations. Innovation processes are characterized by continuous competing demands, which generate tensions (Coco *et al.,* 2020). Innovations push away the inhabitants and the environment from the area they are. Innovation enables the combination of features and attributes such as quick qualification or the direct adaptation of products to other products. Applying software and hardware to vehicles or even a direct adaptation of a tablet to a car or truck is another example. Therefore, innovation is continuous, systematic, cumulative, partly subjective, and process based. The fact that the companies that invest in innovation arise from cumulative knowledge and now-know increased withing its innovative processes.

Figure 5: Factors That Trigger Innovative Culture



Source: Developed by the author

The critical question is, what triggers the release of this invaluable enterprising spirit? (Morrison, 2000). It can be claimed that technological innovation studies received more attention despite the great importance of social innovation studies and the cultural aspect of the innovation. In addition, limited studies have examined technological and social innovation together (Bulut *et al.,* 2013). In a study by Hazak (2018), it is found that out of personal characteristics, age, and numbers of children, there are also strong links on a mindset to innovate for the benefit of the employer. Innovative ideas and original applications are the beginning of the work. The process of innovation, which starts with exploratory, interventional, visionary leadership and systematic working order, goes into the forefront of disciplined order and standardization. In other words, if one chain fails the rings like planning, production, distribution, promotion, marketing, pricing, etc., and if we focus only on R&D and new product development, the desired levels of innovation will not be complete.

5.2. Innovation Modelling

Business model innovation is often the key to capturing value from innovation within corporations. More organizations turn to knowledge management to share experiences and expertise, integrate knowledge, and generate new knowledge. However, developing and implementing new business models in practice is complicated and fraught with risk (Euchner and Ganguly, 2015). Organizations need a better understanding of how knowledge management is related to the innovation process and how it can help foster innovation within organizations (Albers and Brever, 2003). Such a process requires articulating and communicating the best practices of the current business model, establishing an appropriate vision, serving stakeholders better in gaining competitive advantage through business model improvements and replacements, stimulating many relevant experiments and tests for potential business model improvements and replacements, and becoming effective in implementing new business models (Mitchel and Joles, 2004).

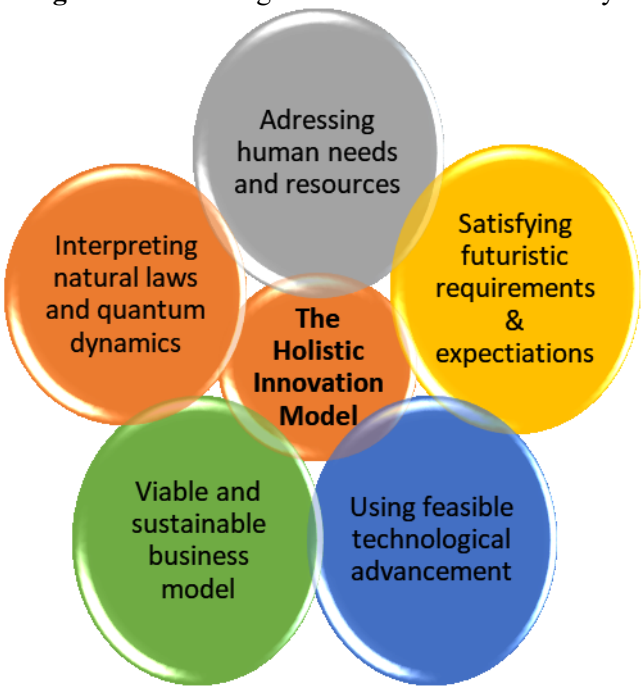
When we look at Turkey, it is seen that there is no national strategy in which this concept is used directly. However, in the "National Science, Technology and Innovation Strategy" prepared by TÜBİTAK and covering the years 2011-2016, target-oriented approaches in automotive, machine manufacturing, and information-communication technologies; needs-oriented systems have been prioritized in the fields of defense, space, and energy-water-food (TÜBİTAK, 2011). In addition, in the Turkish Industrial Strategy prepared by the Ministry of Science, Industry, and Technology from 2011 to 2015, there is no sectoral prioritization, and studies on intersecting axes are emphasized. However, in this strategy, the framework of sectoral strategies is drawn. These sectors are machinery, automotive, iron-steel, non-ferrous metals, chemistry, ceramics, electricity and electronics, textiles, ready-made clothing, and leather products (BSTB, 2011). At the regional scale, the concept of smart specialization has been put on the agenda by the Development Agencies. Of the 26 Development Agencies, 11 have completed smart specialization or regional innovation strategy, and seven are still working (Valandova, 2017). Considering Turkey's participation in the framework programs and the achievements, it is seen that it has an entrepreneurial and innovative economy potential and has developed over the years. However, Turkey is already far behind the EU average in many innovation indicators. These results show that the steps taken by Turkey regarding innovation have partially brought Turkey closer to the EU countries, but they are not sufficient and a radical systemic change is needed. Therefore, policy practitioners who want to realize sustainable economic growth through innovation and intelligent specialization should regulate the communication between institutions that have the potential to reveal and spread innovation and establish an encouraging institutional structure in the economy (Artan and Keşap, 2021).

