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RE-EXAMINING THE RELATIONSHIP BETWEEN INNOVATION AND ENTREPRENEURSHIP FROM SUSTAINABILITY PERSPECTIVE WITHIN THE FRAMEWORK OF THE ABERNATHY AND CLARK MODEL

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Abstract:
The concepts of innovation and entrepreneurship are encountered in the literature as two concepts that feed each other while increasing their popularity, but there is no accepted study on which one is the initiator of the cycle. In our study, where the theoretical development processes of the concepts are discussed in detail, it is aimed to make the cycle more efficient and sustainable by finding the initiator. Innovation is the process of creating new ideas, products, processes or services and their systematic implementation. This process encompasses not only technical or technological developments, but also changes in organisational structures, business models and value models. In essence, innovation is a quest to create value that will contribute to the environment, society and governance. Entrepreneurship, on the other hand, is the process of recognising and valorising opportunities for environmental, social and managerial contribution. Could the answer to whether we innovate because we are entrepreneurs or become entrepreneurs because we learn to innovate and recognise opportunities from an innovative perspective be hidden in the environment. In the Abernathy and Clark model, revolutionary and structural environment focuses on learning, while regular and niche innovation emphasises the innate characteristics of the individual, but without an appropriate learning and practice environment, innate innovative tendencies can be suppressed and negatively affect entrepreneurial activities. In our study, in order to examine the relationality in detail, in addition to a systematic literature review, analyses were conducted on 5-year data of 43 countries. It is emphasised that innovation is a phenomenon that can be taught to human capital and initiates entrepreneurship.

Keywords:
Sustainable Innovation, Sustainable Entrepreneurship, Individual Entrepreneurship, Sustainable Development

1. Introduction
While the process of change in the world is increasing exponentially, it is stated that the main reason for this is innovation and that it is entrepreneurship that presents innovation as a value. In our study, firstly, the concepts of innovation and entrepreneurship are examined based on the literature, and then the Abernathy and Clark Model is analysed.

2. Theoretical Framework
2.1. Innovation
Innovation, in its dictionary meaning, refers to an understanding that encourages innovation, aims to gain advantage through innovation and adopts an innovative approach. In the Oslo Guidelines prepared by the OECD in 1992 and translated into Turkish in 2005, innovation is defined as follows. 'Innovation is the implementation of a product or a process, a new or renewed promotion system, or innovative organisation-based working methods that have not been used before or are made more efficient in internal work, organisation planning and definition, or inter-organisational relations'. According to the Oslo Guidelines, the results of the innovation process integrate the various components that emerge from an enterprise's innovation process, namely product innovation, process innovation, organisational innovation and marketing innovation (OECD, 2005). Innovation has thus become one of the most important

organisational processes and outputs, combining both innovation and social value creation (Kim et al., 2012). In fact, this concept includes the endeavour to develop new perspectives in the processes of design, production or marketing of the final product, to create original phenomena and to improve existing processes. In fact, it defines the process of transforming an abstract idea into a concrete product or service (McDaniel, 2002). Although innovation is a phenomenon based on change, not all differentiation directly implies innovation. The most important output of innovation-oriented change is the capacity to provide economic contribution based on labour-benefit balance. Therefore, not every change process can be characterised as innovative; the concept of change has a broader framework than innovation. Innovation is directly related to the impact of change on economic efficiency and performance (Ayaz, 2015). This situation emphasises that the concept of innovation is as valuable as the value it provides to the society and emphasises its measurement.

The point to be emphasised in our study is whether sustainable development is possible through the innovations created by entrepreneurial individuals or through the innovations of entrepreneurial individuals enabled by the innovative ecosystem. For this reason, sustainable economic growth starts with an entrepreneur's mental and economic development demands and the introduction of the innovation process into economic life, and then continues with the process of other entrepreneurs adopting, imitating and following innovation. It is to make person-based innovation possible by making structural or revolutionary innovation. Looking at this process from the perspective of companies that value social innovation, it is argued that companies that are able to invest financially and morally in scientific research and product development, in developing the backbone of the company and the culture of working together, acquire more technological capacity than others and thus dominate the field of innovation (Moreira et al., 2016).

