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DEPRECIATION TAKES INTO ACCOUNT THE DIFFERENCE BETWEEN THE PRODUCTION FUNCTION AND VALUE OF FIXED ASSETS[2]

The article examines the difference between value and production factors. Was done theoretical research influencing different factors of the amortization on useful life of fixed assets. Formed an innovative approach to estimate reasons of depreciation, which change proportion of survival fixed assets. Proposed a method for adjusting the useful life of tools using depreciation for reason strong influencing scientific and technological progress and development of country on the fixed assets. Developed a methodology to estimate changes in the factors of repair tools, which affect on survival life passive and active assets, as an element of the production function of the fixed assets.

JEL: O47; E23; D24

1. Introduction

International competition in prices for finished products forces companies to revise the terms of use fixed assets with high comparative level noted new innovative in technical characteristics word tools which may allow the company to produce products at a lower cost. High value of the cost associates with the initial rate of depreciation costs which were not implemented work tools in accordance to changing cost of repair service fixed assets. Forecast the probability of repair depends on a variety of endogenous and exogenous factors obsolescence affect on the reproductive value of fixed assets. Thus the company can make a profit from the obsolescence work tools that reduces the competitive advantages due to the company benefit profit could derive from the use of alternative works tools which have the lower cost or better rate of production.

English index for useful productive capital (VICS) does not consider the amount of profit receiving from the obsolete tools according to the System of National Accounts UK, which

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arise the desire of manufacturers to maximize return on assets. Therefore, in the UK, there is the gap between the value of fixed capital and its productivity or replacement fixed assets (FA). The gap between performance and value arises was engaged for reason the influence of factors of obsolescence, which are differentiated by quantitative and qualitative characteristics. Randomness of physical deterioration of the resource associates with the difference of technical resource properties (durability, flexibility with respect to external physical effects). There is possible of the accident wear by estimating the standard deviation of the industry which determines the probability that the object of depreciation in accordance to their technical qualities which will generate inflow of income from its own performance before it will transfer its value to the cost of production. It means that production is characterized by the point of optimum use of fixed assets (FA), where the active suspension is carried out to reach this point. According to the normal distribution of statistics work tools will be bring profit to company after zero depreciation (optimum point) but reducing the competitive advantage of the company due to the cyclical decline cost alternative work tools and finished products. Change in price of goods occurs because of supply on the market and price of use innovative technology tools which provides company attractive prices. Therefore cost of finished goods estimates based on differences between the useful life of fixed assets value for the company and the period of production survival.

2. Foundations

In economic there are differently kind of depreciation which is relative to time, quality, area of applying. Kind of depreciation in time reflects accounting type of depreciation (linear, non linear, accelerating and etc. Thus in accordance to area of applying there are different concepts of depreciation: "amortization" reflects depreciation of intangible assets, "depreciation" refers to fixed assets, and the "depletion" objects of immovable property, such as land, subsoil minerals. Therefore, depending on the classification of fixed assets (buildings and structures, machinery and equipment, land) should be set different useful lives of fixed assets. Quality kind of depreciation is derive on physical deterioration fixed assets and obsolescence. Physical deterioration occurs due to physical loading on fixed assets and physical wear and tear, which accumulates as they reach the maximum useful life of fixed assets. Factors physical deterioration express conditions and mode of operation of the fixed assets. Moreover factors physical deterioration also are related to the influence of natural (natural) conditions, which may include solar radiation, temperature, humidity. Obsolescence factors are determined based on external sources, determined by statistical authorities and other official structural divisions and internal sources, which the company defines the organization. In connection with the global scientific, technological progress and the complexity of production technology businesses there are requirement of noting functional and external obsolescence of fixed assets using accumulated depreciation expense. For example, the production line in mechanical engineering for a decade has become more complicated in processed to a level that could not be predicted at initial estimation of the amount of depreciation.

There are 2 kinds of obsolescence, one of them is relative to analog of fixed assets and another is relative to alternative of fixed assets. Obsolescence of 1st kind provides enterprise optimal period during which the rationality of the use of tools is available in production. It is maintained under the influence of changing the value of the analog. The pressure on the value of the initial investment have increasingly key factors shaping the cost of tools, which include the cost of labor, the price of raw materials, materials required for the production of tools. But form the optimal useful life of fixed assets are the impact of government subsidies, the level of competition producers indicators specificity firm and industry on the tool offset. The cost of the new tools will pay off faster if you replace existing tools in earlier period of depreciation, which can be expressed numerically as the difference between the cost of the new and old tools that reduce depreciation without loss of profit for the company, as the new tools require less than the cost of repair and maintenance service. Obsolescence 1st kind provides enterprise optimal period during which the rationality of the use of tools is maintained under the influence of changing the cost of the analog. The cost of the new fixed assets will pay back faster if you replace existing fixed assets in period, which matches the amount of depreciation without loss of profit for the enterprise.

Obsolescence 2nd kind reflects changes in the productive capacity of the alternative fixed assets. For example, the introduction of science-intensive oil-extraction equipment based on the mass production has strong influence by obsolescence 2nd within last 3 year. Due to scientific and technological progress new oil-extraction equipment is based a centrifuge, which provides the best quality of oil, accelerates the speed of processing of raw materials, reduce energy costs, reduces the cost of labor in monitoring the implementation of the operations of fixed assets and increase the productivity of oil compared with the existing enterprise in-line oil extraction equipment. Therefore, alternative tools require less repair costs and maintenance while providing the company more productive. Thus, depreciation should be accrued to the point of optimum useful tools because when company reach the point of equal productive capacity tools, further tearing fair and standard cost depreciation will compensate economically impractical due to the effects of obsolescence of the 2nd kind.

Obsolescence 2nd kind is inextricably linked with the obsolescence of the 1st kind, because the cost of expenses at the end of the life cycle of the equipment will increase as the period between the turnaround cycle, where the achievement of equal productive capacity, fixed assets should perform the initial production function aimed to obtain full value from the production tools. Indissoluble connection of all forms of obsolescence is characterized by the assumption of a permanently influence of scientific and technological progress. If there is scientific and technical progress, the industry has to change of existing fixed assets on new fixed assets due to competitive level of production in industry for ownership equipment – enterprise.

Mechanisms for re-evaluation of the residual value of fixed assets is widely used in international practice (paragraph 48 of IAS 16) which can`t fully estimate the physical wear of fixed assets, because in IFRS depreciation`s expenses are accepted, which are used in the statement of profit and loss and may vary according economic motivation and politic company. Therefore, depending on the structure of the depreciation policy of the enterprise, the company can handle the replacement value of fixed assets in future period without reflecting part of physical deterioration and obsolescence of fixed assets in paragraph 16 IFRS . While the replacement cost should reflect the physical and moral deterioration of fixed assets in according to IAS 16 which is defined as "a test for impairment of assets when their value taking into account the physical wear is excessive for business." The company has the ability to use the most useful method of depreciation, which will provide economically advantages by renewal of fixed assets of the company regardless of the form of reporting (GAAP US, IFRS). Using the optimal useful lives of fixed assets is a prerequisite for maintaining the expanded production at the company which retains competitive advantages in the market. Given that depreciation reduces the tax base and income which affects on the value of cash flows in foreign practice when company forecasts their cash flow of businesses. Thus, the depreciation allows company to manipulate items of report for the credit institutions in terms of net operating earnings before depreciation, interest and taxes (EBITDA) which presents itself as mainly covenants. Overall, the recovery of production benefit from the existing tools will provide the company financial performance and the best premium to shareholders in the form of additional dividends per unit of production advantages (cost and operating time) due to accounting mechanism "virtual" revaluation ineffective and is only an increase in settlement operations. In international practice, taking into account depreciation, an increasing number of ways to legally regulated revaluation of residual value (residual). IFRS revaluation may be carried out once a year, GAAP has no restrictions on the fair value measurement of assets. Under IFRS (IAS) 16 "Fixed assets" and IFRS (IAS) 38 "Intangible Assets" company can select the 2nd model of asset valuation: the model accounting for the cost and revaluation model. The concept of accounting of fixed assets in the IFRS are considered separate and distinct concepts reassessment (revaluation), depreciation (depreciation) and the depreciation of the value of assets. Also in accordance with IFRS in the amount of depreciation included costs for assembly and disassembly of fixed assets.

Value of fixed assets depends on obsolescence of fixed assets, unlike the function of productivity in terms fixed assets of production of survival, which is based on the physical depreciation of fixed assets. Depreciation value function was defined by obsolescence, which reflects facility company to retain it`s competitive advantage . Thus the company can maintain the lowest cost price for the finished product by matching used assets and innovative fixed assets which were created under the influence of scientific and technological progress. Obsolescence type I reflects duration of its useful life in the case of the changing costs of fixed assets and therefore require comparing cost of replacement with the same carrying value. Obsolescence second type focus on the stage of operation tools and has a predominant influence, since its value depends entirely from the amount of expenses for repairs and replacement the same characteristic of fixed assets. Obsolescence third type occurs when the prices of raw materials, innovative alternative equipment were changed by factors of obsolescence of second type (like as the tax regime of the country's products, customs exemptions, management distribution and other exogenous factors). Obsolescence of the 1st and the 2nd type depend on inventory of details by work tools, the degree development of R&D in enterprise and the difference between the quality of tools with innovative operational abilities and used on enterprises assets. R&D improves operated fixed assets, reduces the cost of tools manufacturers and methods production which corresponded to scientific and technical progress in the industry.

At the preparatory stage for obsolescence there are factors which affects on the value of the capitalization of investments in fixed assets. Those factors which include installation tools, the involvement of experts system management account which estimate condition of work tools on enterprises. At the stage of operation tools in terms of obsolescence 1st type fixed assets can be compared with the level of environmental from waste tools available on the production and tools with innovative features. Direction third type of obsolescence of tools associates with reduced cost of individual fixed assets, which is influenced by market conditions relative to counterparts. If you change the value of fixed assets, then the depreciation should be adjusted proportionally so there is a roll of the useful lives tools to optimal. Bias also takes into account reducing the probability through the use of existing capabilities tools in the production and replacement them in time. The probability of occurrence operational defects depends on the manufacturer of tools. On the basis of study of the practice of interaction tools in the same industry, the author proposes to statistical indexes which defense represents fair fixed assets. Moreover company can estimate stock of elements equipment in technology park which can reduce future capital investment in new fixed assets. Thus it arise reduces competitive advantages of the enterprise, as reserves for tools and equipment which available in the company. Of depreciation is equally wear when there is absence rolling demand on products which produced used on enterprise equipment and new equipment with innovative technology. The difference between profit and non-competitive profits is the company facility of get a large scale from the use of reserves, upgraded units and innovative tools, represents in the amount of lost, which the company will not be able to obtain without the use of timing optimization tools. Therefore, the value of lost may be predicted on the basis of indices grouping on the parameters of obsolescence which shall be adjusted by the depreciation of fixed assets. But to estimate the rate of substitution of tools in the indices, the author will draw the line of differences between value and performance tools and machines. Author determines when will be occurred necessary to replacement of work tools and considers that obsolescence in depending on the situation of the country, regions, industries manufacturers where fixed assets were used. Work tools relate to the value of capital and replacement units to the performance of fixed assets. Replacement of fixed assets, based on the constant flow of profits from the use of tools, located in the manufacture and tools with innovative technical and operational characteristics. In a case where the amount of investment is equal to zero the production capacity of the enterprise is not cheating, the value of fixed assets in accordance with the non-linear method of calculating depreciation decreases with age the depreciation period depends on the use of fixed assets, and the replacement cost will remain at last year. Depending on the subject of application distinguishes between depreciation: "amortization" reflects the depreciation of intangible assets, "depreciation" refers to the basic production assets and "depletion" objects of immovable property such as land, subsoil minerals. The active fixed assets will be estimated in the United States as the national income (Baldwin, 2005) by the National research of evaluation of products (NIPA), which is set QCOMP chain index as indicative depreciation in technological fields for the annual depreciation of the planning horizon. UK`s national statistical agencies (ONS) determines during five-year period an index of other machinery and equipment QOMEXC. Also there is the reserves (PIM) of fixed assets which is ranked in groups, industries and sectors of the fixed assets. The fixed assets are estimated by applied indexes which reflects term of capital most advanced tools by industry (VICS), which developed and prolonged by Jorgenson and Griliches (1967), Jorgenson and Stiroh (2000). On the basis of proposed indexes can establish optimal useful life of certain groups of fixed assets by evaluating the effect of amortization on an industry where function and manufactured group of fixed assets, machinery and equipment (VICS). Various factors affect on the variation VICS which are investigated according to the Bureau of Statistics of the United States, the Australian Bureau of Statistics and statistical data on 128 industries and 25 sectors as a basis the United Kingdom of V Research Western authors favor to period of the estimation (year and quarter), amount of depreciation equipment. Thus replacement fixed assets is associated with the maintenance services at a certain level of technology with stocks fixed asstes at current levels in the companies.

