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## DEFINING THE IMMATERIAL PROPERTY RIGHTS IN A DIGITAL NETWORK ENVIRONMENT

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**Summary:** The article discusses property rights to immaterial objects transferred in a digital network environment. These immaterial objects consist of data on network users, their intellectual products, and their relations. Such data are noncompetitive with regard to their use. The aim of the article is to investigate the justifications provided by various theoretical approaches to economics with regard to the possibility of establishing data exclusivity by defining property rights. The article discusses the positions of neoclassical economics, the property rights school, and the transaction costs school, exploring how their assumptions and conclusions can provide arguments regarding the exclusivity or nonexclusivity of data transferred in a digital network environment.

**Key words:** property rights, immaterial rights, digital networks, data, information.

### 1. Introduction

Property plays a key role in the structures of economic and social life. The establishment of property rights is generally recognized as a cornerstone of the market economy [Hume 1969; Demsetz 2000; North 1981]. Traditionally, property concerned physical (material) objects. The scarcity of material objects is widely regarded as the primary premise for defining property rights, whereas immaterial objects, such as financial obligations, licences, or information may lack the attribute of scarcity if their use is noncompetitive. This is an attribute of content transferred in the second generation digital network environment (Web 2.0). Affording exclusive rights to such content is a source of theoretical controversies and conflicts observed in economic reality.

Noncompetitiveness of Internet content is not tantamount to its being in the public domain. Such content is developed by specific individuals and relates to various private, economic, political, or social events, which leads to a possible contradiction between views holding that Internet content constitutes public goods and the need to protect it by defining the immaterial property rights [Benkler 2006]. The aim of this article is to systematize the theoretical and practical issues with regard to defining property rights to content transferred in a digital network environment.

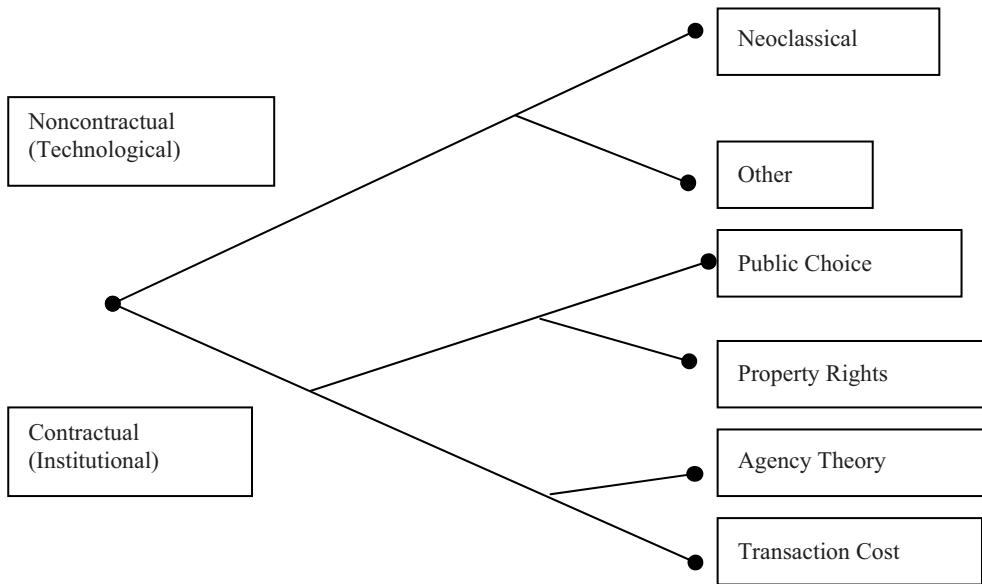
In the second part of the article, I will discuss the main theoretical positions within various schools of economics sharing methodological assumptions relating to the investigation of property rights that go back to the age of Enlightenment. This will make it possible to identify methodological similarities and differences between those positions. On that basis, I will be able to determine the relationships between the concepts of property rights to material objects and various positions regarding the immaterial property rights. Before addressing that matter, I will discuss the basic characteristics of content transferred in a digital network environment and identify those subsets of such content that might potentially be subject to the immaterial property rights. The next part of the article will present the possibilities of establishing rights to the immaterial digital products in a network environment within the frameworks of mainstream economics, the property rights school, and the transaction costs school. The analysis of the approaches of those schools to property rights in the context of the characteristics of Internet content will lead to conclusions identifying specific problems with regard to defining the immaterial property rights in a digital network environment and ways to solve those problems.