When the process is viewed from a systemic perspective, which is more inclusive than company-based, it can be explained as an infrastructure that generates knowledge and distributes it to the ecosystem, transfers it to the markets with the support of innovation efforts, and turns it into an asset that creates added value (Gregersen and Björn, 1997). Since 1987, various studies have been carried out in different countries as a systemic approach.

Although the concepts of technological progress and innovation are intertwined, it is difficult to talk about sustainable innovation, practitioner entrepreneurship and sustainable development in environments where the concept of social innovation is not based. This situation has led to the need for modelling in innovation. Between 1950-1960, technology-oriented innovative models were put forward with simple, linear, sequential processes. While research with a scientific approach and developing technology were effective factors, R&D was given great importance. The aim was to make it possible for R&D outputs to reach end-users. Between 1960-1970, market-oriented innovative models with simple, linear, sequential processes were introduced. While the demands and expectations of the market were the effective factor, the market-R&D relationship was emphasised. The aim is to direct innovative studies in line with the demands and expectations of the market. Between 1970-1980, a co-ordinated linkage model with feedback and sequential processes was put forward. The strategic combination of R&D and marketing was studied. The aim is to establish coordinated activities and strong feedback relationships between marketing and R&D. Between 1980 and 1990, the importance of social innovation was recognised and a mutually effective innovation model was introduced with team cohesion and integrated development methods. With interdepartmental information sharing and interaction, attention was paid to the efficiency of technological innovations. The aim is to gain the ability to adapt to rapidly changing technological processes as a company with all departments (Ovacı, 2015). In 2000 and later, a systematic network-based learning model was introduced with fully interactive connected processes. With the development of artificial intelligence, it is predicted that it will play an important role in learning. Developments in daily life, the process of changing business life forms and environmental impact have been given more importance. The aim is to make self-learning and self-improving systems optimally autonomous by making them fully compatible with internal and external stakeholders. Studies have been carried out in various countries to ensure systemicity.

Table 1. Analytical Overview in Innovation Based Systems

Author and Year	System Type	Countries	Units of Study	Analytical Field
Freeman, 1987	National Innovation System	Japan	Socio-economic adjustment	Japanese Ministry of International Trade and Industry, R&D expenses for firms to import technological know-how instead of buying imported technological products, technical know-how education and training institutions, vertically integrated Japanese conglomerate structure
Lundval, 1992	National Innovation System	Baltic countries and Denmark	Feedback learning between end-user and manufacturer	Supporting role of government institutions, R&D and educational institutions, standardisation of education, product-based production and marketing unity and financial factors
Nelson, 1993	National Innovation System	Developed and Developing Country Group (15 countries)	Developing technology and organisational competence of the company and efficiency in daily work	Assignment of R&D studies to institutions, financial resources of scientific studies, competences of companies, university-industry cooperation, government policy
Carlsson, 1995	Technological Innovation Systems	Technological innovation system for Sweden	Technological information networks	Institutional competence, economic situation, collective specialisation, national welfare approach
Breshi and Malerba, 1997	Sectoral Innovation Systems	Some of the sectors active in OECD countries	Inter-sectoral information sharing with feedback	Technological attitudes, innovation fundamentals, knowledge and country-based constraints
Saxenia, 1991	Regional Innovation System	Information technology sector located in Silicon Valley in San Francisco	Unspecified firms in one area (Route 128)	Informal information, human capital, business-to-business contacts
Cooke et al., 1997	Regional Innovation System	Innovative geographies in Europe	Integrated and production-based dependency on indigenised society	Material competence, institution-based learning, production-oriented culture