Depreciation affects on the amount of the cost the product due to its amount is recorded in the fixed costs of production, so it depends on the specifics of the research group FA which have different useful lives. For example, analysts Freddie MAC Center research 6 large cities (Chicago, Detroit, Los Angeles, Northern New Jersey, New York, Philadelphia) (Chang, Chen, 2011), they revealed the specificity estimation model to establish market prices for houses , land and buildings in the United States. The basis of the methodology described depreciation charges to recover the cost of the fixed assets which has been invited to serve as passive revaluation of fixed assets on the basis of the indices:

- LPAI – the value of land in the United States or other beneficial properties, such as terrain, views, access to work, traffic roads, hearing of schools, university, possible problems with the neighbors (noise), easing of parking, the crime rate in the area and etc.
- SPAI – the cost of construction in United States, which includes the cost of wages, materials, surface area for repair, number of bedrooms, bathrooms, garages in the house, central heating, etc.

Estimation of physical deterioration of fixed assets can base on costly guides Marshall Valuation Service in the U.S. and Canada, which excess the cost of the evaluation of the entire property complex. The proposed method estimates the random variables for the indexes which contains the assumption of a normal distribution with a standard deviation based on historical data, which may not be reliable in determining the likelihood of changes in the technological properties of the resource in the future for all sectors of the economy. Trend of change of fixed assets in the technology industry has a deeply wear specific variables of fixed assets, which are unpredictable and must not be determined on the basis of regression. Random chain Markowitz allows to predict the influence of factors on the changing momentum vectors and matrices for active and passive fixed assets. According to the author mathematical apparatus of random processes is Markowitz chain due to all factors of wear fixed assets changes the probability of technological properties of work tools. Technological properties of the equipment will be estimated with probability of regular (cyclic) chain Markowitz.

3. Estimation Framework

Hulten and Wykoff (1997) proposed method of analyze of the 1st type the obsolescence in the British economy, which based on 2-step method of Box-Cox (1964), was used to estimate the value of fixed assets at two levels of quality in the model Salter Solow (indicatives of n and v):

$$logF(l;n;v) = \beta_0 + \beta_1 z(l) + \beta_2 n(l;v) + \beta_3 YD + \varepsilon(l,v), \quad (1)$$ (Box, Cox, 1964)

where $\log F(v;n;t)$ is value at the transition I of fixed assets that have a long productive function per year v n, is a feature that adjusts rather transitional value of assets than a qualitative estimation;

$n(l;v)$ - quantity of indicatives I and v which reflect I- level of quantity and , v- time level;

$z(l)$ - characteristics of the main fund, which operates in the quality of the underlying fund which is the vector coefficient;

YD – expiration year of useful life;

$\beta_{0,1,2,3}$ – gamma of changing each indicatives (z, n, YD).

The advantage of the formula is that adjusting β_2, possible to assess the impact of quality indicators for the depreciation rate. If the rate of depreciation is calculated nonlinear method, $1 - D = exp[\beta_2]$, where D is depreciation rate which ignores the age of the assets. If consider the impact from competition between the fixed assets that consumer demand will displace on fixed assets due to difference between the marginal of fixed assets. But given that the regression may not reflect the actual market rate of depreciation which should be evaluated with φ proportion of price changes over time in the year v n, for market valuation of assets, then $(1 - \varphi(n,v)) = 0$, hence $\varphi(n,v)$ - the rate of depreciation of new equipment. Shortcoming of the model is the lack of integral calculus internal factors affecting on the obsolescence of fixed assets for individual sectors and include the impact of endogenous factors on the wear on equipment. For example: changes in the cost of personal computers in 2000 can not be compared with their cost in the 2013 year, only because of the redistribution of demand and the impact of market factors on the obsolescence of tools that do not reflect changes in the structure of the performance of the main fund, and its value to consumers (CPU, RAM). Some universal factors obsolescence type 1 affecting on the value of the aging of the asset can be represented as the integral calculus, given the need to allocate aggregate indicator:

$$exp[\beta_2]\varphi(n,v) = \int_{v=1}^{n} \max_{0\leq v\leq 1} \pi\mu\varphi(n,v) = \lim_{n\to\infty}\left(1+\frac{\pi}{\mu}\right)^{v}, \quad (2)$$ (Hulten, Wykoff, 1997)

where $exp[\beta_2]\varphi(n,v)$ is adjusted impact of quality the rate of depreciation of new equipment;

μ- index of the cost of raw materials, components in the industry, which should be continuously updated as the index for computer software in the United States (BLS index). The price of raw materials was the influenced increasing inflation, then changing the company's ability to accumulate retained earnings for reinvestment in the company;

π- competitive index, secondary prices for fixed assets per year from other manufacturers;

$\varphi(n, v)$ - the rate of depreciation of new equipment.

For reflect the values of investments or net of tax, it is necessary to take into account the mixture optima of wear fixed funds under method of Hall and Jorgenson (1967), based on a discrete reflection of fixed assets, profit from asset depreciation rates and the prices of the equipment:

$$P_{vi} = T_{iv}\left[In * P_{i,v-1} + I * P_{vi} - (P_{vi} - P_{i,v-1})\right], \text{ (Hall and Jorgenson, 1967)} \quad (3)$$

where T_{iv} is aggregate tax liabilities associated with the asset;

$P_{i,v-1}$, P_{vi}- price of the underlying fixed assets for the period v, which is the general age i;

I - general age of using equipment;

In - natural log of price of the underlying fixed assets.

$$T_{iv} = \left[\frac{1-P_{iv,D}}{1-P_{iv,}}\right], \text{ (Jorgenson and Stiroh, 2000)} \quad (4)$$

where T_{iv} is time period of accounting by depreciation for the period v in the general of age i;

D- present value of depreciation taking into account the effects of inflation.

Optima depreciation of fixed assets based on the discrete weighting of depreciation which can identify the appropriate group of fixed assets. There are the differences in the age of fixed assets which are specific differences in fixed assets within the same group and the impact of taxes, as a sign of obsolescence of the 1st type obsolescence. The basis of the formula is the difference in value of the asset type i in period v compared with the price of the fixed assets of the previous period. So for example the cost of production area, with service life of 5 years, located near to the train and sea transport nodes containing several production areas fenced from each other which will cost significantly more than the cost of premises, operates more than 10 years, located in distance from the crossings. Value of reserves Val_{res} in the final period of *v* is estimated:

$$Val_{res} = P_{v,0}\varphi_{v,0}Inv_v + P_{v,1}\varphi_{v,1}Inv_{v-1} + P_{v,2}\varphi_{v,2}Inv_{v-2} + \cdots, \quad (5)$$

where $Val_{res,v}$ is value of reserves of fixed assets in period v using Income of fixed assets Inc_v;

$P_{v,0,1...n}$ – price of the underlying fund for the period v, which is in the general age n;

$\varphi_{v,0,1...n}$ – the proportion of fixed assets of age n with period performance v, $\varphi_{v,0} = 1$;

Inv_{v-n}- initial investment in fixed assets which were produced in the period number of machines and equipment, which were established in the period v-n.

Then the value will vary according to the following formulas:

$$Val_{res,v} = P_{v,0} Inv_v - Inc_v + Val_{res,v-1}, \quad (6)$$

where $Val_{res,v}$ is value of reserves of fixed assets in period v using Income of fixed assets Inc_v;

Inc_v – income from fixed assets within period v.

$$Val_{res,v} = P_{v,0} Inv_v - Rep_v + Val_{res,v-1}, \quad (7)$$

Rep_v- replacement in period v

Depreciation or replacement equipment will be expressed as:

$$Inc_v, Rep_v = P_{v,0}\left[\varphi_{v-1,0} - \left(\frac{P_{v,1}}{P_{v,0}}\right) * \varphi_{v,1}\right] * Inv_{v-1} + \left[\left(\frac{P_{v,1}}{P_{v,0}}\right) * \varphi_{v-1,1} - \left(\frac{P_{v,2}}{P_{v,0}}\right) * \varphi_{v,2}\right] * Inv_{v-2} \quad ,(8)$$

where Inc_v, Rep_v-$Val_{res,v}$ is value of reserves by inventories in period v using Income of fixed assets Inc_v- value of inventories of fixed assets in period v using Income of fixed assets

Considered a significant drawback is that the formula that ignores the qualitative changes obsolescence of type 1, which reflect management's estimate of capital costs (1st type of material wear) and operating costs (2^{nd} type of obsolescence). If we consider the assumption of non-linear method of depreciation based on intellectual and physical capital:

$$\frac{P_{v,1}^{tan}}{P_{v,0}^{tan}} = \frac{P_{v,1}^{int}}{P_{v,n}^{int}} = (1 - Inc)^v, \quad (9)$$

where $P_{v,1}^{tan}$ is price changed for tangible and intangible assets the combined rate of depreciation based on inventory tools with an optimal combination of existing enterprise fixed assets and units which will be estimated as follows:

$$\mathrm{Inc}_v^{nom} = \sum_{i=1}^{n}\left(\frac{P_{v,i}Res_{v-1}}{\sum_{i=1}^{n} Res_{v-1}}\right) * \mathrm{Inc}_i, \quad (10)$$

Inc_v^{nom}- the amount of income from fixed assets in nominal terms

$P_{v,i}$- price of fixed assets of based on reserve of fixed assets in period v

Res_{v-1}- reserve by fixed assets   in period v

$$Res_{iv} = Inv_{iv} + (1 - Inc) * Res_{i,v-1}, \quad (11)$$

where Inv_{iv} is gross investment in the tool i in period v;

Res_{iv} – the value of stocks for tools I at the plant in the period v, which is in the general age n.

A significant advantage of the formula 10 is the fact that the model does not note discrete data of obsolescence and takes into account the impact on the market valuation of the cost of capital for the exponential in the dynamic cycle of downtime during repair tools. According to Griliches (1967) it is possible to determine the production function by method of lowering the residue comparing tangible and intangible capital located in the enterprise. Productive function of fixed assets reflects quantity of goods which can be created by estimation fixed assets in comparing new technology (R&D). Asking Griliaches (1967) model modification Cobb-Douglas function allows you to define a logarithmic relationship line firms in the industry and specific characteristics of the firm:

$$logInv_{vt} = logR\&D_{vt} - \log\left(Inc_t + Spes_t\right), \text{ (Griliaches, 1967)} \quad (12)$$

where, $logInv_{vt}$ is indicative which reflect productive function of inventory by fixed assets;

Spes- coefficient of specific of firm;

R&D – amount of investment in R&D (research and developments of new technology).

Therefore, the rate of depreciation will affect on the elasticity of the appearance of profits from the use of tools-In:

$$\mathrm{Inc} = \frac{\partial Y}{\partial \mathrm{Inv}} = y\frac{Y}{\mathrm{logInv}} - D, \text{ (Hall, 2001)} \quad (13)$$

where Inc is the amount of income from fixed assets in nominal terms;

$\partial Y, Y$ – income in absolutely express which company receive in changing ∂ and for period;

D - present value of depreciation taking into account the effects of inflation;

∂Inv, $logInv$ - changing of initial investment in fixed assets which were produced in the period number of machines and equipment (∂, log).