## **2. Property rights in various schools of economics in a historical perspective**

Scientific studies of economic phenomena and processes, which have been going on for more than 200 years, all have their roots in Enlightenment philosophy, which continues to define the methodological framework of those investigations. Within this framework, a range of theoretical positions have emerged that emphasize selected aspects of economic life and specific methodological assumptions. This is illustrated by Oliver Williamson (see Figure 1), who identified a neoclassical (noncontractual) approach to economics and a contractual (institutional) one. The two approaches were shown as stemming from the same source: classical economics.

Classical economics has Enlightenment roots. The political philosophers of that period on the one hand pointed to people's self-interest or even egoism and greed as a source of conflicts stemming from a desire to appropriate scarce resources. On the other hand, they stressed rationality as a factor helping to curb individualism and encouraging cooperation. This was most clearly stated by David Hume in his *Treatise of Human Nature* [1739-40/1969]. Bearing in mind the close, long-term personal relationship between Hume and Adam Smith, the metaphorical "invisible hand", which leads self-interested individuals pursuing their own ends, can be interpreted as a manifestation of enlightened reason, which requires that private aspirations should be curtailed in view of the necessity to resolve conflicts peacefully.

Conflicts were seen to arise not solely from people's natural desires and interests, but also from clashes between those desires and interests and the limited possibilities of satisfying them because of the scarcity of material goods. Resource limitations are the basis for describing the original state as the state of nature, which was first



**Figure 1.** Main approaches to economics (microeconomics)

Source: Williamson [1991].

done by Thomas Hobbes and subsequently by John Locke. In his *Leviathan* [1929], Hobbes describes the primordial condition of man as a state of “war [...] of every man against every man”, resulting from human beings’ egoistic nature. For fear that struggle will harm their own interests, people make a compromise agreeing to live as if they were bound by a contract. The contract concerns renouncing part of their individual interests in favour of society in exchange for protection provided by the state. Property rights, rules for conducting transactions, and other institutions are established resulting in struggle being replaced with market competition.

In his “Two Treatises of Government” [1823/1963], John Locke also sets out a concept of a social contract made in a different state of nature than that assumed by Hobbes. According to Locke, life in the state of nature was fundamentally peaceful: people knew private property and the basic rules of cooperation. Thus, most obeyed the law of nature, based on the principle that “no one ought to harm another in his life, health, liberty, or possessions” [Locke 1689]. Some, however, being a minority, may commit violence or fraud in the state of nature. In order to protect themselves against such actions, society, i.e., the majority, make a contract establishing the state to enforce the law of nature. The state operates within the confines of constitutional rules, which concern property rights, transfers of such rights in accordance with the right of free exchange and responsibility for transgressions against the law of nature. Within these confines the state has prerogatives to undertake measures safeguarding the constitutional order.

The concepts outlined so far share an emphasis on a social contract among rational individuals. However, whereas Hobbes regards the social contract as a convention, Locke sees it as an agreement to obey the law of nature. This difference stems from different understandings of human nature: to Hobbes, man by nature was not a social being, whereas to Locke a representative majority in the state of nature was equipped with a social propensity to peaceful cooperation.

The social contract concerns institutions that define the principles of cooperation and competition. During the formative period of mainstream economics, the institutions arising out of the social contract were assumed enthymematically. As a result, the focus in descriptions of the functioning of markets shifted from cooperation among individuals to coordination of independent human actions, and the invisible hand metaphor was interpreted as a characteristic of the market mechanism. In neoclassical economics (the noncontractual approach), in the original state a complete social contract emerges, so institutions, including property rights, are perfectly defined. They are exogenous factors, not included *expressis verbis* in economic models. This is explicitly stated by Joseph Schumpeter in *Business Cycles* [1939, p. 144]: “our model and its working is, of course, strongly institutional in character. It presupposes the presence, not only of the general features of capitalist society, but also of several others. We assume not only private property and private initiative but a definite type of both: not only money, banks, and banking credit but also a certain attitude, moral code, business tradition, and ‘usage’ of the banking community; above all, a spirit of the industrial bourgeoisie and a schema of motivation”.