Source: Chang and Chen, 2004

Systematic innovation-oriented national innovation systems have been established in Japan, Scandinavian countries and Denmark in order to create a culture by influencing all segments of the society. Although the focus groups of these systems are different, their common mission is to create innovation-based business networks that are socio-economically adapted, localised, productive and supported by government policies. The innovation clusters that are formed contribute to the process of creating a creative ecosystem while destroying the conventional economy. In these analytical studies, it is aimed to add value to the country with a systemic approach rather than individual approaches. As a result of the studies, a national innovation system approach has been developed. In short, the national innovation system is a structure that supports economic and technological development, but also includes innovative solutions to improve social welfare from a social innovation perspective. This approach, which promotes inclusiveness and social participation, is not limited to private and public sector cooperation, but also involves civil society organisations, social enterprises and local communities in innovation processes. In this framework, it is essential for sustainable and inclusive development to consider the system as a model that focuses not only on economic growth but also on social development (OECD, 1999).
The infrastructure indicators of the innovation data obtained from the World Intellectual Property Organization for 43 countries to examine the relationality consist of regulatory institutions, human capital and R&D relationship, infrastructure, market development, business diversity, information and technology activities and creative activities (WIPO, 2020).

2.2. Entrepreneurship

The concepts of 'enterprise' and 'entrepreneur', which have been used since ancient times, have been replaced by the concepts of 'enterprise' and 'entrepreneur'. In daily life, enterprise refers to the concepts of entering, starting, attempting to do something, while entrepreneur is used in the sense of an enterprising individual who initiates and carries out this endeavour. From an economic point of view, these concepts express the entrepreneur as a person who directs, seeks and discovers opportunities by understanding the supply-demand relationship, and entrepreneurship as transferring and activating resources economically by considering them from the perspective of benefit and loss in the optimum plan. According to the literature, after the French Cantillon in 1730, the economist French J. Say coined the term 'entrepreneur' in 1800, and it is used for individuals who create economic value with the idea of putting their plans into practice and aiming to create tangible assets by moving one degree higher by using financial resources effectively (Öktem et al., 2003). An entrepreneur is an individual who takes the capital and mental risk of establishing a business from scratch or having a company do business, and turns opportunities into business and utilises them (Hatten, 1997). Although there are differences in various definitions, the common idea adopted by everyone is that an entrepreneur is generally known as the first individual who establishes a company and entrepreneurs are people who have a high perception of opportunities, recognise them, shape them and put forward a business (Thornberry, 2001). In line with these explanations, the point to be considered is the entrepreneur's ability to identify opportunities due to high perceptions. In our study, it is emphasised that the high perception of opportunity perception is not sufficient for entrepreneurship alone and that it can use and develop this ability if it is in innovative ecosystems.
When looking at entrepreneurship from a psychological perspective, there are studies on personal characteristics based on individuals. In these studies, explanations are made by considering the psychological and social conditions of individuals through personality profiles. Psychodynamic and social psychological approaches, which are among personality theories, define entrepreneurship as an individual who aims to reorganise the environment with an innovative perspective while observing differentiation in the attitudes and movements of the entrepreneurial individual. From a psychological point of view, entrepreneurship is expressed as a highly individual-based customised character state.
It is thought to enable the entrepreneur to re-examine and reorganise himself and his surroundings in order to create a situation that reflects his expectation of the future and his drive to strive (Morrison, 2000). In a differentiation conducted by Durham University Business School, it was stated that entrepreneurs possess 'strong sense of achievement', 'autonomy', 'independence', 'sense of internal control', 'measured risk taking' and 'creative tendencies' (Hisrich, 1990). It has been stated that few of these characteristics are innate and that they are generally developed through experiences, environmental factors and sociocultural values (Littunen, 2000).

As can be seen below, the most important difference between the term entrepreneurship in 1725 and the term entrepreneurship in 1985 is to step out of the boundaries of individuality and to be a part of the system in which it is located, and social innovation is a means and an end.

Table 2. Historical Development of Entrepreneurship Concept

Year	Author	Entrepreneurship Concept
1725	Richard Cantillon	Entrepreneurship is a period of accumulating money by managing risk perception.
1797	Beaudeau	Entrepreneurship is defining the perception of risk, thinking about what to do, implementing and following up.
1803	Jean Baptiste Say	Entrepreneurship gains are differentiated from financial gains.
1876	Francis Walker	It is the difference between individuals who make money by buying and selling money and those who make money by using their managerial competences.
1934/1950	Joseph Schumpeter	Entrepreneurship is based on innovation. Entrepreneurship is the creation of an improvement in the product model by reorganising the sector, taking advantage of new assets and resources, using current and never-before-experienced scientific innovations and consuming past resources in a new way.
1961	David McClelland	Entrepreneurship is being motivated and active in the risk pool.
1964	Peter Drucker	Entrepreneurship is an endeavour to increase opportunities by seeing them.
1975	Albert Shapero	Entrepreneurship is the acceptance of the possibility of losing by realising socio-economic arrangements using the possibility of decision-making.
1980	Karl Vesper	Entrepreneurship is a concept that encompasses business policy makers, practitioners and analysts.