Formula is considered a contradiction that allowed error in method of defense of investment due to it uses the net amount of R&D where costs do not represent a representative value of the elasticity of R&D in the industry consolidated in gross value of R&D costs. To aggregate types of equipment available and clarify elasticities to replace items with an existing enterprise resource combination which is proposed to expand the function of different types of assets by a factor specificity of the firm in accordance to method of Hall and Mairesse (Hall, 2001), which revealed a new optimum determination of depreciation of fixed assets, based on industry peculiarities of functioning of the company. Definition of the optimum refers to the method of calculating depreciation on the declining balance, expressing the pressure factor on the R&D depreciation of fixed assets. Then if take into account the optimum industry labor productivity growth will not change at the firm due to the impact on the specific of firms will be negligible and evaluation of R&D for the initial investment which will be identical:

$$y = Spes_t + T_t + \alpha T_{tw} + K_t * L^{\alpha} * K_t^{\beta} * K_{int}^{\delta} * e^{u}, \text{ (Hall, 2001)} \qquad (14)$$

where K_t, K_t^{β} is indicative which reflects value of tangible value of fixed assets (for example: equipments);

K_{int}^{δ}- indicative which reflects value of intangible value of fixed assets (property of brand);

L^{α}- labor of cost which used by fixed assets;

Spes - specific effect of the firm, reflecting the effect of the specifics of the firm's production function tools;

$T_t, \alpha T_{tw}$ - specific temporary effect, which should be constant for several companies in the industry and can be correlated with impaired lifecycle tools;

e^{u} - specific effect of utilization fixed assets.

Modified formula that estimates the elasticity of the production function and elasticity factors should take into account the elasticity of the material $\emptyset K_t$ and intangible (intellectual) capital by $\emptyset K_{int}$ in proportions that can not be equal to their productivity ratios:

$$\frac{\emptyset K_t}{\emptyset K_{int}} = \frac{K_t}{K_{int}}, \text{ (Oulton, 2001)} \qquad (15)$$

where $\emptyset K_{t}, K_{t}$ is indicative which reflects value of tangible value of fixed assets (equipment) $\emptyset K_{int}, K_{int}^{\delta}$ - indicative which reflects value of intangible value of fixed assets (property of brand).

Proposed Hall (1971) modification of the above model differs estimation of elasticity, given that the cost of reinvestment Val_{return} expresses the required rate of return an investor who takes into account a rate of inflation and the interest rate in the country:

$$\emptyset K_{m} = P_{cap} Inv * \frac{(Val_{return} + Inc_{i})}{(Spes + Inc_{i})} \frac{(Spes + Inc_{i})}{(1 + Val_{return})}, \text{ (Hall, 1971)} \quad (16)$$

where $\emptyset K_{m}$ is elasticity of the required rate of return an investor;

Val_{return}- the cost of reinvestment fixed assets;

P_{cap} – the relative price of capital, built on historical data regression;

Inv - cost of initial capital investment in the fixed assets;

Inc_{i} – income derived by an enterprise from the fixed assets;

Spes – specificity factor activities of the company.

Feldstein (1978) argues that there is an ideal elasticity between the production function and value of fixed assets when income variables investment (Inv) tend to infinity, but under the influence of the value of capital costs Inv on the tool, the elasticity of changes in the proportions of changes in demand or supply on the tool and the level of wages charges in the country. Then the elasticity of demand ε_{d} or suggestions ε_{s} measured:

$$E_{d,s\,0,1} = \frac{\varepsilon_{s,d\,0}}{1 - y\frac{\theta_{0}}{\theta_{1}}} = \frac{\varepsilon_{s,d\,0}}{1 - \frac{\varepsilon_{s,d\,1}}{\alpha}}, \text{ (Feldstein, 1978)} \quad (17)$$

where $E_{d,s\,0,1}$ is the elasticity of demand and supply on fixed assets company;

$\varepsilon_{s,d\,0}$ - the elasticity of demand of fixed assets company;

$y\frac{\theta_{0}}{\theta_{1}}$ - the elasticity of supply of fixed assets company;

$\alpha_{0,1}$- indicative which reflects the elasticity of demand to offered tools available on the production and tools with innovative features.

Bostic (1999) allocated land leverage defined as the ratio of land value to the value of the object of depreciation, which in the future used Davis and Heathcote (2003) to assess the quality index LPAI. Analysis of the magnitude of availability to work as a factor in forming the index according to the teachings LPAI Wachs and Kumagai (1973) should be reduced by the amount of the costs associated with the proximity of the workplace – based on the distance from home to work, the cost of the trip. For example, in Los Angeles, only 40% of all jobs located within the city, so the average wage rate is calculated based on the average transportation costs. Analysis of transport costs Nils Kok (Kok, 2010) proposes to carry out cadastral numbers using a geographic information system GIS and evaluate the land by quantity of regional parks. Evaluation mechanism of passive fixed assets proposed by Chang Yan, Chen Jian (2011) should be adapted to the production facilities. Then change indicators form an index proportional to the decrease or increase the useful properties of the production facilities or structures, so LPAI will be characterized by ecological safety, the possibility of recycling, proximity sea and rail transport nodes, accessibility to the work of key personnel, wages in the region. According to the author described Wachs and Kumagai (1973) methods of estimating the cost factor availability to work will not be allowed to determine the best route by which to assess the availability factor of the work of key personnel. Then the value of assets to be transferred to the finished product with useful depreciation:

$$Val_{i,j} = Land_{0,i} * LPAI(j) + Const_{0,i} * SPAI(i) = Land_0 * (1 + \beta X_i) * LPAI(j) + Constr_0 * (1 + \beta X_i^{`}) * SPAI(j)$$

, (Wachs and Kumagai, 1973) (18)

where $Val_{i,j}$ is cost of fixed assets;

$Land_{0,i}$ - the carrying value of land cadastral numbers of regions;

$LPAI(j)$ - quality index which reflects ecological safety, the possibility of recycling, proximity sea and rail transport nodes, accessibility to the work of key personnel, wages in the region;

$SPAI(i)$ - quality index which reflects indicatives relative to buildings such as seismic activity, value of trim of the building, climate condition of the building;

X_i, X_i – cumulative assessment of the useful properties of fixed assets associated with the location and construction works;

β – proportion of the change in estimate of useful properties of fixed assets;

$Const_0$ - base price of construction work without adjusting the useful properties of fixed assets.

Chang Yan, Chen Jian which suggested adapting the 2-step model for utility Box-Cox (Box, GEP, and Cox, DR, 1964) to the calculation of depreciation nonlinear method using exponential function as a dynamic development of the prices of basic passive funds:

$$D_{i,j} = \frac{\exp\left(Land_0 * (1+\beta X_i) * LPAI(j)\right) + \exp\left(Cons_0 * (1+\beta X_i^{`}) * SPAI(j)\right) * \exp(T)}{Val},$$ (Box and Cox, 1964) (19)

where $D_{i,j}$ is the cost of depreciation of fixed assets j in period i;

T – chronological age of fixed assets or amount of time that has passed from the date of acquisition of fixed assets passive.

According to the author's assessment of the useful life of the proposed land use or residential buildings, there is a lack of which is connected with the fact that for example in Tokyo using the formula may be subject to state regulation problem features of buildings and structures of the city, so lost economic viability in determining the value of fixed assets based on a dynamic development. Based on the example, the author proposes to modify the formula by using indexes with the establishment of the limits of construction activities and land prices by taking the logarithm of each utility index:

$$D_{t,f} = \frac{[\log(Land_0 * (1+\beta X_i) * LPAI(f))] + [\log(Cons_0 * (1+\beta X_i^*) * SPAI(f)) * T)]}{\log Constr}, \qquad (20)$$

where $LogConstr$ - logarithm of indicatives of construction buildings such as value of roof, square of the building.

4. Evolution theoretical and estimation models

4.1. Modified estimate of the useful lives of fixed assets

Effect on variable costs noted as competition of obsolescence 1st type obsolescence through an increase of the substitution effect and income reducing the cost of acquisition of fixed assets in the future. Changes in demand for production equipment at swing purchasing power of income by consumer equipment, due to the volatility of prices for equipment and is the income effect. In case if the consumer buys more production equipment fixed assets for which prices have fallen, or replace them with fixed assets by permanent prices, the substitution effect is manifested. If the statistical authorities is indicative of the market of fixed assets, they will determine the position taken by the manufacturer of equipment in the budget line equipment users. Consequently company can set the coefficient of competition for each type of equipment manufacturer in the industry:

$P_i * Q_i = Inc$ (Oulton, 2001) (21)

where Inc is consumer`s income by equipment in the industry;

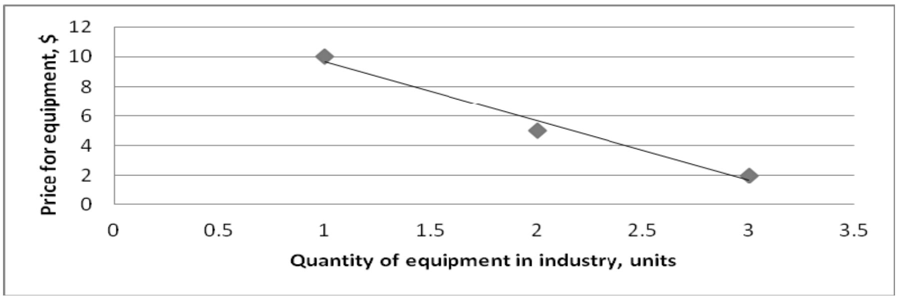
P_i – price of equipment in the industry;

Q_i – number of equipment in the industry.

To determine the effect of income or substitution company have to use of the concept of surplus, which can be estimated using the demand for equipment. Line consumer demand for equipment characterizes the demand for equipment in the industry (figure 1).

Figure 1

Level of demand for equipment in the industry



The chart 1 shows that the price of 10 which is the maximum price that the buyer is willing to pay for a tool that reflects the value of the marginal utility production equipment above which there is no demand for the equipment. Over the next piece of equipment, the consumer, in accordance with the law of diminishing utility will pay less. Consumer equipment over the first amount (10-n), second (5-n), etc.

In order to determine the weighted average useful life of tools, weighted by the marginal product of new tools necessary to compare the production function obsolete tools and implements, with innovative technical and economic characteristics.

Additional variable of equipment reflects the flexibility to repair-R (for the replacement, replace components and assemblies of equipment), then the production function takes the form:

$Inc = g(P_{t}, L, T, R)$, (Baldwin, 2005) (22)

The relationship between individual assets will be determined by the natural logarithms of the values of variables, where Δ-reflects a sign of growth:

$$\Delta Inc = \sum_{i=1}^{j}\left[\left(\frac{\partial lnInc}{\partial lnP}\right)\right] * \Delta P + \sum_{i=1}^{j}\left[\left(\frac{\partial lnInc}{\partial lnL}\right)\right] * \Delta L + \sum_{i=1}^{j}\left[\left(\frac{\partial lnInc}{\partial lnT}\right)\right] + \sum_{i=1}^{j}\left[\left(\frac{\partial lnInc}{\partial lnR}\right)\right], \quad (23)$$

where $\Delta Inc, \partial lnInc$ is natural logarithm by income derived an enterprise on different kind of the fixed assets;

∂lnL - natural logarithm by labor of cost which used by fixed assets;

ΔL - changing by labor of cost which used by fixed assets;

∂lnP - natural logarithm by price of equipment in the industry;

ΔP - changing by price of equipment in the industry;

∂lnR - natural logarithm of amount repairing by fixed assets in period;

∂lnT - natural logarithm by age of fixed assets or amount of time that has passed from the date of acquisition of fixed assets passive.

Increasing production function is recognized as $\Delta Inc = \frac{\delta ln Inc}{\delta T}$, expressing obsolescence type 2 and taking into account the value of investments which available in the enterprise of fixed assets of various types-j. Highlighting each type of fixed assets-I is interchangeability of parts in the repair which characterizes by the final formula:

$$Inv = \sum_{i=1}^{ja} \left[\frac{\left(\frac{\delta ln Inc}{\delta ln F_i}\right)}{\left(\frac{\delta ln Inc}{\delta ln R}\right)} \right] * \Delta G_i, \quad (24)$$

where Δ *Gi is* marginal product of fixed assets-I of various types-j.