Under the institutional approach to economics, the focus of economic analysis shifts to investigations going beyond the role of institutions in economic processes, to a search for answers to the questions of how institutions emerge and how institutions change. References to Enlightenment concepts of social contract, law of nature, and state of nature are necessary in order to resolve those questions. The various approaches differ in their points of departure: Locke’s state of nature was accepted by the property rights school, whereas Hobbes’ state of nature was accepted by the transaction costs school.

The positions of the three main approaches to economics – neoclassical economics, the property rights school, and the transaction costs school – regarding property rights can be compared by describing the relations between successive transactions involving a given material object.

Mainstream economics adopts the assumption that property rights to material objects are perfectly defined in the original state. Any transfer of property rights: purchase, gift, or inheritance is likewise perfect. It entitles the transferee to exercise exclusive rights to a given material object as well as the products and other benefits derived using the object. This is illustrated in Figure 2.

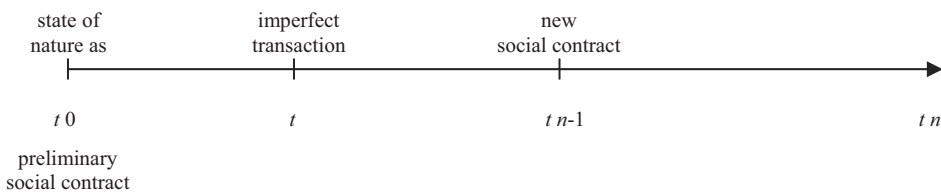
The position of the property rights school is based on the assumption that property rights to material objects are defined in the original state as appropriate in the existing state of affairs. This is done by people equipped with basic social



**Figure 2.** Chain of transactions transferring property rights in the light of the neoclassical approach

Source: author’s own work.

rules regulating reciprocal and hierarchical relations. As the state of affairs changes, e.g., as a result of technological or demographic change, the scarcity of objects subject to property rights also changes. This results in a need to define property rights more precisely. Thus, the social contract in the original state is only preliminary in nature. As reality changes, external effects emerge making the transfer of property rights imperfect. A new social contract defines property rights to eliminate negative external effects. This is illustrated in Figure 3.



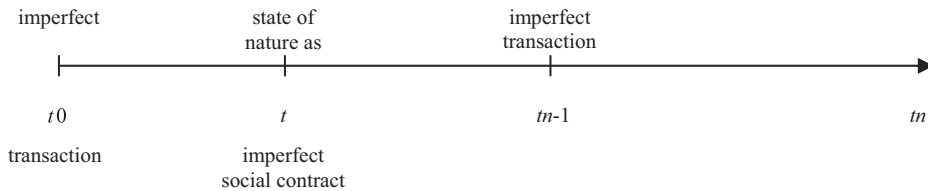
**Figure 3.** Chain of transactions transferring property rights in the light of the property rights approach

Source: authors’s own work.

In the light of the position of the property rights school, a distinction is made between absolute property rights, manifested in the universal possibilities of exclusivity and transferability of objects subject to property rights, and relative property rights, defined as appropriate in a given state of affairs by way of successive social contracts. The application of this distinction to analysis of property rights was based on the Roman legal conception [Alchian 1977; Posner 1972; Demsetz 1966; 1967].

The position of the transaction costs school relates to the Hobbesian state of nature as a state of anarchy. Thus, property rights are initially defined through nonsocial means, such as theft or war. Consequently, in a given state of affairs, property rights depend on the interests of individuals aspiring to a given object. The original contract is a protection against socially unacceptable methods of appropriation but does not define property rights perfectly due to contractual costs and uncertainties [Coase

1960]. The way in which property rights are originally defined delimits the actual possibilities of how the object subject to the property rights can be used following a transaction. Discrepancies between actual possibilities and potential ones, expected before entering into a transaction, prompts people to negotiate, seek arbitration, or seek legislative change. This is illustrated in Figure 4.