Source: Hirsch, 1990

Although not universally accepted after 1980, Say, while linking the entrepreneur with the concept of the new, sees the entrepreneur as the main actor of the development process (Filion, 1998).

In addition to psychological and economic literature reviews, behavioural approaches evolve individual-based entrepreneurship as an entrepreneurial culture that affects society. According to the behavioural perspective, personality is an essential factor that feeds individual-based entrepreneurship, but the individual is insufficient individually for the formation of culture, which can be understood when considered together with other factors. In the light of this information, entrepreneurship is a series of behavioural actions that arise from various factors other than the self and can affect the society (Naffziger, 1995).

In a systemic approach, the achievement motive in collectivist cultures differs greatly from the individual achievement motive. In these cultures, the drive for success permeates different selves in the society with the optimisation of 'individualism', 'selfishness' and 'relational self'. In societies with an awareness of social unity, consisting of interdependent individuals, where human relations are effective and strong, it is stated that there is a social achievement motive based on social improvement. When the ambition to succeed is formed and measured in the self, it is seen that the majority in the social culture does not have this attribute. This situation is due to the fact that the measurements of ambition to succeed based on the self cannot measure the sociocultural ambition to succeed by diversifying it (Kağıtçıbaşı, 2000). The coexistence of infrastructure, resources and cultural attitudes suitable for the development of entrepreneurship or the blossoming of innate characteristics is important for sustainable development in terms of social culture. The important point in this study is that entrepreneurship is seen

as a means of value creation because the desire to create value-added products and services that spread to the society increases the level of welfare by strengthening the middle class as well as the formation of new industries. This, in turn, affects sustainable development in the long run through entrepreneurship spreading to the grassroots (Van Praag and Versloot, 2007).
The infrastructure indicators of entrepreneurship data obtained from The Global Entrepreneurship and Development Institute for 43 countries to examine the relationality consist of entrepreneurial financing efficiency, government support, tax and entrepreneurship policies, entrepreneurship education during school, entrepreneurship education after school, R&D transfer, commercial and legal infrastructure, domestic market dynamics, domestic market competition, physical infrastructure and sociocultural norms (GEDI, 2018).

2.3. Model of Abernathy and Clark
The expectation of different outputs in the approach models according to the framework considered in innovation is shown in Abernathy and Clark's model.

Table 3. Model of Abernathy and Clark

Individual Based	System Based
Regular Innovation	Revolutionary Innovation
New productivity-enhancing investments are encouraged Company partners and employees are trained to work more efficiently Quality and standards are improved	New technologies are integrated into the companies' business Employee compositions are changed and new methods are applied Entering the same market with new methods
Niche Innovation	Structural Innovation
New initiatives are supported for the development of business opportunities Firms establish new co-operations New combinations of existing products are made	Requires reorganisation Organises new training events Redefines the physical or legal infrastructure Establish centres of excellence for the dissemination of know-how

Source: Hjalager, 2002

The social values and innovations created constitute the differences. With changing time and perceptions, the boundaries of the model have been preserved, but the predisposition has shifted towards systemic. As we distinguish in Figure 1, the singularity prioritises the entrepreneur, while the system prioritises the ecosystem. The main purpose of our study is related to which one initiates this cycle.
Regular innovation, which is one of the singularities, emerges through gradual improvements in existing products, services or processes. Enterprises develop practices such as increasing productivity, raising quality standards or encouraging new investments by using their knowledge and technological infrastructure. These improvements are low-risk and continuous improvement orientated. Therefore, they contribute to the sustainability of the existing competitive advantage with a single system. Niche innovation refers to innovations aimed at a specific market segment or narrow needs. Innovations in this category occur by going beyond the traditional competences of enterprises and developing new marketing strategies, product combinations or service forms. The aim here is to differentiate and gain competitive advantage by responding to singularly specific customer demands.
Revolutionary innovation, which is a systemic innovation, involves radical innovations that require fundamental changes. This type of innovation envisages a complete change of technological or organisational structure. For example, practices such as the adoption of new technologies, reorganisation of business structures or entering the market with completely different methods are considered within the scope of revolutionary innovation. This approach leads to fundamental transformations in the sector. Structural innovation refers to far-reaching transformations that take place not only at the enterprise level but also at the sector or society-wide level. This type

