

ASERS

# Journal of Environmental Management and Tourism

Quarterly

Volume VIII

Issue 7(23)

Winter 2017

ISSN 2068 – 7729

Journal DOI

<http://dx.doi.org/10.14505/jemt>

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ISSN 2068 – 7729  
Journal DOI: <http://dx.doi.org/10.14505/jemt>

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DOI : [http://dx.doi.org/10.14505/jemt.v8.7\(23\).13](http://dx.doi.org/10.14505/jemt.v8.7(23).13)

## Intellectual Rent in the Context of the Ecological, Social, and Economic Development of the Agrarian Sector of Economics

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### Suggested Citation:

Yasnob, I.O., Chayka T.O., Gorb, O.O., Shvedenko P.Yu., Protas N.M., Tereshchenko, I.O. (2017). Intellectual Rent in the Context of the Ecological, Social, and Economic Development of the Agrarian Sector of Economics. *Journal of Environmental Management and Tourism*, (Volume VIII, Winter), 7(23): 1442-1450. DOI:10.14505/jemt.v8.7(23).13

### Article's History:

Received September 2017; Revised October 2017; Accepted December 2017.  
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### Abstract:

The research of the essence and peculiarities of intellectual rent in the agrarian sector of economics was conducted through the definition of the notions of the sustainable development and intellectual rent. The intellectual rent at four agrarian enterprises during two years was calculated. The impact of the intellectual capital on ecological, social, and economic development in the context of the sustainable development of agrarian sector was determined.

**Keywords:** intellectual rent; intellectual capital; agrarian sector of economics; sustainable development; innovations; agricultural enterprises; the latest technologies

**JEL Classification:** O30; O34; Q01

### Introduction

Under the conditions of innovation economics, deep changes of the technological basis of social production take place. Intellectual capital is acquiring particular importance at the present stage of development; this capital determines the structure of the national economy, the quality of manufacturing goods and services, the efficiency

of functioning all the economic subjects. The development of intellectual labor and its share in production processes are the important factors, which define the competitiveness of the country in the world economy, its export opportunities and the share in the world money revenue.

At the same time, the modern development of any subject of economic relations, production, economic sector, and the economy on the whole, is not possible without taking into account the concept of sustainable development with the aim of balancing ecological, social, economic, cultural, national components, etc. In this context, one of the most important processes of reforming the agrarian sector of economics under the conditions of integration is the intellectualization of production, as the intellectual capital determines the competitiveness of social-economic systems, and is the key resource of their development.

The aim of the research is investigating the intellectual rent in the agrarian sector of Ukrainian economics in the context of its sustainable development.

The following scientific tasks were defined to achieve the set goal:

- 1) to conduct the research of the essence of the intellectual rent in the agrarian sector of Ukrainian economics and its peculiarities;
- 2) to determine requirements to the intellectual capital in the agrarian sector of economics in the context of its sustainable development;
- 3) to conduct the analysis of the formation and distribution of the intellectual rent at agrarian enterprises, developing according to the innovation strategy;
- 4) to give recommendations as to improving the innovation activities at agricultural enterprises with the aim of raising the usage of intellectual capital and increasing the intellectual rent.

The following methods were used for solving the set tasks: of analysis and synthesis, logical generalization, analogies, comparison, monographic, and graphical methods.

## 1. Research Background

Under the conditions of the innovation development of the agrarian sector of Ukrainian economics the necessity of raising the innovative activeness of enterprises arises; the creation of intellectual rent is the stimulus for such activeness. According to the opinion of German scholars, besides the “know-how”, the sources of the quasi-rent are also the general level of education, labor discipline, creativity, many-year national traditions of production. They are sure, that super-profits, “which such “resources” bring, can exceed the rents from the richest oil deposits” (Schultz 1968, Office for Official Publications of the European Communities 2016, Valentine 2014). At present, the increasing part of economic wealth on the world market belongs to the share of intellectual rent, and it tends to grow. The scholar thinks that the intellectual rent constitutes the considerable share of prices (up to 70%) on modern goods (Qiu and Yu 2010, Simcoe *et al.* 2007).