**Figure 4.** Chain of transactions transferring property rights in the light of the transaction costs approach

Source: author's own work.

The comparison of the various theoretical positions with regard to the establishment of property rights to scarce material objects reveals that differences in assumptions concerning human nature and the original state offer different possibilities of explaining how property rights are defined in situations of unforeseeable demographic, technological, or political changes. Such changes include innovations in the area of information and communication.

### 3. Objects subject to immaterial property rights in a digital network environment

Technological changes, especially technological breakthroughs, are the subject of theoretical discussions focused on explaining their sources. Neoclassical economic models assumed that technology is an exogenous factor purchased together with capital factors of production, in respect of which property rights are clearly defined. Thus, technological change was not associated with an institutional change. In some economic growth models, technology was afforded a place separate from capital stock and labour [Solow 1956; 1957]. The institutional factor, such as property rights, was not recognized, however.

The neoclassical approach is a step back from the concept proposed by Adam Smith, who endeavoured to determine the primary factors triggering innovation and then the chain of events leading to economic growth [Smith 1776/2007]. He assumed that those primary factors were the natural human propensities for specialization, exchange, and reciprocity. These propensities give rise to the division of labour, which may become greater if the market is large enough. Smith was the first to notice the role of technological change in transportation, which brought about a decrease

in costs and an enlargement of markets. However, Smith's analysis did not take into consideration institutional change and its links to technological change.

Technological changes that took place at the early stages of market economy development materialized in physical products, which may justify regarding technology and institutions as exogenous factors. The question to consider is why the inventor was simultaneously an innovator and an entrepreneur at that time. A likely answer is that it was due to imperfectly defined property rights to immaterial objects such as innovative ideas, information, and other results of intellectual activities in the economy, science, art, and literature.

The technological change that has occurred in the area of information is one of the breakthroughs that cannot be examined solely in terms of a change in resource limitations. It is necessary to take into account the size of the market and innovators' ability to appropriate benefits. As Douglas North put it, "an increase in the rate of technological progress will result from either an increase in the size of the market or an increase in the inventor's ability to capture a larger share of the benefits created by his invention" [North 1981, pp. 165-166].

In contrast to Smith's approach, market size is linked to institutional changes, especially changes in property rights that make it possible to appropriate the innovation rent. Such an approach goes beyond the cognitive scope of neoclassical economics pointing the economist in the direction of the tools and methods of institutional economics, especially the property rights school and the transactional costs school. Their application requires the prior determination of what are the immaterial objects produced or transferred in the area of information by digital methods.

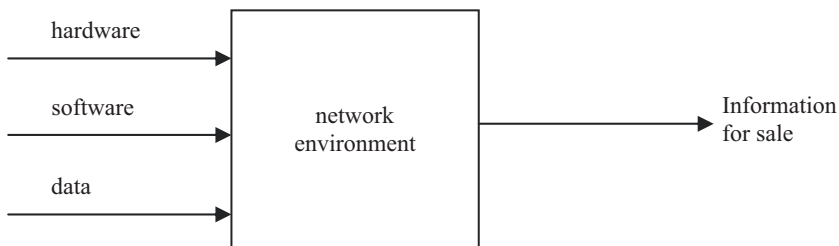
The widely used term "information" comprises all content entered into a computer system, distributed over the Internet, exchanged, or provided free of charge. In fact, those are different categories that must be delimited in order to define property rights. Computers and servers (hardware) are material objects, and the related property rights may be considered sufficiently well defined. Changes in information and telecommunication technologies relate to digitalization algorithms and programmes (software) and content distributed in a digital environment. Software technologies have made it possible to develop Web 2.0 with multimedia and interactive content. This is an innovation that has a network effect and enlarges markets. On network markets, benefits to users stem from the possibilities of communicating with others; the more people there are in a network, the greater the communication possibilities and the greater the incentive to use the network. Consequently, innovators who provide software for hardware have an expanding market. This is not sufficient, however, to appropriate the innovation rent without adequately defined property rights to content distributed by users.

