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THE IMPACT OF PROPERTY RIGHTS ON INNOVATION: A RESEARCH ON COUNTRY DATA

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Abstract

The aim of this study is to determine the impact of property rights on innovation. While many studies analyze the topic at the business level, this study aims to determine the role of property rights in improving innovation performance. The research was conducted based on quantitative research methods using secondary data obtained from various organizations, which are publicly published as innovation indices and datasets referred to as property rights. We conducted correlation and regression analyses using the SPSS software package on both variables published for the year 2022. The analyses have identified a linear and significant relationship between property rights development and innovation indices levels. The regression analysis revealed that these linear relationships are significant. It is vital to develop the elements of property rights as driving forces in the advancement of innovation and to ensure trust in these elements.

Anahtar Kelimeler: Inovation, Property Rights, Inovation index, Performance
JEL Sınıflandırması: *O32, K11, M20*

MÜLKİYET HAKLARININ İNOVASYON ÜZERİNDEKİ ETKİSİ: ÜLKE VERİLERİ ÜZERİNE BİR ARAŞTIRMA

Öz

Bu çalışmanın amacı, mülkiyet haklarının inovasyon üzerindeki etkisini belirlemektir. Birçok çalışma konuyu işletme düzeyinde analiz ederken, bu çalışmada inovasyon performansını iyileştirmek için mülkiyet haklarının rolünün belirlenmesi hedeflenmiştir. Araştırma nicel araştırma yöntemine dayalı bir şekilde ikincil el veri olarak kabul edilen çeşitli kuruluşlar tarafından toplanan kamuoyunda yayınlanan inovasyon endeksleri ve mülkiyet hakları düzeylerini gösteren veri setleri üzerinden yürütülmüştür. Her iki değişkenin 2022 yılına ilişkin yayınlanan verilerden SPSS yazılım paketi kullanılarak korelasyon ve regresyon analizleri yürütülmüştür. Analizlerde, mülkiyet hakları gelişimi ile inovasyon endeksleri seviyeleri arasında doğrusal ve anlamlı ilişkiler tespit etmiştir. Yapılan regresyon analizi ile bu doğrural ilişkilerin anlamlı olduğu ortaya konmuştur. İnovasyonun ilerlemesinde itici bir güç olarak mülkiyet hakları unsurlarını geliştirmek ve bu unsurlara olan güveni sağlamak kritik önem taşımaktadır.

Keywords: *İnovasyon, Mülkiyet Hakları, İnovasyon indeksi, Performans*
JEL Classification: *O32, K11, M20*

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1. Introduction

The fact that people are surrounded by scarce resources has necessitated the establishment of some rules regarding the use of these assets. Property rights are regulations established to ensure the proper and effective use of resources. Rights are important because they determine the conditions under which a single individual, group, or organization can access certain resources (Kama, 2010, p. 107). Property rights are an important concept in terms of promoting economic development, social development, welfare and innovation, as well as protecting the freedom of individuals in private property rights, and understanding how much individuals respect the laws and laws enacted and to be enacted for commercial purposes in a country. When the researches are analysed, it is found that property rights have positive effects such as ensuring development in that country and efficiency in resource distribution (Trebilcock & Veel, 2014; Kerekes & Williamson, 2008). Another important point is that, despite the linear positive effect of these property rights on countries' financial outcomes and growth trajectories, they are notable in non-linear relationships (Bose, Murshid, & Wurm, 2012). A broader group of research has been conducted on intellectual property and industrial property rights, which are expressed as an important dimension of property rights. In the researches conducted in this field, it has been determined that intellectual and industrial property rights have a positive effect on innovation and economic growth. The level of protection of property rights encourages innovation by motivating firms to invest in R&D, and the disclosure of innovations within the framework of intellectual property rights influences innovation in the long term by facilitating the creation of knowledge.