The problem was for the first time set in the fundamental papers by F. Kene, V. Petti, D. Anderson, A. Smith, D. Riccardo, J. S. Mille, C. Marx, O. Marshall. The theoretical foundations of rent relations in agriculture were investigated in the work (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017). The author determines the essence and functions of intellectual rent.

The paper deals with the intellectual rent as a source and result of innovation development. The authors (Sirenko, and Syniavska 2011) investigated intellectual rent in the model of the innovation development of the agrarian sector in the economy. Nevertheless, the investigating of intellectual rent in the agrarian sector of the economy did not receive enough attention despite the necessity of its development, taking into account ecological, social, and economic principles.

## 2. Methodology

During the investigation, the methodological basis are the following scientific methods: historical-dialectical (for determining and analyzing scientific approaches as to defining the essence of intellectual capital, determining features of intellectual rent classification), of analysis and synthesis (for revealing the attributive characteristics of the notion “intellectual rent”), theoretical search and abstract-logical (for characterizing the content filling of the components of the notion “rural territories”), modeling (for making the scenario of perspective intellectual rent at agrarian enterprises).

## 3. Results and Discussion

It is necessary to note, that the swift development of science and technology stipulates the necessity of including a comparatively new category to the economic theory – artificial intellect, the essence of which consists in reproducing

separate intellectual actions of the human by machines (perceiving information, the elements of reasoning, etc.). Artificial intellect is used while making the so called “intellectual systems” (for example, expert systems, bases of knowledge), while solving the tasks of “machine vision” (space orientation, recognizing the situation, etc.), and also in the complex systems of processing information (Shulha 2010).

In the opinion of Zh. Shulha, such definition of intellectual capital contains a number of principal references, which allow to consider it as a generalizing economic category (Shulha 2010).

1. Intellectual capital as a generalizing category, is the totality of human and machine intellect, and also intellectual product.

2. Only those intellectual resources of an enterprise belong to the intellectual capital as the economic category which can create a new value or bring additional profit.

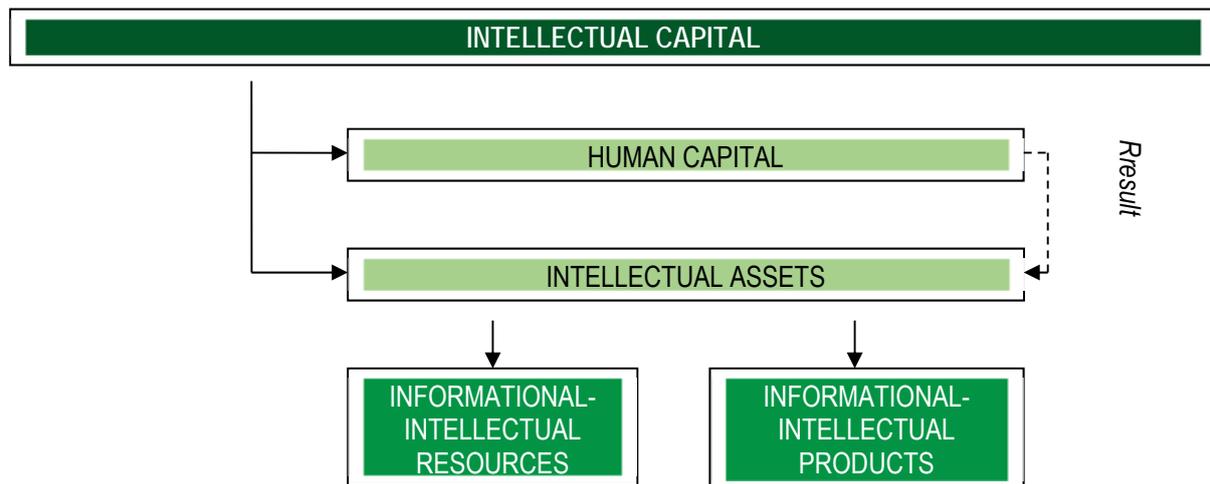
3. Intellectual capital is the means of creating a new value, which principally distinguishes it from the intellectual potential.