Modified formula utility of marginal product allows to determine the value of obsolescence 2-type of fixed assets, when compared with the production function of new fixed assets based on the proportion of each type of fixed assets to the indicative of defined statistical authority in the industry based of fixed interconnection production function with obsolescence of work tools. Based on the production function with the current combination of tools in the company can determine the share elasticity existing combination of fixed assets to the sum of the maximum profit that can bring a company limit the amount of products which produced in the industry. Determine of limits by mechanical impact which allows to calculation the area of comparing the quality of data assembly tools. For two identical tools, collected in different areas of production, quality value productivity will vary identically proportioned mechanical impact on human resources tools, estimated correction factor for the region. Parameter of correction factor is established based on historical data comparing with the regression of recycling processes corresponding group of fixed assets carried out in the country and the country of the original manufacturer serving donor technology.

$$\tau_i = \left(\omega_1 - \omega_1 * \frac{T_0}{T_1}\right), \quad (25)$$

where τ_i is correction parameter identifier optimal amount by depreciation of fixed assets, the maximum value of which is 1, and reflects the conditions of production in the country based on producer. Calculated by statistical authorities on the basis of historical data useful in various types of equipment comparable countries;

T_0 – useful life of plant and equipment producer countries based on asymmetric maximum appraised machinery and equipment;

T_1 - useful life of plant and equipment manufacturer country of final maximum is asymmetrical of evaluated machinery and equipment;

ω_1 – share of mechanical impact during production of tools (machinery and equipment), the maximum weight of 1, equal to the original manufacturer's country.

Adjustment to the value of fixed assets due to altered function of the utility of fixed assets for enterprises under the influence of factors of obsolescence of the third type is manifested due to the lack of difference in prices of basic producer and manufacturer, carrying on business as a franchise, although the useful lives of fixed assets by vary considerably. Manufacturers can benefit profit from the use of the allocated production capacity of fixed assets. This profit express in tax breaks, cheaper cost of human resources costs (low wages), the absence of customs duties for the contribution margin, if you set the market price for a similar asset in the region. But the price of machinery and equipment purchased under the franchise does not allow for variations in the original - the capital costs of taxes and customs duties, the cost of delivery and installation of equipment, invitation specialist consultant with pre-commissioning, which increase the cost of machinery and equipment manufacturer for the final base consumer. Thus, there problem which entrepreneurs create using basic franchise brand, driven by profit maximization incentive, offering machines and equipment at the same price, but useful lives, which vary considerably under the influence coefficient reflecting period of useful lives tools of manufacturer and country as actual manufacturer, even if the same parts used to manufacture tools. For example, making an assumption about using the straight line method of calculating depreciation for the car brand "BMW" in Germany the useful life will be identical with the term using the same machinery and equipment in developing countries, but in developing countries recycling is carried out much later than in Germany, due to incorrect specifications in depreciation policy. Although under the influence coefficient τ i useful life of the main fund-car must be set much shorter than in Germany due to the worst conditions of the original assembly. Accordingly, the profit margin could exceed the size standard profit in several times for obsolescence third type of expected from the use of machinery and equipment. The amount of profit obtained from the use of tools in the period exceeding the period of optimum asset utilization negatively affects the competitive advantages of the company in the proportion of lost benefits from the use of more sophisticated tools in terms of use, minimize costs or changes in the value similar tools, replacement are economically feasible on or before the end of the optimal period of fixed assets. Therefore it is necessary to modify the original parameter comparison of the regions (countries), taking into account the usefulness of recycling equipment systems in the region (country) new tools and region (country) base manufacturer:

$$\tau_t = \left(\omega_1 - \omega_1 * \frac{\tau_2}{\tau_1}\right) * Ut, \qquad (26)$$

where Ut- $\frac{\tau_{opt}}{\tau_1}$ - comparison of the average time utilization in the region (country), which meet the requirements for optimum (USA, Germany, UK, Canada) for fixed assets similar to the average maturity disposal in the country concerned.

4.2. Costs in the calculation of depreciation

By the amount of capital expenditures in equipment affect on tax and customs privileges, which also depend on tax and customs duties of manufacturers of tools and operating costs due to the cost of VAT, customs duties on raw materials, fuels and lubricants which used for production. The cost of imported equipment related to the geopolitical situation of the country which characterizes the presence of relations in the form of customs unions and trade agreements. Therefore estimation of cost of imported tools should be used by useful the following formula:

$$Val_0 = Val_t * \frac{L_0}{L_{i,t}} * \frac{C_{fuel\,t}}{C_{fuel}}, \tag{27}$$

where $Val_{0,t}$ is cost of obsolete and innovative tools;

$C_{fuel,t}$ - proportion of fuel costs for 1 km delivery of obsolete and innovative generation tools;

$L_{0,t}$ – transport route for the delivery of tools for production, obsolete and innovative features.

Estimation of cost the expenses associated with the delivery tools, the author proposes the use of the directed graph (digraph) (Oistin, 2008) for routing, which is an alternating sequence of vertices with intersections on roads the city, the edges (arcs), streets between intersections that can estimates the availability of the production facilities, taking into account various movements (unilateral or bilateral) and traffic roads. Route length is the number of arcs, and the digraph is arbitrary, in which the arc joins with the vertices which can be multidirectional or homogeneous. Since it is necessary to take into account how the traffic route and a route back to the estimated object, it should be used to estimate the closed contour or digraphs (figure 2).

Figure 2

Digraph routing to estimate of traffic route

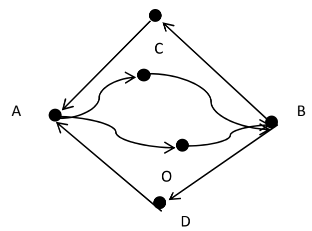


Figure 2 is a digraph in which there is a set of arcs between the vertices A, B, C, D, E, O. Note the arc {A; O}; {O; B}; {A; C}; {C; B}; {A; E}; {E; B}; {A; D}; {D; B} are different, the order of vertices is indicated by arrows, with the vertex A; B which are incident to any arc, therefore removing the direction of the arrows get a replacement on each arc ribs following sequence (A; O); (O; B); (A ; C); (C; B); (A; E); (E; B); (A; D); (D; B), which constitute the base of the digraph. Then the vertices A and B are adjacent vertices A; B and E; D, which can be expressed in terms of the adjacency matrix of a digraph with the vertex set {A, ... B} in which the base is the number of arcs of the form {A; C}; {C; B} or {A; O}; {O; B}. Based on the identified arcs which should determine the optimal route oriented in the digraph to introduce a finite sequence from point A to point B in the form {A; C} → {C; B} → {An ... Bn}. Cost of fuel and time 1 kilometers Val_{km} can be calculated as the value of alternative productive labor. In this case shipping costs is calculated as follows: D$= \{An \dots Bn\} * Val_{km}$.

4.3. Correlations of scientific, technological progress, research, development, depreciation

The role of applied technology is increased under changed technologies due to decreasing the cost of equipment, cost of production and financial results of the company. Thus obsolescence third type is influenced factors reducing the cost of reproduction tools, such factors include: Scientific and Technical Progress, the cost of labor in industries producing tools, change the type of feedstock used equipment, serial production of competitive tools. Sign competition has a special role, as characterized by a set of sub-features, the main of which is the policy of trading activity management equipment manufacturers, which affects on the amount of spare parts for the equipment, the equipment`s warranty. According to the author the impact of scientific and technological progress in the industry should be considered as a combination of factors affecting on obsolescence of the 1st, 2nd and 3rd types in different proportions, economically expedient to use an integral method for calculation cost of calculating tools combining several branches of the least squares, where the function is committed to meeting the goals of entrepreneurs:

$$\varphi = \Sigma[[f - F(x; n)]]^2 \rightarrow max\ V \quad \text{(Feldstein and Lawrence, 1978)} \qquad (28)$$

where V is volume of output;

Q - number of units are used in machine park of company;

T - deadline for the production operation.

Comparison of fixed assets can be calculated several variables which impact on obsolescence, but it has to concentrate focus on market estimation of objects analogues (prices are compared on fixed assets, sales, etc.). Moreover company have to note except that cost accounting dismantlement , transportation, disposal, tax obligations should be considered an amendment to the technical compliance of fixed assets (for specific parameters in the industry) and market conditions in the industry, affecting on the price of hardware sales (including sovereign risk premium for country risk and market risk). Given that the division into areas of obsolescence can not fully taking into account the interaction of variables affecting on the wear of work tools with a separate fixed assets which can evaluate with assumption that the depreciation should be identical to the value of their tools. Thus in accordance to expand production cost must be fully transferred to the finished product. Indicator specificity of firm shall affect on the standard set by the statistical rates for calculation the amount of depreciation. Annual cost of fixed assets is the norm for small sector of enterprises for large manufacturers annual cost of fixed assets is often greater than the normative, as the intensity of use of fixed assets has maximum production orders. Factor specificity of firm reflects the different proportions of tangible and intangible fixed assets for determining the direction of its activities. It will allow to calculate the magnitude of the effect of obsolescence on the tool by the elasticity of the type obsolescence. Keep in mind that the fair fixed assets cut value of depreciation tools under the influence of the parameters in the industry and regions, as well as the specific function of the company. Moreover specific factor determines the optimal time frame during which the enterprise is economically feasible to move the finished product cost tools than standard cost, because the conditions of production conditions innovative tools or analog tools have improved significantly in comparison with the production of moral and obsolete tools, setting the standard price.

$$D_c = P_{analog} * \frac{PV(P_{analog})}{(1+r)^i (1+t)^i} * K_{ind} * K_{region} * K_{commerce} \pm \frac{P_{mark}}{(1+t)^i} \pm \frac{Val}{(1+t)^i}, \quad (29)$$

where $D_{C,1,0}$ – the depreciation is based on the correction factors of obsolescence;

P_{analog} - cost of fixed assets analogue in period t;

$PV(P_{analog})$ – the present value of assets - analog, which reflects the value of the price change on the analog with the sale to assess of the current situation;

K_{ind} – parameters, adjusting the value of fixed assets by industry and region;

$K_{commerce}$ – factor reflects the specificity of the enterprise, using tool in the design, requirements to maintain working tool roughness, complexity figures of finished products, finishes products of specific features and competitive environment of the company;

K_{region} – parameters, adjusting the value of fixed assets by industry and region;

P_{market} – factor of market, which allows us to estimate the ratio of change of R & D (as part of the obsolescence of the 1st and 2nd types due to the effect of scientific and technological progress) to changes in the market (maximum value = 1);

$Val_{u,i}$ - cost of obsolete and innovative tools.

$$T_{opt} = T_{norm} * \frac{D_1}{D_c}, \quad (30)$$

where T_{norm} is normative term use of fixed assets;

T_{opt} - optimal period of use of fixed assets;

$D_{C,1,0}$ – indicative of depreciation which is based on the correction factors of obsolescence.

$$Val = Val_{dismantling} + Val_{transportation} + Val_{salvaging}, \quad (31)$$

where Val_{Qt} is cost of obsolete and innovative tools;

$Val_{dismantling}$ - cost of obsolete and innovative tools;

$Val_{transportation}$ is cost of obsolete and innovative tools;

$Val_{salvaging}$ - cost of obsolete and innovative tools.

$$P_{mark} = \frac{V_1 * P_1 * \frac{Zl_1}{V_1} * Rl_1}{V_0 * P_0 * \frac{Zl_0}{V_n} * Rl_0}, \quad (32)$$

where P_{mark} is cost of trade mark (brand) of fixed assets as indicative obsolescence which defenses of difference in the cost of the trademark fixed assets, which available in the manufacture and innovation tools. It is determined by comparing the benefits of royalties (royalties), allows company to extract the benefits of using a variety of tools from using the trademark;

$P_{1,0}$ - price of fixed assets of based on reserve of fixed assets in period 1 or base period 0;

$V_{1,0}$ - volume of licensed fixed assets available in the production of and fixed assets with innovative features;

$Rl_{1,0}$ - royalty rate for the tool, available in manufacturing and tool with innovative features;

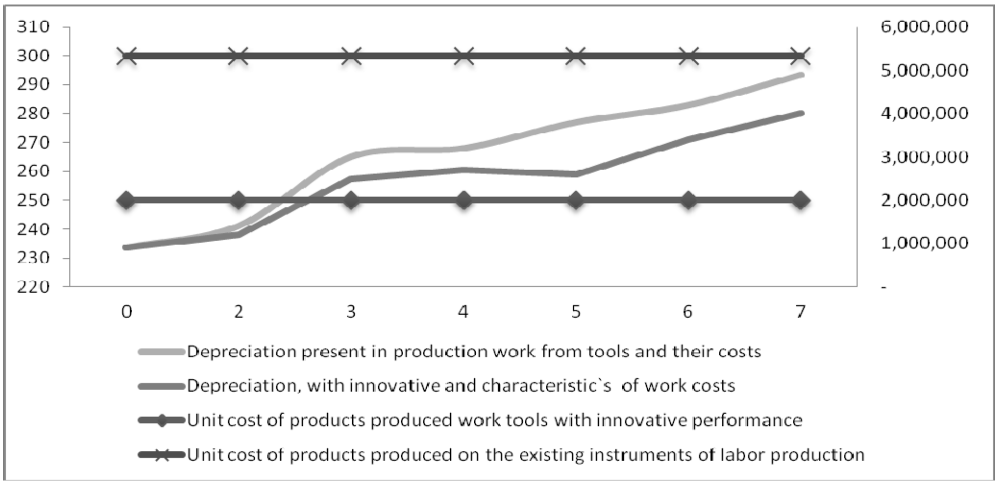
$Zl_{1,0}$ - selling price for the license tools which available in manufacturing tools with innovative features.