From an epistemological perspective, also used in information science, various types of content relate to reality and are a form of expressing the effects of getting to know reality. There are various events, phenomena, and processes occurring in the world. The state of affairs concerning the world is expressed as facts, intelligence, and news.

Access to them is noncompetitive as they are perfectly divisible. Using them for cognitive purposes requires a concept of how to segregate, integrate, and interpret facts. William J. Martin [1983] identified two degrees of conceptualization: the first degree enables the transformation of facts into information; the second into explanatory knowledge. Information and knowledge are also noncompetitive: they can be available to everybody without limiting access to them by others. It should be noted, however, that facts, information, and knowledge have been determined by somebody who has devoted their time or resources. This may justify property rights.

In the context of IT systems, facts are entered into computers in an encoded form. They are then referred to as data. Data are not the same as facts for technical and also institutional reasons. In the basic sense of property, data are the property of the computer owner. Products developed using data are also the property of the computer owner, who can use them, derive profits from them, and transfer their rights to them. Such an approach goes back to the concepts of property rights proposed by John Locke [1823/1963] and Robert Nozick [1975], who recognized two conditions for property: initial appropriation of goods that did not belong to anybody and labour converting such goods. To the extent that facts are generally known and are not exclusive, whoever converts them to data becomes their owner. The owner's rights are not established automatically; however, there are institutional procedures by means of which society defines how property can be used.

In the next step of the analysis, it is necessary to determine the characteristics of data transferred to the Web 2.0 network, i.e., the data transferred to servers and computers having separate owners. Revenues are derived, among other things, from sales of information about facts concerning network users. This is illustrated in Figure 5.



**Figure 5.** Transformation of data into information

Source: author's own work.

Data belonging to computer owners, after being transferred to the network, become a public good unless exclusivity is applied by technological or institutional means. In such a case, there arise external effects for hardware owners in the form



of a free raw material transformed into information products available for sale. Such effects can be exploited commercially if the network market is sufficiently large from the point of view of the information buyer. The technological possibilities regarding digitalization and social interactivity are an important source of market enlargement provided that data entered into the network are nonexclusive. The question arises whether there is a basis for data, i.e., encoded facts about individuals and their products and relations among individuals, to become the common property of network users and owners or even a free good with open access to it.

Neoclassical economics assumes that property rights are defined perfectly through a social contract. Technology is acquired legally together with the immaterial content, which may be interpreted to mean that the purchase of a computer together with intellectual content (software) affords the right to hold data encoding other content, provided they are free. Thus, data may be used commercially if they are free goods, i.e., goods not belonging to anybody. Such a case is rather unlikely, however, especially if the data concern facts about individuals and their products.

Under the property rights approach, in the state of nature there existed property rights defined in a preliminary way as appropriate in a given state of affairs. In a new state of affairs, i.e., in the circumstances resulting from a new technology, property rights to data must be defined. This is a social choice, preceded by a clash of different arguments. On the one hand, property rights to data give them the attribute of exclusivity, which dampens the incentive to pursue technological innovation. On the other hand, nonexclusivity of data in the short term facilitates the use of Internet content and information and in the long term may significantly weaken incentives to engage in creative work and social cooperation. In successive periods various aspects of defining property rights emerge, influencing the enactment of property law, which defines not only rights but also duties. For instance, possession of facts about individuals imposed an obligation of confidentiality and respect for human dignity long before the advent of digital network technologies. Such obligation may, however, for some time remain not reflected in the letter of the law, which is taken advantage of by innovators, who appropriate benefits that arise not solely from technological change but also from a legal loophole. It is possible that societies tolerate such a state of affairs taking into account the balance of short-term benefits to network users and network owners.