4. The basic function of intellectual capital is creating a new value.

Thus, in our opinion, intellectual capital represents a totality of material and non-material wealth, which is the result of human and artificial intellect and give its owner advantages in any sphere of activities owing to the creation of a new value.

In this connection, it is expedient to determine the intellectual capital, as a new and complex category, through its components, which complement each other, as they, according to their contents, are not homogenous and have their own peculiarities (Figure 1).

Figure 1. The structure of intellectual capital



Source: developed by the author

Coming from the essence of rent, as an economic category, the intellectual rent can be determined as a super-profit, which can be received under the condition of using intellectual factors of production (intellectual capital), directly not connected with the exploitation of natural resources. It is created by the owners of higher quality human capital, patents on inventions, other kinds of intellectual property. The intellectual rent is a result of talent and initiative of scientists, inventors, engineers, managers, and business people, who can claim for the main share of the super-profit (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017). This rent is the main stimulus for raising the innovative activities of the enterprise. So, the question arises concerning its ecological, social, and economic orientation with the aim of providing its sustainable development.

Modern researchers are mainly concentrated on determining the sources of intellectual rent formation and the mechanisms of its distribution. In our opinion, the majority of scholars, besides the innovations as the sources of intellectual rent appearing at macro- and micro-levels, soundly mention the general level of education, labor culture, creativity, long lasting national traditions of production. Besides, the following peculiarities of the intellectual rent can be distinguished (Simcoe, Graham, Feldman 2007):

- 1) the intellectual rent appears in innovational, informational, and social branches of economy;
- 2) the owners of intellectual capital and intellectual resources are the economic subjects of acquiring the intellectual rent;
- 3) super-profit, monopoly profit, the economy of expenditures, received from using high-quality intellectual resources are the sources of the intellectual rent formation;

4) the specifics of legal provision of the intellectual property;

5) from the micro-economic viewpoint, the source of the intellectual rent are most often innovations, because they give the economic subjects such competitive advantages as the additional income from the objects of intellectual property. Taking into account all the kinds of innovations, which are used by the innovation active enterprises, the terms of their effective usage, the results of introduction, the intellectual rent can be subdivided into three forms: monopoly, differential, and absolute;

6) differential and absolute rents are the most possible forms for agrarian economic subjects, because, as the research proves, these forms largely depend on the innovation activities of the subjects of innovation process at the micro-levels. Besides, the condition for the absolute rent is only the presence of innovation directed management, and this form of rent can appear at enterprises, which are various as to their dimensions and form of ownership. In this context, the mechanisms of appearing enterprises-innovators in the economic environment and the system of measures concerning the stimulation of the transforming conservative economic subjects into innovators, acquire the key importance.