In addition, innovation has an important place in both the development of the country and the success of enterprises. The Endogenous Growth Theory, one of the economic theories, argues that innovation is the engine of economic growth and that property rights play a significant role in this process. This theory emphasizes that companies need to protect property rights in order to invest in R&D and develop innovative products. When analysed in terms of enterprises, there are many studies showing the positive effect of innovation in terms of performance (Li, Zhou, & Si, 2010; Aboramadan, Albashiti, Alharazin, & Zaidoune, 2020; Kiong, 2021; Kamuri, 2022). When considered on a business basis, very few studies have questioned whether the distribution of property rights within the units of a business and the use of these rights affect innovation. A study conducted at this level examined whether the allocation of property rights to business units or subsidiaries of the enterprise affects technological innovation. Magelssen (2019) has identified a significant relationship between the distribution of property rights within international businesses and technological innovation. According to this research, subsidiaries that have property rights have produced more technological innovations than those that do not (Magelssen, 2020). It is also important for countries to take measures to ensure innovation, which has an important factor in the success of enterprises, which are expressed as the cells of a country's economy. There are studies explaining the role of innovation in the economic development of countries (Elverdi & Atik, 2021). Innovation is often seen as a complex and risky process. Trust has an important role in the development of innovation. Firstly, trust creates a tolerance in the culture of the organisation against failure when managers make innovation decisions. Then, trust facilitates the acquisition of resources and reduces financial crises. In addition, trust increases the perceived return of innovation by reducing concerns about intellectual property risks. (Ding, Guo, Kuai, & Niu, 2023, p. 475). Trust has an important role in increasing innovation. However, developments in property rights are important to ensure trust in countries. Many studies in various fields show that trust is positively affected by developments in property rights (Chung & Kwon, 2024; Blumm, 2009; Hall & Ahmad, 2013).

Based on this importance, since there is no study in the literature that analyses the direct effect of property rights as a whole from the data of the countries, it is aimed to determine how the development of property rights and the effect of property rights on the innovation indices of the countries will contribute to the economic development of the countries and the performance of the enterprises to the decision makers in the future. For this purpose, firstly, the theoretical

framework on property rights and innovation is given. Subsequently, the methodological approach and findings of the research are presented. The research concludes with conclusions and recommendations.

2. Theoretical Background

This section of the study covers literature on innovation and property rights, both of which are research variables. We first express the concept of property rights, followed by an explanation of the concept of innovation.

2.1. Property Rights

Property rights play a significant role in shaping the reasonable expectations that individuals can have in their relationships with one another as a societal tool, thereby increasing the importance of these rights. These expectations also find their place in laws, traditions, and moral values. A person with these rights has a say in how the people around them behave in certain ways. Because of this entitlement, a property owner holds significant power against others intervening in their behavior and obstructing the exercise of their rights. In this context, property rights play a fundamental role in shaping individuals' expectations and interactions within society (Demsetz, 2013, p. 125).

The right of ownership allows the owner to use and benefit from the asset and to prevent others from doing so. In addition, it grants the rights holder the freedom to transfer these rights to others (Segal & Whinston, 2013, p. 100).

The property right includes the individual's privilege to use their owned assets for the purpose of consumption or generating income. In addition to all this, it also encompasses the right to transfer the property or asset through sale, gift, or inheritance to another party. The right to property generally includes the right to enter into contracts with other parties regarding leasing, pledging, mortgaging, or allowing others to use a good or asset; this also applies in situations such as an employment relationship (Besley & Ghatak, 2010, p. 3).

The economics literature has made important contributions on how secure property rights affect economic development and efficient resource extraction. The key takeaway from this literature is that property right security provides a dynamic benefit to the owner; by reducing the risk of loss or expropriation, it makes it possible for an additional unit of protection today to yield a larger return tomorrow. This not only increases the value of natural resource stocks, but also rationally incentivizes resource conservation. Improving property right security is therefore seen as a tool for both economic development and environmental sustainability (Noack & Costello, 2024, p. 1).