of innovation involves strategic steps such as redefining the physical or legal infrastructure, establishing centres of excellence to facilitate knowledge sharing and integrating new supporting structures. Our systemic innovations are shaped by a combination of both internal (business) and external (society, sector) factors (Hjalager, 2002). When we remove all systemic factors, we are left with innate abilities as expressed by the psychological approach. If this talent grows in an environment where it is not possible to use it, the talent loses its functionality and atrophies. This is likened to a blind person's blindness of the visual area after a while and regaining function for another sensory purpose (Kanjlia et al., 2016).

3. Hypothesis Development

This section features studies that illustrate the connections between innovation and entrepreneurship.

3.1.The Relationship Between Innovation and Entrepreneurship

When the relationship between innovation and entrepreneurship is examined, it is seen that entrepreneurship is in the state of existence of the human being, which is an irrational being, and therefore psychological factors fed by the environment are important. One of the factors that are effective in determining entrepreneurship is psychological factors.

These psychological factors consist of innate characteristics as well as sub-factors such as success motive, desire for control, willingness to assume risk, adaptation to the immeasurable, self-confidence and innovativeness (Chye Koh, 1996). According to Schumpeter, the father of innovation-based entrepreneurship, entrepreneurship consists of an innovative personality. For this reason, the phenomenon of innovation constitutes the essence of entrepreneurship. Thus, entrepreneurs start with what is new in product, work structure, processes and organisational structure (Sundbo, 1998). Innovation is a phenomenon learnt consciously or unconsciously from the environment.

Along with the changing world, entrepreneurship and innovation in international trade have been adopted as a critical phenomenon for countries to consolidate and increase their position in sustainable development programmes, globally integrated economic studies and international competition. As we come across in many studies, entrepreneurship and innovation are identified with each other and even expressed as different faces of the same entity. Here, it is effective that entrepreneurial culture supports innovation and encourages entrepreneurs towards innovative activities. Curiosity, as it is known, forms the basis of science and provides a large number of discoveries by increasing the level of interest of individuals and motivating individuals on the basis of discovery. In other words, curiosity in entrepreneurship is an essential factor for innovation (Peljko et al., 2016).

In detail, Schumpeter's theory of innovation speaks of innovative entrepreneurship leading to creative destruction. Schumpeter largely associated entrepreneurship with the periphery of the conceptual basis of innovation. According to Schumpeter's work, the way to become an entrepreneur is to realise an idea or innovation that has not been realised in the past, rather than being the rightful owner of a valuable asset or company. The entrepreneur, who makes the potential resources that are already available for use more efficient than the old ways of doing business and likes more competitive innovation, is the main vein of the developed economy. The entrepreneur's new endeavours to develop and change the existing market disrupt the economic order and cause the situation called 'creative destruction' by Schumpeter, making the issue directly innovation-based.

While Schumpeter mentions the entrepreneur as the person who makes innovations in his work titled The Theory of Economic Development, in his work titled Capitalism, Socialism and Democracy, he gives less value to the importance of the entrepreneur compared to his previous work and attributes innovations to corporate companies consisting of entrepreneurial culture rather than individual entrepreneurship. Schumpeter's mentioning the importance of innovations on sustainable economic development in his studies on entrepreneurs and bringing it to the literature has set an example for the studies in this field. The impact of his studies on the relationship between innovation and entrepreneurship is great. In the literature reviews, the effect of innovation on entrepreneurship has been determined and it has been determined that this effect leads to sustainable investment appetite with the formation of entrepreneurial culture, which in this case supports sustainable development policies by considering international competition.