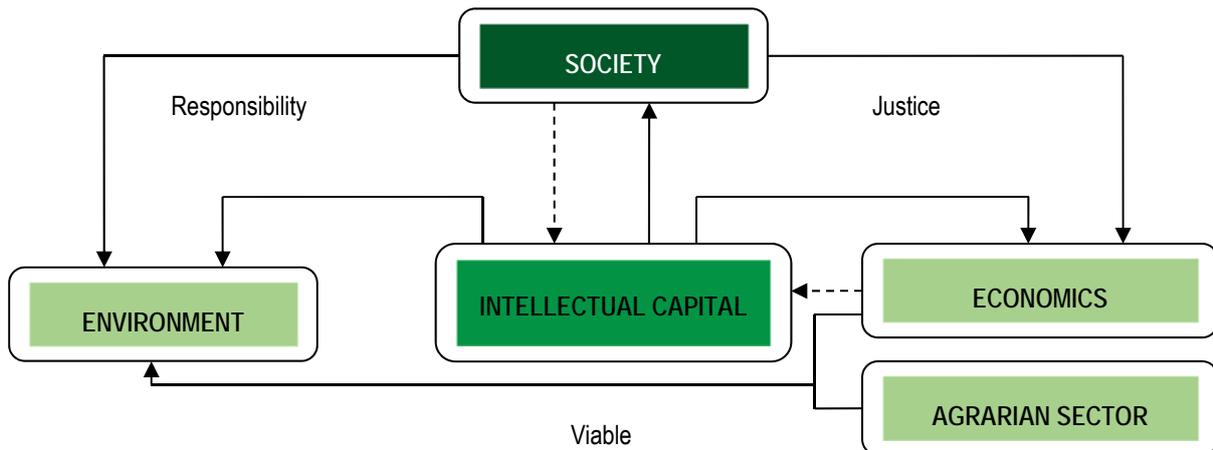
Under modern conditions, the economic subjects, particularly belonging to the agrarian sector, try to provide their long-term development, which is possible taking into account ecological, social, and economic conditions; this is called the sustainable development. Thus, the sustainable, long-term development is a permanent process of changes, which provide the harmonious connection of economical, ecological, technological, social, and other systems with the needs of the present and future generations. It stipulates the expediency of using the translation of "sustainable development" into Ukrainian as «стійкий розвиток», but not «сталій розвиток». The arguable point here is connected with the fact, that one notion unites two internally contrary as to their meanings words – "sustainability" as a balance and "development" as a process of changes. Besides, in the English language the considered notion is derived from the word "to sustain" – "to lean on, support, endure", and the term "sustainability" means, first of all, the state of stability, in other words, the balanced state, supported by something. Such opinion is supported by a number of Ukrainian scholars (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017).

Thus, the sustainable development is the model of functioning of the system with limited parameters, which provides the balanced dynamic equilibrium during the definite period of time among the components of the integrated social, economic, and ecological system (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017). Its aim consists in searching the paradigm of uniting the economic growth and raising the living standards together with improving the state of environment. The theory of sustainable development is based rather on the alternative values, methods, persuasions, than the economic growth, which ignores ecological safety following the models of extensive and intensive development.

So, the concept of the sustainable development considerably depends on rational, thrifty, and attentive attitude to nature, as a living organism, and this sets certain requirements to the intellectual capital (Figure 2):

- providing rational using of resources;
- preserving the natural environment;
- decreasing the negative impact on the environment;
- creating additional places of work (decreasing the level of unemployment, raising the living standards, etc.);
- providing the long term of using;
- increasing the economic efficiency, and so on.

Figure 2. The influence of intellectual capital on ecological, social, and economic development in the context of the sustainable development of the agrarian sector



Source: developed by the author

Using the intellectual capital, an agricultural enterprise develops according to the innovation strategy, which in our opinion, provides the efficient long-term dynamics of its development by introducing innovative decisions. Moreover, the efficiency of the innovation strategy of enterprise's development in the agrarian sector of economics can be evaluated by determining the intellectual rent at the level of enterprise (IPП) by the formula (1) (Shulha 2010):

$$IR_{\text{enterprise}} = I - C - P_n^p, \tag{1}$$

where «I» are the incomes from all kinds of activities (gains from selling products, operational, investment, and financial incomes) during the year in hryvnias (UAH);

«C» are the spending according to all the kinds of activities (the cost of products, operational, investment, and financial expenditures) during the year, UAH;

$P_n^p$  is the planned profit of enterprise per year, UAH;

$$P_n^p = OC \times P_{pn}^p, \tag{2}$$

where «OC» is enterprise's own capital by the end of the year, UAH;

$P_{pn}^p$  is the average branch value of the owned capital profitability according to the data of the state statistical reporting (%)

Everything, presented above, allows us to determine the efficiency of the formation and distribution of intellectual rent on the example of four agricultural enterprises, which develop according to the innovation strategy: the farm (F), limited liability company (LLC), partnership with additional liability (PAL), and private enterprise (PE). Using the financial reports of these enterprises (form 1 "Balance" and form 2 "Report about financial results"), we calculated the distribution of their intellectual rent (Table 1).