The protection of property rights is fundamental to securing the profits that investors and entrepreneurs will obtain. When the specified protection is absent, the entrepreneur's willingness to invest decreases. In this sense, insecurity regarding property rights indicates both low investment levels and low economic growth. Studies at the microeconomic level show that the protection of property rights has a positive impact on investments. These findings demonstrate the critical role property rights play in economic development and individual entrepreneurs' investments. (Shah, et al., 2024, p. 2).

Property rights provide incentives in terms of resource utilization. The use and transfer of these resources presents a combination of rights, both official and unofficial. Property rights range from open access, where everyone can use a resource regardless of how it affects others, to a completely defined set of exclusive rights. A complete set of special rights includes (Alston & Mueller, 2008, p. 573):

- The right to use property, provided that the user does not interfere with other people's property rights.

- The right to restrict the use of this property by others
- The right to derive income from the property owned,
- The right to sell.
- The right to bequeath to the desired person through inheritance.

It is recognised that property rights are of considerable importance in determining the use of resources. The more individualised these rights are, the stronger the incentives to protect and enhance the value of the asset concerned (Alston & Mueller, 2008). Personal property rights are seen as important for personal welfare and economic development. These rights are considered a critical prerequisite for facilitating voluntary and mutually beneficial exchanges that promote specialization, innovation, and economic growth. Scholars have argued that the protection of private property rights plays a crucial role in preventing coercion, securing freedom, and enhancing personal well-being. Empirical studies show that there is a strong positive relationship between the level of protection of private property in countries and economic development. In this context, it is concluded that the protection of private property rights is of fundamental importance for both individual welfare and economic development (Levine, 2005, p. 61).

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One component of property rights is intellectual property rights. Terms that encompass intellectual and industrial property rights include frequently encountered ideas and literary works, music and film works, performing artists, phonogram producers, inventions, trademarks, and designs, new plant varieties, and semiconductor product topographies. Intellectual property rights, recognized as an economic right, encompass elements such as the use, reproduction, distribution, and modification of works or innovations that are the products of creative activity. It is the totality of legitimate rights that enable the availability and control of skills, creativity, resources, and technology, providing the inventor or license holder with a competitive advantage and income benefit. Within a legal framework, legal texts protect economic intellectual property rights, dividing them into two sub-branches: intellectual/artistic rights and industrial property rights (Parlakyıldız & Güvel, 2015).

2.2. Innovation Concept

Innovation is a concept that has been at the center of our lives since the existence of humanity. People have always sought ways to be more efficient, effective, and better. This quest has led to significant milestones that form the foundation of civilization. Throughout history, critical innovations such as the invention of writing, the control of fire, and the beginning of agriculture have propelled humanity to new horizons and fundamentally transformed our ways of life. Innovation is defined as the implementation of a new or significantly improved product, service, process, new marketing method, or new organizational method in business practices, organizational structures, or any other stage related to business (Kadar, Moise, & Colomba, 2014). When the literature is examined, innovation has been defined separately in various fields and subjected to a classification.

Many researchers agree that innovation is the cornerstone of economic development. According to Smith, the size of the market determines the division of labour. Each increase in the size of the market can lead to an increase in the division of labour and thus specialisation. Specialisation is seen as essential for the eventual introduction of specialised learning and innovations. Innovation increases the productivity of labour and thus the size of the market. In this

way, Smith treats the foundations of the analysis of technological change as an endogenous process (Çetin, 2013, s. 3). According to Schumpeter, innovations arise from commercially applied ideas or inventions. According to her, such innovations are the primary driving force behind economic development (Fritsch, 2017).

From Schumpeter's perspective, the entrepreneur directs the means of production in new ways and is not necessarily a genius contributing to humanity. The entrepreneur's decision to innovate is associated with the expectation of profit. Innovation contributes to product development and strengthens the entrepreneur's position in the market, which encourages high profits and new innovations, thus having a positive impact on economic growth. (Galindo & Picazo, 2013,p. 504).