The primary determinant of individuals who exhibit resistance to innovation and possess limited skills is their inclination towards routine and maintenance of the status quo (Smith & Johnson, 2018). Such individuals are often entrenched in their comfort zones and exhibit a strong aversion to embracing novel ideas and practices, thereby impeding innovation within their respective spheres. Their apprehension stems from the fear that innovative changes might disrupt their established equilibrium and disturb their comfort and tranquility (Thompson, 2016). This psychological phenomenon is commonly referred to as "change resistance" in organizational behavior literature (Jones, 2019).

Frequently, we encounter the adage "do not reinvent the wheel!" as a cautionary statement against unnecessary or disruptive change. However, when individuals adhering to this mindset hold leadership positions within an institution, it forebodes a bleak future for the organization (Anderson, 2017). Leaders who are unable to transcend their comfort zones are averse to business development due to their trepidation of embracing innovation (Smith & Johnson, 2018). Regrettably, succumbing to fear hinders progress and growth. Consequently, companies governed by such leaders will inevitably struggle to compete with their more adaptable counterparts, leading to diminished profitability and relegation to historical footnotes (Thompson, 2016).

The universe, akin to a dynamic stage, is molded by ceaseless motion and the emergence of novel creations, all in pursuit of achieving its inherent harmony and stability (Brown, 2020). Development, change, and innovation are fundamental components driven by the necessity dictated by natural laws (Johnson, 2019). Analogously, if electrons, protons, and neutrons were to cease their perpetual cycling within an atom's nucleus, life as we know it would cease to exist (Brown, 2020). Celestial bodies also exemplify this constant flux, consistently altering their positions within the cosmos (Anderson, 2017). This awe-inspiring motion, witnessed at both the macroscopic and microscopic scales, encompasses the astonishing movements of subatomic particles, the grand trajectory of Earth, Moon, and Sun resembling the passage of time, and the magnificent voyage of our Milky Way galaxy (Jones, 2019). Each of these phenomena epitomizes the rhythmic harmony inherent in the universal order surrounding us (Johnson, 2019).

Figure 6: Modelling Innovation for Sustainability



Source: Developed by the author holistic

The inexorable progress of innovation in the cosmos, analogous to the vastness of the human body on a macro scale, undoubtedly influences the individual human, the microcosm, in terms of transformative and innovative patterns. Each day, the universe is reconstituted, commencing anew with impeccable order. The diverse manifestations of events serve as subtle messengers, imparting profound truths to the realm of our innermost thoughts and emotions. To keep pace with the perpetually evolving course of events, it is imperative that we embrace an innovation model that emulates the universal wisdom inherent in the continuous, flawless, and miraculous creations.

In order to optimize our efforts in meeting human needs and utilizing resources, satisfying futuristic requirements and expectations, harnessing feasible technological advancements, comprehending natural laws and quantum dynamics, and establishing a sustainable business model, it is essential to identify the most exemplary innovation model available. Therefore, the paramount innovation model should incorporate the following essential components as is shown in the Figure 6:

1. Addressing human needs and resources: The model should prioritize the fulfillment of human needs and efficiently allocate available resources to ensure the well-being and development of individuals and society as a whole.