The given results show, that in 2015 the LLC and the farm used not only the licenses on the objects of industrial property, but also other intellectual resources, while in 2016 all the enterprises had the detachable value of the intellectual rent, which is the result of the low level of the enterprise's intellectual potential.

Table 1. The dynamics of the value of intellectual property in agrarian enterprises, 2015-2016

Indicators	The farm (F)			The limited liability company (LLC)			The partnership with additional liability (PAL)			The private enterprise (PE)		
	2015	2016	Dynamic, %	2015	2015	2016	Dynamic, %	2015	2015	2016	Dynamic, %	2015
1. Incomes from all kinds of activities during the year in hryvnias (I), thousand UAH	29989	30965	3,3	0733232	1760539	9,6	14319	15281	6,7	11274	10746	-4,7
2. Spending according to all the kinds of activities during the year (C), thousand UAH	23352	23620	1,1	0564784	1694913	10,7	14227	13113	-7,8	10137	9021	-11,0
3.Planned profit of enterprise per year ( $P_n^p$ ), thousand UAH	6585,4	12369,8	87,8	165324,0	509552,6	208,2	1466,7	2674,8	82,4	2020,1	3320,9	64,4
4. Enterprise's own capital by the end of the year (OC), thousand UAH	28632	34943	22,0	718800	1439414	100,3	6377	7556	18,5	8783	9381	6,8
5. The average branch value of the owned capital profitability according ( $P_{pn}^p$ ), %	23,0	35,4	53,9	23,0	35,4	53,9	23,0	35,4	53,9	23,0	35,4	53,9
6. The intellectual rent (IR), thousand UAH	51,6	-5024,8	×	3124,0	443926,6	×	-1374,7	-506,8	×	-883,1	1595,9	×

The results of the research testify that the enterprises must solve the questions of innovation development independently, because the government support of innovation activities in Ukraine does not meet modern requirements, and has mostly the declarative character. Under such conditions the innovation development of the agrarian sector, though having a more complicated structure by using natural resources and biological organisms in functional and production processes, takes place only at separate enterprises. The implementation of the model of innovation development in the agrarian sector of the economy stipulates appearing benefits according to three directions (for the society, monopoly benefits, and private benefits), which requires balanced agreement of the number of the manufacturers of goods, who introduce innovations, their motivation, the structure of stimuli, generated by the society, the level of competition, demand for innovations and innovative products on the side both of the final consumer and the processing consumer. Considering the internal system factors, the innovation development of the agrarian sector of the economy is restrained by the unsatisfactory financial state at enterprises by 30%, by the low quality of scientific-experimental work and low level of integrating science with production by 25% (Sirenko and Syniavska 2011).

At the same time, agricultural enterprises have lately begun to introduce innovations more actively, changing the paradigm of thinking. As a result, about 20% of agricultural enterprises, mainly large companies and private leasing enterprises spend more than 30% of their net profits on improving the production. Nevertheless, on the majority of farms and fields of the economic subjects of the agrarian sector of Ukrainian economy expensive technologies dominate – the spending of fuel per 1 ha of farm land exceeds 2-3 times that in the developed countries of the West. About one third of agricultural enterprises are unprofitable (Shulha 2010).

It should be noted that insufficient financing is a big problem for introducing innovations in the agrarian sector. On the average, 250 thousand dollars are spent annually in the USA on creating one variety or hybrid of crops, and the general expenditures are 1.5-2.5 million dollars. In Russia the selection of one hybrid of vegetable crops for the protected soil costs 69 million rubles, or 200-300 thousand dollars. In Ukraine about 1 million UAH is allocated on conducting the vegetable research program for the protected soil, which equivalent to 125 thousand dollars. The given indicators of the level of financing the agrarian sphere demonstrate its insufficiency in Ukraine, because it is twice lower than in Russia and tens of times less, than in the USA (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017).