Numerous classifications examine the concept of innovation. According to Schumpeter's classification of innovation, it consists of the introduction of new products, the introduction of new production methods, the opening of new markets, the establishment of new supply sources, and the creation of new market structures. The Oslo Manual classifies product innovation, process innovation, marketing innovation, and organizational innovation into four areas. This classification is defined as follows (Yavuz, 2010):

1. Product innovation is defined as a significantly enhanced version of a product or service. Technical qualifications may include critical developments in components, materials, and integrated software. The company or the market can define it as a new product. We can measure the success of product innovation by its customer demand, implementation feasibility, and marketability.

2. Process innovation: This is defined as the critical updating of production or delivery methods, or intermediate steps. It contains critical developments in areas such as technology, equipment, or software. It can also refer to the development of innovative processes during the various stages of product development or creation. We can use the development of current production methods for generating automotive fuel from renewable sources as an example.

3. Marketing innovation: It includes significant differences in marketing methods such as product design, packaging, positioning, promotion, or pricing. The relationship between the customer and the seller aims to differentiate. It emphasizes the preference for an innovative approach or method over the traditional customer-seller relationship.

4. Organizational innovation: This pertains to the introduction of educational activities, the use of machinery and tools, and the dissemination of external information. It entails a preference for current methods in workplace organization and external connections. It includes new structures aimed at bringing together material and human resources in the best possible way.

The financial literature analyses externalities arising from innovations under three main headings (Pece, Simona, & Salisteanu, 2015, p. 462):

- The technology leakage effect reduces the costs of competitors and factors such as missing patents and the transfer of skilled labour to other companies are taken into account.
- The inability of companies to capture the full social gains generated by innovations means that the social benefits of this process are not fully reflected in individual earnings.
- The displacement effect is characterised by the fact that new ideas make existing production technologies obsolete and inefficient, leading to a constant need for innovation.

There are many factors that contribute to countries' economic growth. Among these factors, the most commonly observed are the savings rate, increases in the stock of productive inputs, and technological change. Innovation can be said to be an important determinant of economic growth, as it directly influences technological change. Sustainable growth in a globalizing world, where increasing population strains natural resources daily, hinges more than ever on fostering innovation. Intellectual capital distinguishes innovation from traditional capital measures, particularly when compared to physical stocks (Lebel, 2008, p. 2).

The impact of innovation activities on economic growth is analysed. Innovation affects economic growth directly and indirectly by enabling low-cost production. Four different hypotheses are put forward to explain the relationship between innovation and economic growth (Maradana et al., 2017, pp. 2-3):

- Supply Frontier Hypothesis: Innovation activities trigger economic growth.
- Demand Pursuit Hypothesis: Economic growth triggers innovation activities.
- Feedback Hypothesis: There is a mutual interaction between innovation activities and economic growth.
- Neutrality Hypothesis: There is an independent relationship between innovation activities and economic growth.

Variables like R&D, patents, and the number of researchers often explain the concept of innovation, yet a single component cannot fully capture its complex structure. While some view variables like patents, R&D, and the number of researchers as key drivers in the innovation process, others criticize them for their inadequate representation of innovation, citing their inherent weaknesses and inability to yield clear results regarding innovation output. On the other hand, the creation of innovation indices by considering many components such as innovation inputs, processes, and outputs makes these indices more successful, as they represent this complex structure (Süt & Çetin, 2018). As mentioned above, innovation emerges as an important structure that ensures both the continuity and success of economic activities, as well as the development of economies.

3. Methodology

In this section, the purpose, method, sample, hypotheses and findings of the study are presented.

3.1. Purpose of the Research

The study aims to analyse the relationship between property rights and innovation in depth. In this context, it aims to bring together theoretical and empirical findings by comprehensively assessing the effects of strengthening property rights on innovation processes and outcomes. The analysis reveals the impact of property rights on innovation indices using quantitative methodology, thus providing concrete evidence on the role of property rights in fostering innovation. To this end, correlation and regression analyses are conducted to examine in detail the extent and dynamics of the relationship between property rights and innovation.

The following hypotheses were formed to test the relationship stated in the research.