When the relationship is analysed from the perspective of the Abernathy and Clarke model, both processes are presented as dynamics that support each other. While entrepreneurship in regular and niche innovation offers innovative solutions by continuously improving the existing structure, revolutionary and structural innovators prepare the ground for entrepreneurship by creating new business areas with innovative developments. At first

glance, the two-way interaction plays a critical role in both circularising the competitive advantages of businesses and the emergence of new ventures, but from a sustainability perspective, entrepreneurship is a phenomenon that needs to be nurtured and innovation is a phenomenon that feeds (Mulgan, 2006). The entrepreneur's culture of innovation does not come from a single source, i.e. either purely innate characteristics or only learnt knowledge and experience. Research, especially studies conducted in parallel with Abernathy and Clark's innovation model, reveal that this culture is formed by a combination of both the individual's innate psychological and personality characteristics and environmental interaction, education and experience processes. Innate innovative characteristics such as creativity, risk-taking tendency and flexibility constitute the potential of the individual, but these characteristics are not sufficiently nurtured in an environment where innovation is not taught, that is, in an environment where supportive education, mentoring and a suitable cultural environment are not provided. In such an environment, although individuals may have the capacity for creative thinking, they may not acquire the necessary tools, strategies or courage to develop and apply these abilities, i.e. the lack of a culture of innovation at societal and organisational level leads to both the failure to fully realise individual potential and the slowing down of overall economic and social development. The basis of sustainable development is considered to be social innovation because it is a critical step for a sustainable and inclusive development in a hyper-competitive environment, as it is considered as a model that centres not only economic growth but also social development.
H1: There is a positive relationship between Innovation and Entrepreneurship.

4. Material and Method

This section presents the findings derived from the analyzed data. To evaluate the hypothesis, Pearson correlation analysis is employed to measure the association between variables, while regression analysis is conducted to assess statistical significance. The Innovation Index is sourced from the World Intellectual Property Organization (WIPO), whereas the Global Entrepreneurship Index is compiled by the Global Entrepreneurship and Development Institute. The analysis was performed using the statistical software SPSS 26 to provide a comprehensive understanding of the examined relationship.

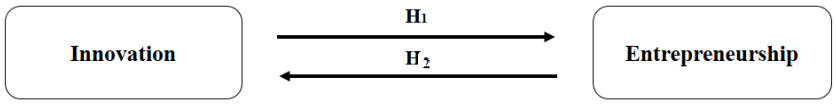

Figure 1. Conceptual Model

The literature review indicates that the relationship between innovation and entrepreneurship has been examined using the Abernathy and Clarke model, revealing a positive association. This study seeks to validate the significance of this relationship through the analysis of secondary data.

5. Analysis Result

The association between the two variables was initially examined through the calculation of the Pearson correlation coefficient. As presented in Table 1, the results indicate a strong and statistically significant correlation between the variables.

Table 4. Pearson Correlation Table

	Explanation	Innovation	Entrepreneurship
Innovation	Pearson correlation	1	0,838**
	2 tailed signifance		,000
	Sample size	215	215

Entrepreneurship	Pearson correlation	0,838**	1
	2 tailed signifance	,000	
	Sample size	215	215

** Correlation, significance level at 0.01 (two-tailed)

According to Pearson correlation, it is determined that there is a very high correlation of 0,838 between innovation and entrepreneurship. This means that the relationship between these two variables is very strong. If the value in the two-tailed significance row exceeds 0.05, it suggests the absence of a statistically significant correlation between the variations in the variables. In this study, a significance value of 0.000 indicates a strong association between the variables. A value of zero signifies an exceptionally high level of statistical significance.

Table 5. Regression Coefficients Table

Hypothesis Relations			Estimate	Standard Error	Critical Ratio (t-value)	P	Label
H_1: Innovation	→	Entrepreneurship	1,413	,063	22,447	***	

The regression coefficient shows that innovation has a strong effect on entrepreneurship and the critical ratio is greater than 1.96 in the same relationship. When the P value is less than 0.001, *** sign is placed. When the P value is less than 0.05, it expresses significance. According to the P value, H1 hypothesis is significant.