Moreover, not only no money is allocated on introducing the latest technologies in Ukraine, but also there is a problem of the technical base reproduction for agrarian production, because it is necessary to invest more than 300 billion UAH during the period of 10-20 years to achieve the level of the technological requirements of the production process at agrarian enterprises; today it is unreal for the producers of goods (Gorb, Yasnolob, Protsiuk 2016).

Moreover, the investments in agriculture according to the reproduction structure are mainly made in the technical re-equipment and reconstruction of the functioning enterprises, buildings, constructions (72.9%), but not in the new construction (24.9%); they are mainly made owing to the money of agricultural enterprises, while the state budget invests only 3.2% in the agrarian sector (in separate branches the government financing reaches 85%, and on the whole 5.6% in economics (Aranchiy, Makhmudov, Yasnolob, Radionova 2017).

The following fact also testifies about insufficient financing: according to the estimations of the scientists, during the previous years the agrarian sector did not receive considerable sums of money on financing scientific, scientific-technological work, and their share in the gross added value of agriculture constituted .65% (Gorb, Yasnolob, Protsiuk 2016).

Today, the innovations are mainly introduced in the profitable plant growing branches: 46% of enterprises use new varieties and hybrids of crops, 25% - new farm machines, 14% - new systems of soil cultivation. Not many enterprises (5%) use scientifically substantiated systems of crop rotation.

In livestock farming, 52% of enterprises used new breeds of livestock, while other kinds of innovations, in particular, high-efficient feeds, new mechanisms and means for plant protection are at almost the same level (about 16%).

Taking into account the underdevelopment of Ukrainian branches of livestock farming, introducing the innovations in livestock farming is the most probable way of economic subjects' activities. Simultaneously, it will also be possible to process products on the industrial basis, which will enable to solve social, economic, and ecological problems in the future. But, at the same time, it is expedient to change the innovation policy and strategy of enterprises depending on the specialization of the region, natural-climatic conditions, the possibilities of cooperating, etc. (Gorb, Yasnolob, Dedukhno, Kaliuzhna 2017).

Thus, the main creating elements of the model of the Ukrainian agrarian sector innovation development are the biological potential and scientific-educational system, which forms the innovative thinking, generates innovations, and provides the agrarian sector of economics with competent specialists, who are able to work with different kinds of innovations. It is possible to provide the dynamic synergic effect in the enterprises' activities and support the system in the state of innovative development in the time space under the condition of outstripping the rates of making changes in the system of management comparatively to the changes in the external environment. The psychological readiness of the organization, managerial staff and its team must become the motive factor of innovation development. The efficiency of the innovation development of the agrarian sector of economics is determined by the ability of the management system to provide the effect from introducing various kinds of innovations at various hierarchical levels including agrarian enterprises and the effectiveness of making changes in all the sub-systems.

Moreover, the factors of influence on perceiving innovations by the national agrarian enterprises, external and internal orientation, and the necessity of diagnosing and evaluating the factors of providing success must be taken into account: strategy aggressiveness, integration, interference, the level of self-regulation in the organization, the level of the brain center ability to forecast the directions of changes, the level of team readiness to changes, the rates of increasing the team competence, the directions in changing the values, persuasions, technologies, and the philosophy of thinking.

The regional innovative policy has to be filled with the new content, and namely: the strategic directions of innovative development of the regional agrarian sector of economics and target orientation; the tasks of economic, social, ecological, synergic, demographic, scientific-technological, organizational-legal, institutional-structural character; the mechanisms of implementation and methods of regional institutions' influence, which will assist in

raising the level of strategic decisions' substantiation for providing the sustainable development of the agrarian sector of economics, its competitiveness.