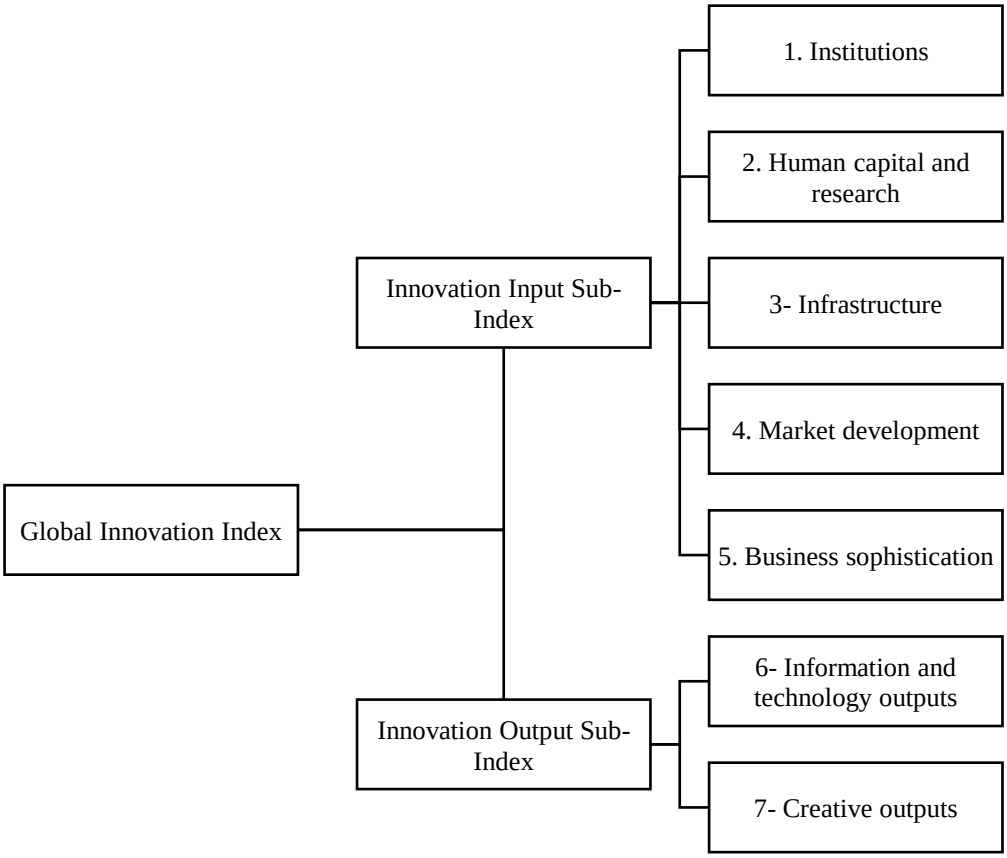
H1: There is a significant relationship between property rights and innovation index.

3.2. Research Methodology

This research is designed based on quantitative research method to analyse the relationship between property rights and innovation indices of countries. The first variable of the research was taken from an index showing the level of development of property rights in countries. This index analyses countries by looking at their sub-components in these 3 headings by giving the highest 10 and the lowest 0 points over 3 different components of the Property Rights Index. This index's first component focuses on the political and legal domains. This component provides information about the strength of a country's institutions and the respect for "rules of the game" among its citizens. It also significantly affects the index's other two components as the first component. The other two components, Physical Property Rights (PPR) and Intellectual Property Rights (IPR), reflect two forms of property rights that are decisive for the socio-economic development of countries. It shows the legal status of items in these two categories, as well as the level of development in each country. The relevant institution releases a report that summarizes these three free elements and includes a country-specific index (The Heritage Foundation, 2022). The Global Innovation Index is

a preferred tool for examining a country's innovation capabilities and policy implementations in order to identify its strengths and weaknesses. The objective of this index is to develop techniques for assessing innovation, concentrate on comprehending it, and establish a setting that consistently assesses the elements of innovation (Taş, 2017). The 2022 report of the Global Innovation Index (GII), which ranks the world economies according to their innovation capabilities, was published by the World Intellectual Property Rights Organisation (WIPO). The index is prepared regularly every year in cooperation with the World Intellectual Property Rights Organisation (WIPO), INSEAD and Cornell University. The report includes innovation sub-input components and innovation output sub-components in the calculation of the index. These components are shown below (Dutta, Lanvin, Wunsch-Vincent, & León, 2022)

Figure 1: **Infrastructure of the Global Innovation Index (GII)**



Source: (WIPO, 2022).