4.4. Comparison of the production function and value of fixed assets

The main factor wear of fixed assets is the positive exponential regression cycles between overhauls, the cost of fuel, lubricants, parts, components and assemblies for the tools, the cost of raw materials used as the main material of this tools. For example: raw hexane, helium or ethane, which are used for crushing for production soybean oil, thus they change significantly the value of the cost of finished products. Raw materials capable of generating oil which was needed for company to implement the replacement tools with the new techno-economic characteristics. Therefore requires there is requirement of replacement tools after the influence factors of obsolescence of the 2nd type by optimizing the useful lives of tools that is not included in the government`s regulatory terms. Company can use tools due to new depreciation policy of calculation of useful life requires costly and less productive ethanol to reduce a competitive advantage of the company. For example old tools expressed in the high cost of the finished products. An equally important factor of obsolescence of the 2nd type is labor productivity, as reflected by Trainer using the logarithmic function that equalizes the maximum limits on productivity to instruments of labor, given the exponential levels of repair cycles, during which will be formed by productivity levels and there is no dynamic overhaul cycles during which operates an innovative tool with better productivity. In some cases, the productivity of tools located in production and new tools are identical, then the cost of labor involved affects the frequency and duration of the overhaul cycles, moreover interrupt cycles which are considered as a function of productivity. Square regression difference logarithmic functions tools used in the manufacture and tools with innovative features on the example figure 3, will be R^2=0.8986-0.9482=-0.0504. It means lower value of labor involved on the tool with innovative features, which was postponed to the cost of production in comparison with available production power of tools associated with the increased number of repair cycles. In chart 2 the difference of exponential approximations for innovative equipment and tools made available R^2=0.8639-0.861=0.029 reflecting square regression in which will be functioned as operating costs, affecting on cost per unit of product innovation tools for less than the operating costs of existing tools due to the cost bonus by the depreciation. You must use the dimension values which reflects productivity hours to establish correlations and the effect of this cycle on change in productivity.

Figure 3

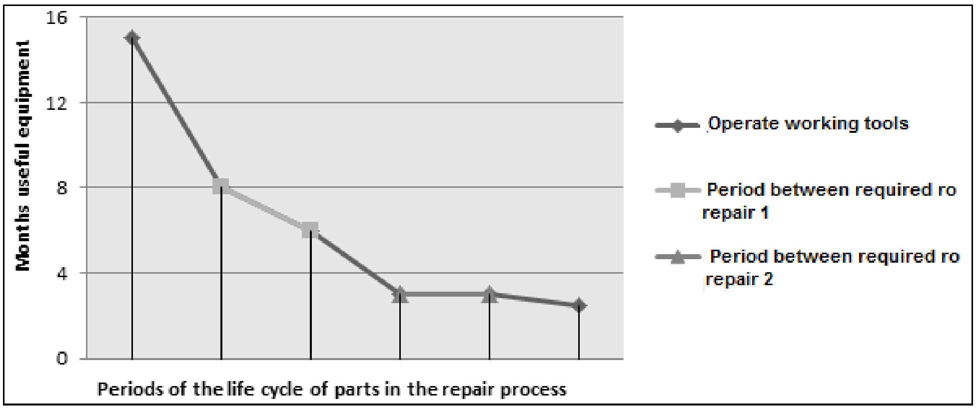
Comparison of the effect on the cost of products performance tools available in the manufacture and innovation of tools



Optimal useful life of tools available for the production of replacement equipment with innovative features, which is the period during which will accelerate depreciation on section D: E and equal to the value segment A:B, optima between the exponential and the logarithmic values of the intersection depreciation tools available in the workplace and tools with innovative features operation. Points of contact optima exponential and logarithmic reflected on the interval A:B are the only economically feasible points. In the figure 3 are determined the impact of production costs. Period A:B from figure 3 is characterized by bifurcation of segment D:E which of as transition the tool makes from simple to advanced production by replacing the moral and obsolete tools with the technical operation of innovative features. Expanded production is characterized by a lower coefficient of disposal fixed assets compared with coefficients introduction of innovative tools and replacement of fixed assets ratio greater than one, meaning that the company is able to produce products at a cost which not exceed the cost of competitive manufacturers using the latest tools. Obsolescence factor should be based on the assumption that the items of equipment can be used as a substitute for other tools. Moreover obsolescence of work tools is a donors for equipment with a long useful life which is not fully depreciated at a given moment. Therefore, a linkage repair service and amortization of fixed assets should be relative to spare parts from other types of equipment in the company of one manufacturer or the corresponding group of fixed assets, which can be used to repair existing equipment. If the cost of repair exceeds the cost of the new service tools, then there is an inherent wear and tear, which is associated with excessive costs. In the case of overhaul work (figure 4) and wear a partial order that would estimate correctly the obsolescence of tools based on the repair service. Thus company must take the potential of negative impact of each overhaul cycle for the equipment in comparison with an alternative replacement for the tool.

Figure 4

Changing in operation of the equipment and the intervals between overhauls at all stages of the life cycle of the equipment components



Research of the figure 4 suggests that the equipment in the life cycle moves on decreasing curve useful in the initial period in which the operational interval of using fixed assets was significantly more months than intervals post-repair operation. Corrective maintenance feature is the fact that the periods between the requirements for repair parts will be reduced as endurance tools in changes of repair service, repair service and the frequency which increases after each repair carried out by machinery and equipment. Therefore, the author proposes a modified method for the effective age in the logarithmic probability of physical depreciation method, estimating the maximum influence on wear of the work tools used by

Western economists. They pay special attention to the binary function useful life of tools, making a distinction between the term survival (survival) and the period of destruction (discard). Binary occurs due to aging of metals, fluctuations in temperature and humidity, quality of service and corrosion, so the term survival tools is not equal to the period of actual utilization of tools. Hayashi и Inoue (Harchaoui, 2002), provide a logarithm model for estimate of useful life fixed assets which bases on data of regression market value for last years without indexes:

$$log K_{market_{iv}} = \log \alpha_v + log \left[1 + \frac{\varphi K_t}{T_{market}} * \frac{(1 - Inc_{int}) * P_{iv}^{int} * K_{int}}{(1 - Inc_{t}) * P_{iv}^{t} * K_t} + \frac{\varphi K_{int}}{T_{market}} \varphi \frac{K_t}{K_{int}} \right] + \varepsilon_{iv}, \quad (33)$$

where K_{market} is factor of market, which allows us to estimate the ratio of change of R & D (as part of the obsolescence of the 1st and 2nd types due to the effect of scientific and technological progress) to changes in the market (maximum value = 1);

Inc_{int} – income from intangible fixed assets within period v;

P_{iv}^{int} – price of intangible fixed assets;

P_{iv}^{t} – price of tangible fixed assets;

K_{int} - market value of intangible fixed assets;

K_t - market value of tangible fixed assets;

T_{market} - indicator, which reflects the trend of changes in the main market factors affecting the fixed assets estimation of market movement at a rate of Tobin's:

$\frac{\varphi K_{int}}{T_{market}}$ - the relative cost of R & D market;

$\varphi \frac{K_t}{K_{int}}$ - fixed capital, taking into account the proportion φ, similarly constructed Divisia index, which uses the Bureau of Economic Research Britain and the USA, as indicative of the relative values for fixed capital.

Market factors influence on the cost of tools, which must be transferred to the finished product through depreciation, it is advisable to use the trend changes T_{market}, given for individual industries j:

$$T_{market} = \frac{\sum_{j=1}^{J}\sum_{t=1}^{t} t_{j1}^{t} k_{j1'}^{t}}{\sum_{j=1}^{J}\sum_{t=1}^{t} t_{j}^{t} k_{j'}^{t}} + \frac{\sum_{j=2}^{J}\sum_{t=2}^{t} t_{j2}^{t} k_{j2'}^{t}}{\sum_{j=1}^{J}\sum_{t=1}^{t} t_{j}^{t} k_{j'}^{t}} + \dots \frac{\sum_{j=n}^{J}\sum_{t=n}^{t} t_{jn}^{t} k_{jn'}^{t}}{\sum_{j=n}^{J}\sum_{t=n}^{t} t_{j}^{t} k_{j'}^{t}}, \text{ (Tanguay, 2005)} \quad (34)$$

where T_{market} is indicator, which reflects the trend of changes in the main market factors;

l_{jn}^{t} - market value of intangible fixed assets with kind j in period t of the n quantity of fixed assets;

k_{jn}^{t}- market value of tangible fixed assets with kind j in period t of the n quantity of fixed assets.

5. Forming methodological and methodical approach to the evaluation of active fixed assets ranked by depreciation groups

5.1. Evaluation depreciation of passive fixed assets

According to the author, companies should be use modify formula of depreciation through logarithmic indexes LPAI, SPAI which reflects the usefulness of all the factors influencing on fixed assets:

$$D_{i,j} = \frac{\ln\left(\varphi_0 + \sum_{k=1}^{m} \varphi_k \gamma_k + \sum_{t=1}^{n-1} \theta_t * T_t + \epsilon_{i,P}\right) + [\ln(Cons_0 * (1 + \beta X_i^{*}) * SPAI(f)) * T)]}{\ln P}, \quad (35)$$

where $D_{i,j}$ is indicative of depreciation which is based on the correction factors of obsolescence;

γ_k - income in absolutely express which company receive in changing ∂ and for period;

φ_k - proportion of changing price on land in comparing with other places in region;

θ_t - proportion of changing price on buildings in comparing with other constructions in country;

T_t - transportation costs, calculated on the optimal route to the workplace;

$\epsilon_{i,P}$ - rate of influence obsolescence factors- P of depreciation on income of fixed assets - I;

$Cons_0$ - logarithm of indicatives of construction buildings such as value of roof, square of the building;

βX_i - cumulative assessment of the useful properties of fixed assets associated with the location and construction works and β – proportion of the change in estimate of useful properties of fixed assets;

LnP- natural logarithm of price of fixed assets of based on reserve of fixed assets in period 1 or base period 0.

After modifications company will need to expand the formula factors affecting on depreciation of fixed assets due to changes in the level of wages in the country, changing in transport costs which estimated by the optimal ratio of the digraph as deviations from the average leverage of land in the country, the number of the most active working age fixed assets of the region group 25 to 42 years:

$$D_{t,j} = \frac{(\ln(\varphi_0 + \sum_{k=1}^{m} \varphi_k Y_k + \sum_{t=1}^{n-1} \theta_t * T_t + \epsilon_{I,P}) + Age + (L - Tr) + \delta_{land} + \ln(Cons_p * (1 + \beta X_t^{\,n}) * SPAI(f)) * T))}{\ln P}, \quad (36)$$

where $D_{t,j}$ is indicative of depreciation which is based on the correction factors of obsolescence;

Age – population of residents in the age group since 25 for 42 years;

L - wages are the most active and working-age population in the region;

Tr – transportation costs, calculated on the optimal route to the workplace;

δ_{land} – deviation leverage land as land value relationship to the cost of the passive core fund;

$\epsilon_{i,P}$- rate of influence obsolescence factors- P of depreciation on income of fixed assets - I;

LnP- natural logarithm of price of fixed assets of based on reserve of fixed assets in period 1 or base period 0.