2. Satisfying futuristic requirements and expectations: It is crucial for the model to anticipate and fulfill future demands and expectations, considering the evolving nature of human aspirations and societal progress.

3. Using feasible technological advancement: The model should leverage feasible technological advancements and breakthroughs to drive innovation, enhance efficiency, and maximize the potential benefits for individuals and organizations.

4. Viable and sustainable business model: The innovation model must be grounded in a viable and sustainable business framework that enables long-term growth, profitability, and environmental responsibility.

5. Interpreting natural laws and quantum dynamics: By incorporating an understanding of natural laws and the intricacies of quantum dynamics, the innovation model can harness the fundamental principles governing the universe to inspire novel and transformative solutions.

The Holistic Innovation Model can be represented by the following formula:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \varepsilon \quad (1)$$

Where:

Y: Dependent variable, representing the level of holistic innovation

X1: Independent variable, addressing human needs and resources

X2: Independent variable, satisfying futuristic requirements and expectations

X3: Independent variable, using feasible technological advancement

X4: Independent variable, representing a viable and sustainable business model

X5: Independent variable, interpreting natural laws and quantum dynamics

β0: Intercept coefficient, representing the constant term

β1-β5: Coefficients for each independent variable, representing the impact or influence of that variable on holistic innovation

ε: Error term, accounting for the unexplained variation or random factors.

Each independent variable should be measured on a relevant scale or metric that captures the corresponding aspect of the Holistic Innovation Model. The coefficients β1 to β5 indicate the magnitude and direction of the influence of each independent variable on the dependent variable. These coefficients can be estimated through statistical methods such as regression analysis using a suitable dataset. It's important to note that the specific measurement scales, units, and coefficients would need to be determined through empirical research and analysis tailored to the context and domain of the Holistic Innovation Model. Additionally,

the model can be expanded or modified based on the specific needs and requirements of the innovation process being studied.

Therefore, the pursuit of the best innovation model necessitates a comprehensive approach that encompasses human needs and resources, futuristic requirements and expectations, feasible technological advancements, a viable and sustainable business model, as well as an interpretation of natural laws and quantum dynamics. By embracing these elements, individuals and organizations can effectively navigate the ever-changing landscape of innovation and contribute to the advancement of society.

6.Conclusion

Based on the comprehensive analysis conducted through conceptual, theoretical, and literature-based reasoning, this study has provided coherent responses to the predefined research questions:

- Does the accumulation of knowledge through new paradigms signify the ultimate perfection of humanity in the course of human capital development with smart expertise?

Throughout history, humanity has consistently displayed an evolving trend of learning. Significantly transformative shifts have consistently emerged as a consequence of visionary figures such as prophets, saints, and social leaders. Examples include the watchmakers led by Hz. Yusuf, the sailors guided by Hz. Noah, and the tailors under the leadership of Hz. Idris. Hence, the revelation and inspiration bestowed upon humanity have played a pivotal role in its development and the progressive accumulation of knowledge. Such revelation and inspiration can be attained through research and development endeavors, as well as sincere prayers made with genuine intention and verbal expression in accordance with societal needs. In essence, new paradigms and inventions are founded on the rectification of deficiencies in existing knowledge and the cultivation of novel methodologies and approaches aimed at maximizing benefits. Consequently, it is reasonable to incorporate innovations that benefit humanity and enhance efficiency, economy, and productivity not only in technical domains but also across all administrative and management processes, encompassing policy and strategy.

Individuals who harbor apprehensions toward innovation and change often dread their perceived lack of readiness to sustainably evolve. However, reality does not permit such hesitations. Within the swift current of time, where approximately 160,000 people confront the approach of death daily, transcending to an uncharted realm, malevolent adversaries stand before us, acting ruthlessly, immorally, and even savagely, ignorant of their ultimate fate. On this path to eternal bliss, genuine perfection can be attained by confronting internal and external obstacles and trials. Nonetheless, individuals possessing unwavering spiritual fortitude will find that Allah can transform their hardships into ease, their winters into spring, and their

chaos into freedom and order if they sincerely try to comply with His natural laws and environmental order set in the universe.