As shown in Figure 1, each component of the innovation index consists of seven components divided into two main categories. Each country provides the index with data based on the specified components, which is considered an important indicator of that country's innovation strength.

3.3. Sample of the Study

In the "Sample" section of the research, the sample group selected to examine the relationship between property rights and innovation is detailed. Within the scope of the research, the countries in the two data sets described in the method section above were selected. The countries whose data are included in the research are shown in Table 1 below.

We selected the countries listed in Table 1 because both data sets were available at the time of the study. The research methodology section of the study explains how we obtained the relevant datasets and their content.

Table 1: **Countries for which 2022 Data is Available within the Scope of the Research**

Countries	Innovation	Property Rights
Austria	50.2	98.4
Brazil	32.5	50.3
Canada	50.8	89.5
Chile	34.0	73.0
China	55.3	43.7
Colombia	29.2	50.9
Croatia	35.6	81.1
Cyprus	46.2	85.6
Egypt	22.7	39.0
France	55.0	93.8
Germany	57.2	95.7
Greece	34.5	76.0
Guatemala	17.8	39.8
Hungary	39.8	75.8
India	36.6	49.9
Norway	48.8	99.6
Oman	26.8	74.9
Panama	25.7	58.8
Poland	37.5	72.3
Qatar	32.9	68.6
Romania	34.1	81.0
Serbia	32.3	58.8
Slovak Republic	34.3	83.2
Slovenia	40.6	89.7
South Africa	29.8	43.2
Spain	44.6	87.7
Sweden	61.6	97.3
Switzerland	64.6	95.2
Togo	15.1	36.8
Tunisia	27.9	60.9
United Arab Emirates	42.1	63.5

3.4. Research Findings

In order to determine the relationship between property rights and innovation index, the above hypotheses were established and correlation analysis was applied for this purpose. The findings obtained as a result of the correlation analysis are given in Table 2.

Table 2: **Correlation Analysis Results**

		Innovation Index
	Pearson Correlation	.699
	Sig. (p value)	.000
Property Rights	N	Yok

As seen in Table 2, there is a significant relationship between property rights and innovation index ($p<0.05$). Pearson correlation coefficient is 0.699. Therefore, it can be said that there is a positive and high degree of relationship between property rights and innovation index. This situation can be interpreted that if one of these two variables increases, the other will also increase or if one of them decreases, the other will decrease.

After the correlation analysis, regression analysis was applied in order to establish a model in which innovation index is considered as the dependent variable and property rights as the independent variable. The hypotheses related to the regression model are given below.

H1: The regression model is significant.

Firstly, the results of whether the regression model is significant or not will be analysed. These results are given in Table 3.

Table 3: **Regression Analysis Results**

ANOVA					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig. (p value)**
Regression	.330	1	.330	40.216	.000
Residual	.345	42	.008		
Total	.675	43			

When Table 3 is analysed, it is seen that the regression model is significant ($p<0.05$). In other words, the model in which the innovation index is considered as dependent and property rights are considered as independent variables, in other words, the model that property rights affect the innovation index is significant as seen in the ANOVA table. Therefore, the table in which the model will be obtained will be analysed and the regression model will be created. The results of the model are given in Table 4.