Thus, the resulting formula reflects obsolescence 1st type to estimate cost of the land due to the main resource allowing to estimate the land is its demographic and social component, in contrast to the main component obsolescence tools like raw materials and labor productivity.

In assessing obsolescence 1st type associated with the volume of capital investments in the same object-land designated for industrial which should be used as factors affecting on the value of the dollars per square meter of land: the fact of railway, maritime routes, the view rights to the land. Depending on the population of a certain age group should be determined the coefficient of trading ability of the land plot, land area in square meters.

Depreciation Land size should be adjusted to the changing value of the land by the land value of the index, which is determined for different objects fixed assets inventory numbers:

$$D_{land} = (P_{\$/ha} * S_i * (100\% - \alpha - \beta - (\gamma_1, \gamma_2, \gamma_3, \gamma_4) - \varepsilon - \vartheta) - P_{\$/ha} * S_i * K_{trade}, \quad (37)$$

where D_{Land} is amount of the depreciation of passive fixed assets as land;

$P_{\$/ha}$ – price to hectare land plot cadastral number (for field placement);

S_l – square of land area;

K_{trade} – coefficient of trading ability of the land and buildings;

α - deviation of land area;

β - the cost of land in foreign currency of operation purchasing;

$\gamma_1, \gamma_2, \gamma_3, \gamma_4$ - changing electricity capacity, cost of legal services for registration of property rights, the initial cost of the land surveying, the productivity of the local aqueduct ton per hour, or boiler, posted on the site of an alternative land, the productivity of local structures placed (LSP)on the territory of an alternative land, deflection characteristics of communication on the comparison and alternative land plot;

ε- alternative area of land;

ϑ- distance from place of federal center to region using fixed assets.

5.2. Develop of alternative indexes to estimate passive fixed assets

The author develops alternative indices to the estimation of passive fixed assets, which will adjust the value of assets on the basis of universal methodologies by statistical treatment of public bodies without involving costly services for data usage Marshall Valuation Service or other services for real estate valuation. Moreover the company will not be able to officially change the cost of depreciation on fixed assets due to they must be depreciated in the last period of use. Author proposes to use additional leverage assessment for indexes which bases on corrective value of fixed assets at the balance sheet date and the amount of depreciation of fixed assets for the apportionment of the cost of the finished product. The period during which, in accordance with the proposed method depreciation of fixed assets is a period of actual wear of working tools. In the absence of negative price shocks finished products company, the amount of physical deterioration should be replaced by the method of calculation for construction costs and interest rates in the country. Data for monitoring construction costs can be obtained by analyzing the open directories and cost parameters indicatives of various classes of equipment, technological equipment and tools, based on the statistical comparison of operating results for different groups of fixed assets. Index revaluation of buildings, structures and improvements will be:

$$IZZSU = \frac{h_{standart}}{P_{standart} + Val_{roof} + Val_{exterior\ walls\ standart} + Val_{fill\ openings\ standart} + Val_{trim\ standart} + Clim_{standart}} *$$

$$K_{seismic} = \frac{1}{V_{standart} \cdot S_{standart}}, \qquad (38)$$

where $h_{standart}$ is standard height of the building in accordance with which the index is set;

$P_{standart}$ – standard price of the building in accordance with which the index is set;

Val_{roof} – standard value of roof;

$K_{seismic}$ – rate of seismic activity;

$Val_{exterior\ walls\ standart}$ - standard value of exterior walls of the building;

$Val_{fill\ openings\ standart}$ – standard value of fill openings of the building;

$Val_{trim\ standart}$ – standard value of trim of the building;

$Clim_{standart}$ – standard climate condition of the building;

$V_{standart}$ - volume of the building;

$S_{standart}$ - square of the building.

Then the useful life of the passive assets can calculate:

$$T_{dep} - T_{nor} * \omega \, (1 \quad IZZSU), \tag{38}$$

where T_{dep} is optimal period of depreciation for building and land;

T_{nor} - normal period of depreciation in accordance to norm of law(linear method of depreciation);

ω - period depreciation holidays, bonus on depreciation term plus straight-line method of depreciation.

To estimation passive fixed assets relating to property index of land (DRI) depending on the region can be determined by the following factors:

$$IZU = \left(100\% - \alpha - \beta - (\gamma_1, \gamma_2, \gamma_3, \gamma_4) - s - \vartheta\right), \tag{39}$$

Then the useful life is determined by:

$$T_{dep} = T_{nor} * \frac{\ln(P_{\$/ha} * S_1 * IZU - P_{\frac{\$}{ha}} * S_1 * K_{trade}}{\ln(P_{balance})}, \tag{40}$$

where $P_{balance}$ is cost of fixed assets in accordance to initial value.

6. Devisible of emprical rezults

Applying proposed methodic calculation of depreciation depends on kind of fixed assets. For transport object as active assets in accordance to mind authors should be use formula 33 but for estimation land depreciation as passive assets should be use indexes formulas by 38,40. Author estimate practical useful proposed in theory methodological on Sodrugestvo S.A. which based in Kaliningrad, Russia. First of all author highlight transports fixed assets in group of company Sodrugestvo S.A. which have to subsidiaries LLC Terminal. Thus in Appendix 1, Table 1 were reflected classification transports fixed assets by LLC Terminal. In accordance to formula 28 period of useful by fixed assets (T) were defensed for LLC Terminal in table 1 Appendix A

In accordance to formula 27 in table 2 Appendix A author estimated of fuel differences for transport vehicles depending on the fuel quality $L_{0,i}$ changed the useful life of the motor vehicle. The useful life of fixed assets according to the manufacturer planned on the basis of the fuel quality country of origin according to the formula 27, but the country fixed aseets can operation of these features may vary significantly, which will affect the frequency and periodicity of the costs of maintenance and repair, fuel and lubricants. Adopted in the Russian Federation GOST 51105-97 differ from international standards Euro 3, Euro 4 in terms of the content of inflammable benzene σ_benzola (5 to 1) and sulfur content (0.05 to 0.005), which affects the frequency of operation Engine, so the author proposes to determine the deviation of the quality of auto gas stations in the region. But besides standard deviation according to an experimental comparison (Table 2, Appendix A) domestic gas stations with a deviation of the major foreign fuel components affecting the operation of the engine of the vehicle. So for foreign gas stations (Shell) is characterized by the lowest content of polluting substances in the engine as methyl tert-butyl ether σ_ (methyl tert-butyl ether), 5% than the 13.5% for Russian gas stations, as there is less pressure for saturated parovσ_pary Kirishi- car wash 72 3 kPa than Shell 68.8 kPa. Based on its review of fuel quality variations on the standards the author compares the quality of fuels (gasoline, diesel, liquefied petroleum gas, compressed natural gas) producing countries vehicles with fuel quality $C_{fuel,t}$ in the Russian Federation (Table 3).

The base rate of consumption and the type of fuel $L_{0,i}$ establish a general rule $C_{fuel,t}$ fuel consumption vehicle manufacturers, but in the absence of data on the fixed assets may use statistical data from the statistics - flow rate of fuel and lubricants for road transport P 3112194-0366-03 based on primary data, which classify vehicles for domestic cars and the CIS countries, foreign cars, buses, domestic and CIS countries, foreign coaches, cargo onboard vehicles, cargo onboard domestic cars and countries CIS tractors, dump trucks, vans, cars and cement trucks, tank cars, tankers and oil trucks cars, fire trucks, winch truck chassis, the lab on cars, car cranes, field equipment, cable layers.

Using the received data about quality of fuel in region of using vehicles author calculated total influence if factor obsolescence fixed assets $Vai^{i}_{0,t}$ in Table 4, Appendix B.

The obsolescence 1 kind fixed assets of the formula 29, taking into account the characteristics of fixed assets, the author proposes to evaluate the obsolescence of the 1st kind on the primary indicators and the actual performance of the region on the basis of management accounting for all transport vehicles of Sodrugestvo S.A. (Table 5, Appendix B).

Moreover in Table 5 author used formula 31 for calculation indicator K_{region}. Those data used in Table 6 Appendix B for estimation of Dc – obsolescence 1 kind and 2 kind of transport vehicles for estimation of market value of fixed assets P_{mark} in accordance to formula 32. The author proposes in determining the obsolescence of the 2nd kind for the vehicle to use a methodology for evaluating the factor obsolescence by formula 29, based on the comparative approach, taking into account that the vehicle may be purchased on the primary market and the secondary market vehicles. In Table 6 Appendix B the author uses three alternative object of fixed assets compares identical in appearance vehicle classification dimensions. Thus, the author in table 7 Appendix B estimates the two kinds of obsolescence, taking into account the recycling rate services for vehicles and several variants of alternative fixed assets, and author calculated optimal period of depreciation using formula 30, which can allow comparing depreciation in accordance optimal period and normal period of renewable fixed assets. Thus author defense deviation of depreciation from normal figures, bonus in year and bonus in absolute terms which can reflect accrued period from normal depreciation to optimal depreciation in accordance proposed by author methodologic of calculation fair value of depreciation for companies.

Comparison of methods calculating of depreciation of passive assets highlighted indexes methods (LPAI, SPAI), which most accurately reflect the depreciation and amortization. Author proposed own indexes (IZZU, IZU) reflected obvious advantages of able to quickly assess the performance of buildings and constructions the Russian Federation. At the same time author`s indexes reflect only part of the obsolescence of the 2nd kind of passive fixed assets, providing an opportunity to the company to estimate the optimal value of depreciation of fixed assets by means of selected indicators of management accounting company. Indices (IZZU, ILS) will reduce the additional cost estimates for the use of these agents paid statistical compilations (for example- Marshal valuation) or to attract third parties to estimate of fixed assets. Synergy cost of buildings and structures for land determined based on comparing initial date of analog`s land in region (Table 8, Appendix C) which based on comparing location of alternative objects of land (Figure 1) . Basic data on the comparison of alternatives land are shown in Table 8, Appendix C, which are based on the collection of information from the newspaper of free ads "Hand in Hand", an advertising magazine "Real Estate of Kaliningrad ',' housing market." Obsolescence of the 2nd type is also determined according to the formula 37 based on the comparison of alternative facilities and coefficient of Trade ability K_{trade} based on recommended discount auction of fixed assets (Table 9, Appendix C), which based on the population figures of the settlement, ownership of real estate.

Estimation of depreciation D_{land} under the influence of obsolescence of the 2nd kind by the formula 37 based on initial comparing fair value of cadastral cost of land in Table 10,

Appendix D. The main indicator index obsolescence 2nd kind is the logistics cost land (IZU) performance is evaluated by the formula 40, based on primary data alternatives (Table 10, Appendix D). Manufacturing complex for deep processing of oil-bearing crops Sodrugestvo S.A. is located in the Kaliningrad region, Kaliningrad, on the shore of a navigable canal linking Kaliningrad with the Baltic Sea, 25 km from Kaliningrad. Kaliningrad Sea Canal starts from the entrance breakwaters Baltiysk (see the Figure 1), runs along the north coast of the Kaliningrad (Vistula Lagoon) to the mouth of the river Pregol. The author also takes into account that in estimation of the obsolescence of the formula 40 should be evaluated IZU- deflection characteristics of electric power to compare and alternative land areas by the formula 40. In accordance of initial information about the Sodrugestvo S.A. the territory of the land area has total capacity of 20 MW Q which consist of indicative γ_1, created a boiler capacity is 98 tons of steam / hour which consist of the amount of changing indicative γ_2, it runs on LSP of local structures placed which consist of the amount of changing indicative γ_3, on a alternative function local sewage treatment plant capacity of 680 cubic meters per day which presents the amount of changing indicative ε . Statistical indicators of the power of alternative land were reflected in Table 9, Appendix C which consist of changing indicatives α, β, ϑ. Thus basing on value IZU company can calculate optimal period T_{dep} for using fixed assets by formula 39 in accordance to proposed author`s methodology in Table 14, Appendix D.