- Does there exist a pinnacle of human perfection that marks the end of history, rendering new paradigms for development and formulation of a wholistic innovation model?

The realm of innovation is replete with opportunities and challenges, particularly in the context of business model innovation. The imperative to harness innovation for value creation within organizations is evident, yet the path to realizing this potential is fraught with complexities and risks. A deeper understanding of the symbiotic relationship between knowledge management and the innovation process is essential for organizations striving to foster innovation.

Resistance to innovation, often driven by a predilection for maintaining the status quo, poses a significant hurdle to progress. Individuals who cling to routine and familiarity may inadvertently stifle innovation within their organizations, fearing disruption to established norms. Leadership that embraces change and innovation is pivotal for a company's success in today's dynamic landscape. Leaders who remain entrenched in their comfort zones can impede growth and competitiveness.

In a broader cosmic context, innovation mirrors the perpetual motion inherent in the universe itself. The universe continuously evolves, driven by natural laws, just as innovation fuels progress and transformation. Change resistance within organizations can hinder their ability to adapt and thrive. Therefore, it is imperative for leaders to transcend their comfort zones and embrace innovation to ensure the enduring relevance and prosperity of their organizations.

The universal model of innovation, reflected in the ceaseless rhythm of cosmic motion, offers valuable insights for fostering innovation on a microcosmic scale. This model should prioritize addressing human needs and resource allocation, anticipate future demands, leverage feasible technological advancements, operate within a sustainable business framework, and draw inspiration from natural laws and quantum dynamics.

Incorporating these elements into the Holistic Innovation Model provides a comprehensive approach to innovation. The model considers human needs, futuristic requirements, technological advancements, sustainable business practices, and natural laws, all of which influence the level of holistic innovation. While the model's specific parameters and coefficients may vary based on empirical research and context, it underscores the importance of a multifaceted approach to innovation.

In the quest for the best innovation model, organizations and individuals must embrace complexity, adaptability, and a holistic perspective. By doing so, they can navigate the ever-evolving terrain of innovation and contribute to societal advancement and prosperity. Consequently, the present time calls for the design

of a smart specialization strategy through the fusion of technology and industrial policy. Each strategy should be developed independently, taking into account science policy, essential research priorities, and production-related objectives. The allocation of resources, contemplation of these priorities, and the strategic direction should align with the principles of the smart specialization strategy.

Looking at Turkey, while there may not be a direct national strategy explicitly focused on business model innovation, various initiatives and strategies underscore the importance of innovation across diverse sectors. These strategic endeavors emphasize target-oriented approaches in specific industries and the need for interdisciplinary collaboration, demonstrating a nascent potential for an entrepreneurial and innovative economy. Nevertheless, Turkey still lags behind European Union averages in innovation indicators, necessitating more substantial systemic changes and effective communication among institutions.

While sectoral prioritizations are outlined within regional plans for various areas in Turkey, they are not comprehensively addressed within the framework of smart specialization and continuous innovation. In summary, the concept of smart specialization is gaining traction in many developing countries, particularly within the European Union member states. However, there is a dearth of studies focusing on this concept in developing economies. The absence of research on smart specialization should not be misconstrued as a disregard for the innovation-oriented sectoral focus that this approach entails. The concept encompasses an abstract categorization of activities as a tool for regional development. As for Turkey, it is crucial to consider smart specialization in the 12th Development Plan, which will span the years following 2019-2023, the timeframe of the previous plan. The decision regarding the widespread adoption of this concept throughout Turkey should be informed by a comprehensive evaluation of both the worldly and spiritual needs of society. If embraced, the framework for division of labor among institutions should be established based on smart specialization and the continuous open innovation model.

Suggestions for future research:

- Explore the significance of smart specialization as a tool for regional development in developing economies, with an emphasis on its potential benefits and challenges.
- Analyze the integration of smart specialization into national development plans, considering both secular and spiritual dimensions of societal needs and priorities.

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