Table 6. Regression Coefficients Table

Hypothesis Relations			Estimate	Standard Error	Critical Ratio (t-value)	P	Label
H_2: Entrepreneurship	→	Innovation	0,497	,022	22,447	***	

By looking at the regression coefficient, it is seen that entrepreneurship has an effect on innovativeness and the critical ratio is greater than 1.96 in the same relationship. When the P value is less than 0.001, *** sign is placed. When the P value is less than 0.05, it expresses significance. According to the P value, H2 hypothesis is significant. In a model in which the independent variable and the dependent variable are replaced, it is seen that 1 unit increase in entrepreneurship increases innovation by 0.497 units on average. Although both hypotheses are acceptable, it is seen that in hypothesis H1, innovativeness increases entrepreneurship strongly with 1.413, while in hypothesis H2, entrepreneurship increases innovativeness relatively weaker. From a sustainability perspective, it is possible to say that innovation is a factor shaping entrepreneurship because even if entrepreneurship increases innovation, this effect remains more limited. The analysis with 43 country data supports the idea that innovation is a fundamental aspect of entrepreneurship.

6. Conclusion and Discussion

This network was analysed on the basis of literature and significant links were identified. In order to evaluate the statistical significance of these studies, 5-year data, including innovation index and entrepreneurship index, of forty-three countries in six continents were obtained. This study differs from other studies by elaborating the relational network in question and presenting it as a whole from the sustainability framework.

Relationality is analysed within the framework of Abernathy and Clarke model and the hypothesis is tested. From the perspective of sustainability, the question of whether innovation feeds entrepreneurship or entrepreneurship feeds innovation is sought to be answered.

In fact, the main value of our research is whether we should prioritise investment based on the principle of limited resources and infinite opportunities, and whether we should focus on people with limited lifespan or on the system with unlimited lifespan. It is aimed to compare sustainable entrepreneurship and the sustainable innovation that feeds it, instead of a one-time shining individual-oriented entrepreneurship. In Abernathy and Clark's model, structural innovation and revolutionary innovation categorise systemic sustainable innovation, while regular innovation and niche innovation are based on the human practitioner. As we have explained with psychological theories, the innate abilities of human beings do not grow and turn into value if there is no suitable environment. This situation can be depicted by planting a tea seed in a desert environment that receives no rain. Although some plants may grow in the desert, this does not mean that the desert is an ecosystem.

This situation can be represented by individual cases in non-innovative systems that have developed entrepreneurial skills through their own efforts, but it is not sustainable. For this reason, in the light of the relevant theory, it is stated that the basis is innovation. As a result of the analyses, it is seen that the correlation between the two concepts is very high with 0.838. In some cases, this high correlation leads to intertwining of concepts and confusion in generalisations about which one is the independent variable. When we look at causality, it is seen that innovation affects entrepreneurship at a high rate of 1.413, while entrepreneurship affects innovation relatively less with 0.497. This situation shows the fundamental aspect and inclusiveness of innovation on entrepreneurship. The indices subject to our empirical study are composed of scores obtained from the combination of many sub-variables. In the innovation index, the weighted and main sub-divisions are political stability, business environment, regulatory environment, education, infrastructure, while in entrepreneurship it is opportunity perception, risk appetite, product innovation, process innovation, global support and competitiveness. According to our country comparisons, while a country's high level of innovation ensures high level of entrepreneurship, high level of entrepreneurship does not necessarily mean high level of innovation. According to the results of the analyses, the importance of sustainable innovation on sustainable entrepreneurship is highlighted.

To summarise, in order to add the term sustainable in front of the concepts, it is suggested that priority investment areas should be planned in line with the sub-indicators of systemic innovation, which enables entrepreneurs to develop and forms the basis, remembering that the human being, which makes entrepreneurship possible, is an irrational and limited-life entity, thus making innovation and entrepreneurship fed by innovation sustainable.

Instead of encouraging individual entrepreneurship in our hyper-competitive world, it is recommended to invest in sustainable innovation in order to ensure sustainable development in line with the United Nations 17th Sustainable Development Goal of strategic partnership for sustainable development and to enable sustainable entrepreneurship in the medium and long term.

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