The optimal value of depreciation of building under the influence of obsolescence based on initial data about buildings ($h_{standart}, P_{standart}$, $Val_{roof}, K_{seismic}, etc$) in Table 12 , Appendix D. Those data used in the formula 38 for estimation index IZZU of depreciation (Table 12, Appendix D). Author calculated IZZU based on differences of buildings, moreover in Table 14, Appendix D author calculated optimal period T_{dep} for buildings used formula 39. Thus in Table 14, Appendix E are reflected depreciation in accordance to optimal period of replacement passive fixed assets (both kinds: land and buildings)- T dep. Author calculated period of holidays for straight-line method of depreciation which can allow companies suspend optimal period of depreciation (Tdep) and company can make capital investment (CAPEX) within the better period for replacement of fixed assets.

Based on proposed by authors methodologic of calculation the depreciation for active and passive fixed assets, author estimated changing which will be caused by strengthening of competitive position company and financial ratios in accounting reports by IFRS in Table 15 Appendix E. The forecast of the capital expenditures of the renewal of fixed assets in accordance with the optimal period of depreciation is relative with the cash flows of the enterprise and the cost of business (Enterprise value). For each type of fixed assets are calculated the amount of capital investment (CAPEX) during the planning horizon of business value (10 years). Thus part of the fixed assets can be updated much earlier than the residual useful life of the forecast period from 2014 to 2019 according to the proposed by authors method (formulas 40, 42 for passive fixed assets and 33 for active fixed assets) of calculation of the optimal depreciation rate. The cost of business models actually acting on depreciation rates and proposals modeled scenario where fixed assets can be replaced during the actual operation with fixed assets. In case if company want to accelerated depreciation, then they will set the amount of additional charge of the depreciation bonus (bonus) for the straight-line method of depreciation or depreciation holiday's, which will allow enterprises to:

- To restore capital assets for a shorter remaining period of the influence of the obsolescence of the 1st or 2nd kind.
- To reduce the fixed costs of the fixed assets. In the proposed model of estimation passive fixed assets using indexes IZZU and IZU, author of the amortization policy set the amount of deviation of fixed costs in each period subsequent to the timely replacement with comparing analog (obsolescence of the 1st type) or an alternative tool (obsolescence of the 2nd type). In Table 15 Appendix E, author comparing influence on different kinds of depreciation on active and passive fixed assets. It presents that cost of passive assets (land) has the maximum influence of analog object on estimation land and it consist of 5.24%. But for active assets deviation of differently types of obsolescence consist of 9.5%, that confirmed that alternative fixed assets and science progress has strong influence on fixed assets.
- To receive the income from the disposal of fixed assets for scrap or sale of fixed assets that are used depreciation rates or after upgrading or retrofitting.

For the fixed assets remaining term which according to the optimum value depreciation policy proposed by the author more than the remaining term of normative depreciation rates as linear amortization method. In Table 16 (Appendix E) author estimate the influence of changing in depreciation policy on indicatives from Income Statement of Sodrugestvo S.A. using indicatives:

- Increasing revenue due to changing in depreciation policy
- Decreasing fixed cost due to changing in depreciation policy
- Changing in capital expenditures (CAPEX)
- Increasing/decreasing depreciation amount

Thus, the company can increase the useful life of the fixed assets with the following advantages:

- avoid the cost of capital investments that were planned according to the depreciation rates;
- keep the collateral value of the assets for credit commitments for investment and working capital loans;
- minimize the cost of the depreciation write-off in the calculation of net profit.

In Table 16 Annex E author calculated the enterprise value of company based on new depreciation policy in accordance to proposed methodological which consist of 555 mio USD per year. The optimum period of depreciation of fixed assets reflects the obsolescence of the 1st or 2nd kinds, as well as changes in the cost of capital investments, fixed costs and depreciation in accordance with the optimal value of calculated depreciation. The total value of the business for the group of companies Sodrugestvo S.A. is reflected in Table 17, Annex E for the agricultures sector in comparing with main competitive. Thus change the value of the business after the introduction of the new depreciation policy in enterprises will be change revenue of Sodrugestvo S.A. on 33 mio USD, EBITDA on 73 mio USD and Net profit on 54 mio USD. Total EBITDA margin will be change on 8.8% in according to the proposed acceleration of the depreciation amount of active fixed assets on 3% and deceleration for passive fixed assets because production assets require acceleration in the market productive fixed assets. Accordingly, the sector companies will need 35% increase in capital expenditures (CAPEX), which will lead to a 6.3% increase in revenue in the enterprise, reduce fixed costs for repairs and maintenance of fixed assets on 1.8%.

7. Conclusion

Author considered the value of assets based on period of useful life the production function and developed a deeper approach to estimate the various functions of fixed assets, which must be taken into account depreciation. The author offered a theoretical rationale for estimating of capital stock using modified formulas of indexes. The author developed a fundamentally new mechanisms for evaluating fixed assets within the parameters of various types of wear that takes into account not only the specifics of the company but also by the specific parameters of assessment in the industry which operates basic foundation. Thus, the optimization based on a visual method which allows identify the period that should be changed normative useful life of fixed assets for suspend the company's competitive positions in the industry. Evaluation of optimal life of the tools adjusted the value of tools of obsolescence type 2, reveals the optimum criteria (costs or working hours), which can be obtained from the use of tools with more advanced technical and operational characteristics. Therefore, use of the term moral and obsolete tools for accelerating that fair value of depreciation based on the company which able to maintain a competitive level of unit costs provided by new technologies in the industry.

Advantage of estimation markets factors is that if there is an assumption about the accuracy indicative of depreciation for the industry/ It will change the cost of R&D which will be adjusted as $\frac{\Phi K_{inf}}{T_{market}}$ and should not be greater than 1. Thus market disadvantage factor is the randomness influence of exogenous factors on the wear during period which does not provide information about the projected value of the coefficient. Respectively, it becomes difficult to estimate the depreciation rate for the future useful life of fixed assets.

Separation benefits and value of production functions is determined as differences in the proportion of resources produced for consumption, which is not defined for each industry tools, the level of demand elasticity on the equipment in the industry, imperfect competitive advantages in the industry, the macroeconomic impact and level of economic development in which operates the entity measures the depreciation of fixed assets. Wear of obsolete tools will optimize the regulatory useful life of tools to the period when there will be economic feasibility of replacing the outdated tools. The need for replacement of tools arises due to endogenous and exogenous factors affects on the cost of fixed assets. Change in value of obsolete tools displaces period of optimal use of the instruments of labor, during which the company will be able to earn only the profits which formed competitive advantages in the international market, as compared to alternative tools. The size and cost of use of outdated tools allows company trade on competitive prices due to company has the allowable size of the cost of finished products.

The article has analysis of compilation indexes which allowed the author to develop own indicates for exact market value of fixed assets and depreciation for different of fixed assets. Developed indexes allows companies to evaluate fixed assets in terms of their usefulness in industrial. Thus company can estimate fair value of depreciation and amortization of fixed assets in accordance to actually level of wear assets deterioration. Comparison of methods reflect the modified foreign indexes (LPAI, SPAI), which reflect most accurately the depreciation and amortization of fixed assets designed by the author indexes (IZZU, IZU). Author`s indexes reflects fair value of depreciation with obvious advantages due to the possibility to quickly estimate the performance, corrective useful lives depreciation of fixed assets for different groups without any additional statistical compilations (Marshal valuation) or engaging third parties to evaluate assets. Basis of foreign indexes face in practical conditions with time-consuming processes environmental analysis of land or buildings and a high proportion of subjectivism. Mechanism proposed by author determines the value of distortion of the real depreciation advantages from useful life company of land, buildings or structures and allows individual factors to estimate of fair value of fixed assets. Due to factors of estimation fixed assets is not effective way for calculation of various fair value wear working tools. Author concentrated on region working area of fixed assets and other specific factors which can defense fair value of work tools.

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Appendix A

Table 1

Classification of transports as fixed assets by LLC Terminal

Name of vehicles	Kind of transport vehicles	Classes of vehicles on carrying capacity (mt)	Classes of vehicles on the passenger capacity	T – The useful life of the vehicle (year)
TOYOTA CAMRY H 508 PB 39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
KIA MB Carnival/Sedona/VQ O843PT	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
TOYOTA CAMRY O 419 CY 39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
TOYOTA Land Cruiser 150 O418CY39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
Audi A8L,O054MM39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
TOYOTA CAMRY P381A T39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
Toyota HIACE H 630 TC 39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
HYUNDAI H-1 2.5 MT O318PK39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
Toyota Camry, H 788 TC 39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
Toyota Camry, O677CP39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
Toyota Camry, O678CP39	Vehicles with an engine capacity: more than 1,000 cubic meters. cm but not more than 2000 cubic meters. centimeters	2.1-5.0	Small class	25
CATERPILLAR сер.№CFH00419 КУ5596	Dump trucks with full weight more than 12 tons, but not more than 20 tonnes	20.0	Middle class	25

Table 2

Comparison of fuel consumption standards GOST 51105-97 (Euro 2) and the requirements of the European Union (Euro 3; Euro 4)- $L_{fuel,i}$

No test	Gas station	The iron content, mg / l	The content of monomethyl aniline,%	Content aromatisation cal carbon-hydrogen bonds,%	Benzene content,%	The content of methyl tert-butyl ether,%	Sulphur content,%	Tar, mg / 100 cc	Pressure-saturated vapor, kPa
1	Shell	none	0.26	40.50	0.58	5.00	0.004	3	68.8
2	Neste	none	none	43.00	0.90	7.20	0.006	1	64.8
3	Shell	none	0.42	44.00	0.76	4.20	0.004	2	69.7
4	ПТК	none	0.42	42.00	0.59	1.20	0.003	2	70.5
5	Kirishi-car service	none	none	36.00	0.10	13.00	0.000	2	72.3
6	BP	none	none	30.50	0.51	8.00	0.000	1	71.6
7	BP	none	none	32.00	0.56	7.50	0.002	2	70.6
8	TNK	none	0.51	38.00	0.50	10.30	0.003	2	69.4
9	BP	none	none	28.00	0.10	13.50	0.002	1	77.8
10	Lukoil	none	none	50.50	0.57	2.00	0.000	2	68.5
Standards	DEN 51105-97 (Euro 2)	0	1.30	55.00	5.00	15.00	0.050	5	60-95
	Euro 3	0	1.30	42.00	1.00	15.00	0.015	5	60-95
	Euro 4	0	1.30	35.00	1.00	15.00	0.005	5	60-95

Table 3

Comparison of the quality of fuel in Russia and the vehicle producing countries (%)

Countries	$C_{fuel,i}$				
	petrol	diesel fuel	liquefied petroleum gas	compressed natural gas	biofuel
United States	12.32	19.10	11.20	12.32	66.30
China	14.10	16.10	6.20	9.32	16.30
Japan	14.30	0.20	4.30	0.60	11.60
Canada	19.10	0.30	0.60	-0.10	1.90
France	16.10	0.20	0.20	0.90	-0.10
Australia	12.32	14.10	3.10	2.35	13.20
Spain	12.32	2.00	1.30	1.90	4.00
Germany	12.32	19.10	2.35	12.32	26.30
Sweden	9.32	16.10	6.20	9.32	16.30
Italy	14.10	0.90	4.30	1.90	6.60
United Kingdom	11.60	0.20	4.30	0.60	11.60
Belgium	11.20	0.30	0.60	-0.10	1.90
Netherlands	6.20	0.30	0.60	-0.10	1.90
Czech Republic	16.10	0.20	0.20	0.90	-0.10
Austria	0.20	14.10	3.10	2.35	13.20
Belarus	3.20	2.06	1.30	1.90	4.00