Table 4: **Regression Model Coefficients**

Coefficients	**Unstandardised Coefficients**		**Standardised Coefficients**		
	B	Std. Error	Beta	t	Sig.
(Constant)	.097	.049		1.980	.054
Innovation Index	.411	.065	.699	6.342	.000

The result of whether the coefficient of the regression model is significant or not is shown in Table 4. According to the result of the analysis, the coefficient b is significant ($p=0.000<0.05$). Since the regression model is significant in the previous table and the coefficient for the regression model is significant in this table, it is possible to construct the regression model. The regression model is given in Equation 1.

$$\text{Innovation index}=0.097+0{,}411(\text{Property rights}) \quad (1)$$

Equation 1 presents a simple linear regression model for innovation index and property rights. In the model, it is seen that property rights positively affect the innovation index. It is possible to interpret the model as follows: 1 unit increase in property rights will cause 0.411 unit increase in innovation index. Therefore, it is concluded that property rights is a variable that positively affects the innovation index. Finally, the results obtained for the interpretation of Adjusted R2 are given in Table 5.

Table 5: **R2 and Adjusted R2**

Model Summary			
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
.699	.489	.477	.090586

Table 5 shows R, R2, adjusted R2 and standard error. R value is the correlation coefficient obtained as a result of correlation analysis. Therefore, it will not be interpreted again. R2 shows how much of the change in the dependent variable is explained by the independent variable. However, adjusted R2 will be interpreted here instead of R2 since it gives more accurate results. The table shows that the adjusted R2 is 0.489. Therefore, 48.9% of the change in the innovation index is explained by property rights. It can be said that the ratio obtained is quite good.

4. Conclusion

The efficient use of resources and the transfer of goods are important for businesses in preventing high costs and risks in the production process. The right to ownership through property rights creates incentives for businesses and producers. In this study, the relationship between property rights and innovation is analysed. In this context, first the conceptual framework of the

issue is drawn and then the impact of property rights on innovation is analysed. Indices that reveal the innovation levels reveal the advantages and disadvantages of countries in terms of innovation by showing their innovation performances. In addition, it guides the enterprises in countries in terms of innovation activities. When the factors that will affect innovation are determined correctly, it is expected that both the development of innovation-enhancing factors on the basis of countries will be ensured and indirectly the enterprises will turn towards and develop innovative activities. In the research, it is revealed that the development of property rights in a country affects innovation indicators. There are a number of studies that need to be done to improve property rights, which is an important tool in developing innovation. Considering the basic indicators that constitute property rights, the institutions in countries expressed as the political and legal sphere and their power and trust in them, as well as physical property rights and intellectual property rights, include determinants for the progress of a country and its enterprises. There are important issues in ensuring the development of property rights. The concept of property has changed from the past to the present and now information and digital assets should be handled within these. The reality and content of property rights have also been categorised into various forms with legal regulations over time and their importance in commercial life is increasing. For example, intellectual property rights have been divided into sub-headings such as patents and copyrights, and it has become possible to trade with these rights. The provision of property rights involves legal and administrative steps. These steps have become different as time has progressed and the costs and procedures required to ensure property rights have also become different. For example, more modernised registration systems and digitalisation facilitate the fast and efficient enforcement of property rights. The protection of property rights is realised through legal regulations and practices. These forms of protection have evolved over time and have been strengthened by technological developments. For example, digital rights management systems and cyber security measures play a critical role in protecting intellectual property rights. However, it is known that property rights are violated in various ways and practices. Among these, the development of technology has increased the number of piracy, copyright infringement and attacks on various property rights. For this reason, current measures and sanctions should be established and implemented in order to protect property rights more robustly (Morris, 2009:pp. 27-28). Another supporting study was conducted on Chinese firms using the Poisson regression estimation method with a survey technique. This research examines how and to what extent property rights affect business innovation. The research has revealed that property rights institutions have increased the level of business innovation over space and time. Additionally, it has been confirmed that property rights institutions influence individuals' (system/policy) expectations, and this situation shapes business innovation (Liu & Li, 2010). Since the development of property rights affects innovation, decision makers should update regulations and rules by taking into account the developments and changes in the relevant field.

In addition, it is suggested that other macro variables that may affect innovation should be addressed in terms of other researches. It is recommended to carry out researches not only on enterprise level variables but also on other factors that may indirectly affect innovation in terms of enterprises and to take policies in line with these researches.

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