The low level of innovation susceptibility and activeness of the agrarian sector subjects in the Ukrainian economics is stipulated by the factors of the external and internal systemic character. Externally, the obstacles to implementing the model of innovation development are mostly caused by the absence of the system in decision making as to the government innovation and agrarian policy, the undeveloped system of financing and crediting of innovation activities, and a high level of innovation activities risks. The internal systemic destabilizing factors are in the area of unsatisfactory financial state of agrarian enterprises, lowering the quality of research-experimental work, and the level of integration of science with production.

It should be noted, that in spite of declaring the innovative way of development to be of the first priority for Ukraine, the systemic management of the innovation process in the agrarian sector of economics has not yet been formed by the government. The legal basis of regulating the innovation activities in Ukraine requires the improvement; at present this basis is fragmentary, not unified, and contradictory. The national education and science, which are of primary importance for the innovation process, need considerable structural transformations. It is necessary to form the efficient mechanism of the financial support of the innovation activities in the agrarian sector of economics.

The way to solve the above-mentioned problems can become the systemic, gradual provision of the innovative development of the agrarian sector of Ukrainian economics by developing the intellectual capital; training highly-qualified specialists who are ready to conduct scientific work; developing the complex of measures as to creating and developing the unified, coordinated organizational and financial infrastructure of innovative activities; providing favorable conditions for the diversification of innovation financing sources; clear determining the priorities of scientific-technological development; harmonizing the legislation in the innovative sphere; creating the mechanisms of government stimulation of the innovation activeness of agricultural enterprises, in particular, introducing innovations in agro-industrial production and their diffusion, etc.

Taking into the account all the above mentioned and agricultural specialization of Ukraine, the topical problem arises – the problem of leveling the threats of ruining and degradation of the agrarian sector of economics and using potential opportunities of its innovation development, the solving of which lies in the formation of management system appropriate to the mentioned conditions through changing of social thinking paradigm and positioning the agrarian sector as a “point of the dynamic growth” of the Ukrainian economy.

The tendencies of the world economy development persuasively demonstrate that our country cannot have any other way of development, but the formation of such economic model, which would be based on knowledge, that is, the economics of innovative type. The underestimating of this fact during the nearest future years can lead to Ukraine being ousted from the market of highly technological production, and it, undoubtedly, will not allow to improve the living standards of the population considering modern standards, and provide food safety of the state. It stipulates the necessity to preserve and develop the intellectual capital in the agrarian sector of economics as one of the leading branches of Ukrainian economy, and this capital can provide the innovation development of the country on the whole.

## Conclusion

The research of the intellectual rent essence was conducted. The rent is the result of using the intellectual capital, which represents the totality of material and non-material wealth that are the outcome of human and artificial intellect and give its owner the advantages in any sphere of activities owing to the creation of a new value. The intellectual rent is made by the owners of higher quality human capital, patents on inventions, and other kinds of intellectual property, that is the intellectual rent represents the super-profit, which can be gained from their using. This rent is the main stimulus for raising the innovative activeness of enterprise.

1. The requirements to the intellectual capital in the agrarian sector of economics were determined. In the context of the sustainable development, the intellectual capital must be based on the harmonious uniting of economic, ecological, technological, social, and other systems with the requirements of the present and future generations. Thus, the intellectual capital in the agrarian sector of economics must provide: rational nature using; preserving the natural environment; decreasing the negative impact on the environment; raising the social well-being of the population; the long term of using; increasing the economic efficiency, etc.

2. The conducted analysis of the formation and distribution of intellectual rent at agrarian enterprises showed that in 2015, the LLC and the farm used not only the licenses on the objects of industrial property, but also other