Under the transaction costs approach, the degree to which property rights are defined is never perfect because of transaction costs. Individuals interested in a given object may use various possibilities of defining property rights to that object, not only through changes of legal institutions, but also through bilateral negotiations, renegotiation of contracts, or arbitration. None of those possibilities guarantees that property rights will be defined clearly and fully for reasons regarded as the basic source of the imperfection of institutions: uncertainty and human opportunism. Uncertainty with regard to the use of data must be interpreted as unpredictability of the consequences of defining property rights to data; opportunism, as the tendency

to take advantage of opportunities to appropriate rent. These sources are reinforced in a digital network environment because of the size of the markets, which extend beyond the borders of states that enact laws. Time and space are the key conditions in which property rights are defined; they influence the perception of the diverse consequences of defining access to and possible uses of data containing encoded facts about individuals, their products, and their relations with others. In the short term, the fast spread of networks on a supranational scale is not conducive to the manifestation of all the diverse external effects. Neither do the strong interests of innovators help to make those effects apparent. Compared with the property rights school, the transaction costs school shifts the focus of analysis from legal institutions to private institutions, which has to do with its being rooted in the reality of common law, while the property rights school is concerned with Roman law and the prerogatives of the state.

#### 4. Conclusions

The new technologies that made it possible to build the second-generation network can be used for commercial purposes if network effects ensuring increasing economies of scale are achieved. Considering various business models, the largest amount of beneficial network effects are achieved if the data transferred in the network are free goods. Such data have the attribute of noncompetitiveness: their use by one person does not limit their availability for use by others. However, such data represent content concerning specific individuals and their relations with others as well as intellectual products. Earlier changes in information and communication technologies led to the establishment of social and legal norms that defined access to such content. Privacy protection and copyright were established in the late 19th century, as appropriate for the technology of that time. New technologies, involving facts encoded using equipment and algorithms having owners, brought about a new institutional situation, exploited to appropriate the innovation rent by treating data as a free raw material for the production of information for commercial purposes. The supranational dimension of many networks makes it impossible to apply national legal regulations with regard to personal data and personal intellectual products.

The positions of various schools of economics presented earlier do not make it possible to offer a clear explanation as to why some immaterial objects have been afforded exclusive property rights, while others, such as personal data, are treated as free goods. The position of neoclassical economics is ambivalent, whereas the positions of the institutional approaches point to the imperfection of all institutions that are defined in the social process as to their nature. Detailed institutional solutions result from successive private or social agreements. Defining more precisely immaterial property rights makes it necessary to resolve conflicting interests, whose nature is concealed and may be recognized in a particular state of affairs upon the application of new technology. It can be tentatively concluded that property rights to data are

not a durable, universal element of the scaffold of market economy institutions but rather short-term institutional arrangements. However, a deeper reflection directs attention to what is an element of the institutional scaffold, namely human rights.

Human rights were introduced into intellectual circulation during the age of Enlightenment. They were interpreted as “property in one’s own person” [Locke 1823/1963], which meant that a human being cannot be subject to market exchange. However, human rights have gained a broader interpretation as rights to the self-determination of one’s life choices. In this sense, they are a durable element of the institutional scaffold stemming from cultural heritage. The right to personal data protection is inscribed in constitutions and social traditions at national level. There are, however, no supranational traditions or legal regulations applicable to digital networks, which operate globally. The size of network markets makes it possible to exploit this void to appropriate the innovation rent.

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## DEFINIOWANIE PRAW WŁASNOŚCI NIEMATERIALNEJ W SIECIOWYM ŚRODOWISKU CYFROWYM

**Streszczenie:** Przedmiotem artykułu są prawa własności przedmiotów niematerialnych, transferowanych w sieciowym środowisku cyfrowym. Są to dane o użytkownikach sieci, ich wytworach intelektualnych i relacjach. Dane te są niekonkurencyjne w użytkowaniu. Celem artykułu jest zbadanie, jakich uzasadnień dostarczają różne stanowiska teoretyczne ekonomii w odniesieniu do możliwości ustanowienia wyłączności danych za pomocą zdefiniowania praw własności. W artykule omówiono stanowisko ekonomii neoklasycznej, szkoły praw własności i szkoły kosztów transakcyjnych, badając, jak ich założenia i konkluzje mogą dostarczyć argumentów w odpowiedzi na pytanie o wyłączność lub niewyłączność danych transferowanych w sieciowym środowisku cyfrowym.

**Słowa kluczowe:** prawa własności, przedmioty niematerialne, sieciowe środowisko cyfrowe, dane.