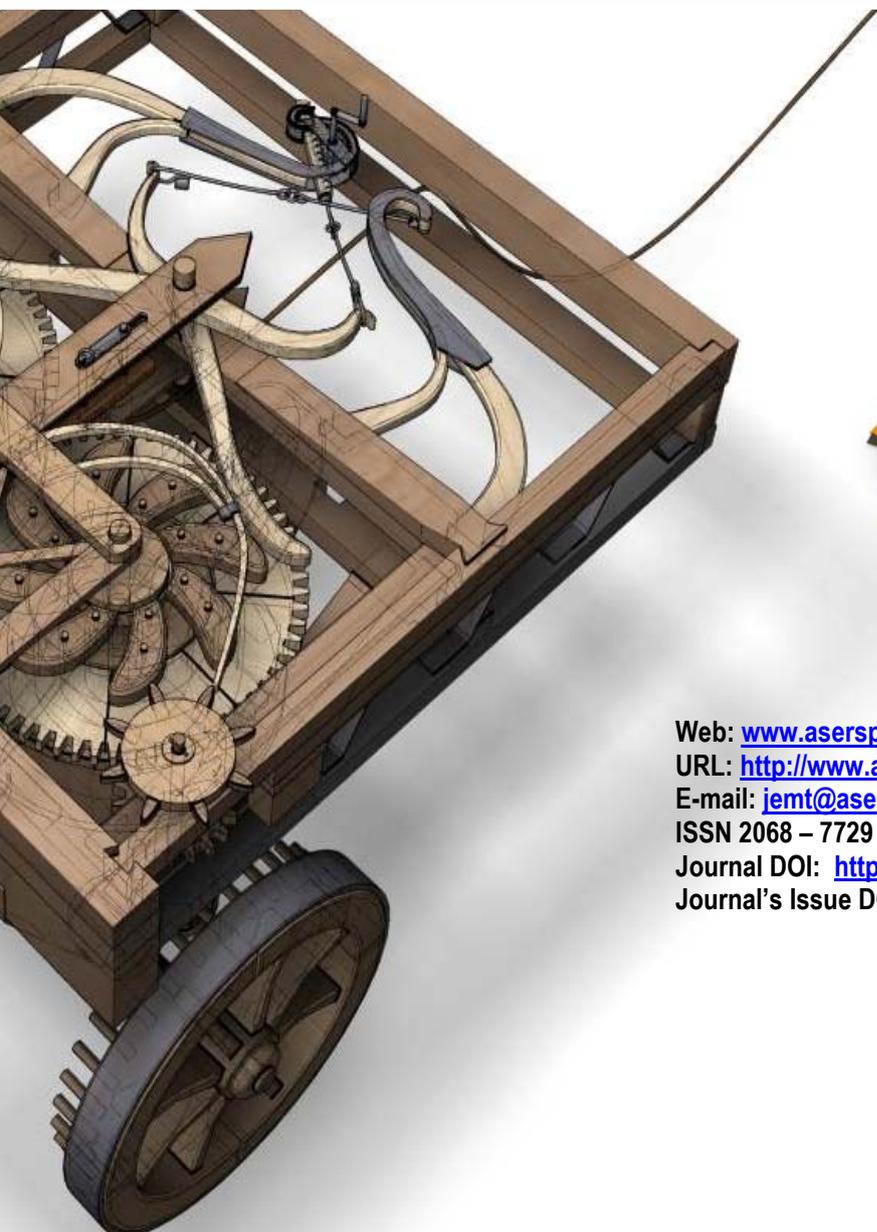
intellectual resources, while in 2016, all the enterprises had the negative value of the intellectual rent, which is the result of the low level of the enterprises' intellectual potential.

3. The recommendations to the agricultural enterprises were given as to improving their innovative activities with the aim of raising the using of intellectual capital and intellectual rent. The recommendations envisage: the psychological readiness of the organization, the managerial staff and team; developing the efficient strategy; the possibility of integration and interference; sufficient levels of self-regulation and the ability of the brain center to forecast the directions of changes, the readiness of the team to changes; growing of the team's competence; the directions in changing of values, persuasions, in technologies, in the philosophy of thinking; the presence of financial resources (one's own or attracted); the possibility of the government support, etc.

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ISSN 2068 – 7729

Journal DOI: <http://dx.doi.org/10.14505/jemt>

Journal's Issue DOI: [http://dx.doi.org/10.14505/jemt.v8.7\(23\).00](http://dx.doi.org/10.14505/jemt.v8.7(23).00)