Appendix B

Table 4

The primary data for the evaluation factor vehicle fuel

No	Name of vehicles	Start-up date	Inisial cost RUB	Normative Period	Total Period	Optimal period	Region of using vehicles	$Val_{q,i}$ Deviation of the fuel quality (%)	$Val_{q,i}$ 2013-2014 (%)
1	TOYOTA CAMRY H 508 PB 39	10.02.2007	452000	7	7.39	0	Kaliningrad region	7	8
2	KIA MB Carnival/Sedona/VQ O843PT легковой	02.03.2010	640000	7	4.33	3	Kaliningrad region	7	8
3	TOYOTA CAMRY O 419 CУ 39	26.05.2010	831000	7	4.10	3	Kaliningrad region	7	8
4	TOYOTA Land Cruiser 150 (PRADO) O418CУ39	26.05.2010	1772000	7	4.10	3	Kaliningrad region	7	8
5	Audi A8L,O054MM39	04.05.2011	2859000	7	3.16	4	Kaliningrad region	7	8
6	TOYOTA CAMRY P381A T39	27.03.2012	1033000	7	2.26	5	Kaliningrad region	7	8
7	Toyota HIACE H 630 TC 39	05.06.2007	705000	7	7.07	0	Kaliningrad region	7	8
8	HYUNDAI H-1 2.5 MT O318PK39	05.06.2009	559000	7	5.07	2	Kaliningrad region	7	8
9	Toyota Camry, H 788 TC 39	09.06.2007	516000	7	7.06	0	Kaliningrad region	7	8
10	Toyota Camry, O677CP39	07.07.2010	855000	7	3.98	3	Kaliningrad region	7	8
11	Toyota Camry, O678CP39	07.07.2010	855000	7	3.98	3	Kaliningrad region	7	8
15	CATERPILLAR D5N сер.№CFH00419 KУ5596	22.03.2008	3746000	7	6.28	1	Kaliningrad region	7	8

Table 5

Data for calculation obsolescence transport kind of fixed assets (%)

No	Name of vehicles	Country of production	$Val_{dismantling}$			$Val_{transportation}$		$Val_{salvaging}$		K_{ind}	$K_{commerce}$	K_{region}
1	toyota camry н	Japan	11	13	8	9	12	11	4	2	0.20	2
2	kia mb carnival/sedona/vq	South Korea	4	6	3	4	9	2	21	0	0.20	41
3	toyota camry о	Japan	11	13	8	9	12	11	4	0	7.00	2
4	toyota land cruiser	Japan	11	13	8	9	12	11	4	0	1.90	2
5	audi	Germany	28	21	13	14	18	8	11	0	0.30	9
6	toyota camry	Japan	11	13	8	9	12	11	4	0	0.90	2
7	toyota hiace	Japan	11	13	8	9	12	11	4	0	7.00	2
8	hyundai h-1 2.5 мт	China	31	21	15	11	15	11	6	0	0.20	4
9	toyota camry,	Japan	11	13	8	9	12	11	4	0	7.00	2
10	toyota camry,	Japan	11	13	8	9	12	11	4	0	0.20	2
11	toyota camry,	Japan	11	13	8	9	12	11	4	-1	7.00	2
12	caterpillar d5n	Russia	2	2	2	2	2	2	2	3	7.00	0
13	toyota camry н	Russia	2	2	2	2	2	2	2	1	0.20	0
14	kia mb carnival/s	Germany	28	21	13	14	18	8	11	1	7.00	9
15	toyota camry о	Germany	28	21	13	14	18	8	11	0	0.20	9
16	toyota land cruiser 150 (prado)	Russia	2	2	2	2	2	2	2	0	0.20	0
17	audi	USA	18	18	8	11	14	6	5	3	0.20	3

Table 6

Estimation of D_c – obsolescence 1 kind and 2 kind of transport vehicles

No	Name of vehicles	initial RUB	T_{norm}	$\frac{\Delta I_1}{V_1}$	$\frac{NI_1}{RI_0}$	V_1	P_1	$\frac{\Delta I_0}{V_0}$	P_{analog}	P_0	V_0	P_{mark}
1	TOYOTA CAMRY Н 508 РВ 39	452000	5.00	7.39	2	0.136	34	1.002	519800	34	1.002	537880
2	KIA MB Carnival/Sedona/VQ О843РТ легковой	640000	5.00	4.33	2	0.156	34	1.002	736000	34	1.002	761600
3	TOYOTA CAMRY О 419 СУ 39	831000	5.00	4.10	2	0.136	34	1.002	955650	34	1.002	988890
4	TOYOTA Land Cruiser 150 (PRADO) О418СУ39	1772000	5.00	4.10	2	0.120	34	1.002	2037800	34	1.002	2108680
5	Audi A8L,О054ММ39	2859000	5.00	3.16	1	0.115	15	0.992	3287850	15	0.992	3402210
6	TOYOTA CAMRY Р381А Т39	1033000	5.00	2.26	2	0.136	34	1.002	1187950	34	1.002	1229270
7	Toyota HIACE Н 630 ТС 39	705000	5.00	7.07	8	0.720	72	1.002	810750	72	1.002	838950
8	HYUNDAI H-1 2.5 MT О318РК39	559000	5.00	5.07	4	0.410	53	1.000	642850	53	1.002	665210
9	Toyota Camry, Н 788 ТС 39	516000	5.00	7.06	2	0.136	34	1.002	593400	34	1.002	614040
10	Toyota Camry, О677СР39	855000	5.00	3.98	2	0.136	34	1.002	983250	34	1.002	1017450
11	Toyota Camry, О678СР39	855000	5.00	3.98	2	0.136	34	1.002	983250	34	1.002	1017450
12	CATERPILLAR D5N сер.№CFH00419 КУ5596	1442000	7.00	6.63	5	0.136	48	1.000	1658300	42	0.993	1715980
13	TOYOTA CAMRY Н 508 РВ 39	1442000	7.00	6.63	5	0.136	48	1.000	1658300	42	0.993	1715980
14	KIA MB Carnival/Sedona/VQ О843РТ	3746000	7.00	6.28	4	0.136	42	1.002	4307900	-	1.002	4457740
15	TOYOTA CAMRY О 419 СУ 39	3746000	7.00	6.28	4	0.136	42	1.002	4307900	-	1.002	4457740
16	TOYOTA Land Cruiser 150 (PRADO) О418СУ39	1654542	7.00	2.54	-	0.136	-	-	1902724	-	-	1968905
17	Audi A8L,О054ММ39	1110675	7.00	0.89	1	0.115	15	0.992	1277276	15	0.992	1321703

Table 7

Period of optimal useful of assets fixed (T optimal)

Name of vehicles	Sturt-up date	Initial cost, RUB	T norm	T	Linear Depreciation	Obsolescence 1	Obsolescence 2	T_{opt}	Depreciation in accordance to optimal period	Deviation optimal depreciation per year (%)	Period of depreciation bonus	Depreciation with bonus	Accrued period from normal depreciation to optimal depreciation
TOYOTA CAMRY H 508 PB 39	10.02.2007	452000	5	7	90400	45164	44388	10	45164	-50.04	2.6	67800	2.6
KIA MB Carnival/Sedona/VQ O843PT легковой	02.03.2010	640000	5	4	128000	68677	76255	8	76255	-46.35	4.1	67800	4.1
TOYOTA CAMRY O 419 CУ 39	26.05.2010	831000	5	4	166200	112252	99962	7	112252	-32.46	3.3	67800	3.3
TOYOTA Land Cruiser 150 (PRADO) O418CУ39	26.05.2010	1772000	5	4	354400	277069	168736	6	277069	-21.82	2.3	67800	2.3
Audi A8L,O054MM39	04.05.2011	2859000	5	3	571800	291663	306939	9	306939	-48.99	6.2	67800	6.2
TOYOTA CAMRY P381A T39	27.03.2012	1033000	5	2	206600	164102	130385	6	164102	-20.57	4.0	67800	4.0
Toyota HIACE H 630 TC 39	05.06.2007	705000	5	7	141000	63853	60739	11	63853	-54.71	4.0	67800	4.0
HYUNDAI H-1 2.5 MT O318PK39	05.06.2009	559000	5	5	111800	53023	55633	10	55633	-52.57	5.0	67800	5.0

Appendix C

Table 8

A comparison of alternative land

dicatives	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Location	Kaliningrad region, Yantarniy	Kaliningrad region, Sinyavino	Kaliningrad region, Donskoe	Kaliningrad region, Svetliy
Distance from Kaliningrad, km- ϑ	38	41	32	27
The landlocked bay	there is	there is	there is	Channal 450 m.
Kind of property rights	ownership	ownership	ownership	ownership
Land Area- α	14'000	28'000	28'000	24'000
Category	Settlements	Settlements	Settlements	Settlements
Appointment	industrial Zone	industrial Zone	industrial Zone	industrial Zone
The presence and proximity communication connection	Gaz, water,electricity	Gaz, water,electricity	Gaz, water,electricity	Gaz, water,electricity
Railway	no	no	no	2
The cost of land, RUB- β	61 108 600	122 217 200	122 217 200	132 589 008
Feature value	Sentence	Sentence	Sentence	Sentence
The date of sale / Offer	30.06.2014	30.06.2014	30.06.2014	30.06.2014

Figure 1

Scheme of location objects of lands

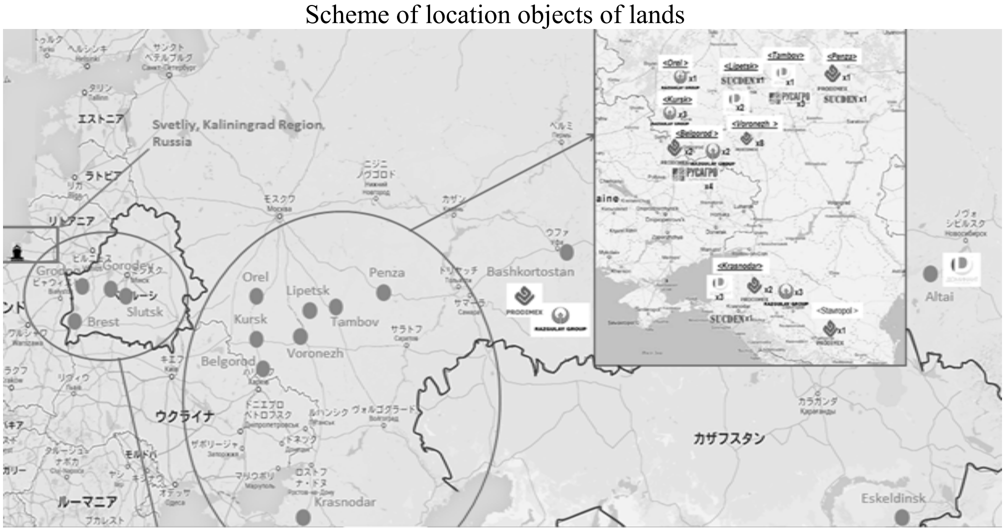

Table 9

Calculation indicative- K- trade discount auction of fixed assets (%)

The number of the peoples in city, thousand pers	Houses Buildings		Industrial facilities		Land	
	Rental	Property	Rental	Property	Rental	Property
< 250	6	9	11	13	11	13
250- 500	6	9	11	13	11	13
> 500	8	11	13	15	13	15

Appendix D

Table 10

The cost of land in the cadastral number

Name of passive fixed assets	The cost of land, RUB- β	Depreciation	Cadastral cost of land	K_{trade}	W_{end} – The current cost of legal services for registration of property rights	W_i the initial cost of legal services for registration of property rights	$\gamma_3 = W_{end}/W_i$ - changing cost of legal services for registration of property rights (%)	L_{end} —the current value of the land surveying	L_i the initial cost of the land surveying	$\gamma_4 = L_{end}/L_i$ (%)	D_{Land} (%)
Land area of 1000 sq cadastral number 39:18:01 00 31:27 HOUSE №15	897	0.00	907.12	0.002%	16.54	16.10	0.001	7.88	7.67	0.0013	0.0009
The land area of 12,000 sq.m. cadastral number 39:18:04 00 05: 0004 plot number 18	8170	0.00	8261.16	0.015%	150.64	146.58	0.011	71.81	69.85	0.0114	0.0081

The land area of 13082 square meters cadastral number 39:18:01 00 31:19 station number 7	11735	0.00	11866.95	0.021%	216.39	210.56	0.016	103.15	100.34	0.0164	0.0117
The land area of 14032 square meters cadastral number 39:18:01 00 31:23 plot number 11	12588	0.00	12728.71	0.023%	232.10	225.85	0.017	110.64	107.62	0.0176	0.0125
The land area of 16369 square meters cadastral number 39:18:01 00 31:22 plot number 10	14684	0.00	14848.65	0.026%	270.76	263.46	0.020	129.07	125.55	0.0205	0.0146
The land area of 16614 square meters cadastral number 39:18:01 00 31:28 plot number 16	14904	0.00	15070.89	0.027%	274.81	267.41	0.021	131.00	127.43	0.0208	0.0148
The land area of 18272 square meters cadastral number 39:18:01 00 31:26 plot number 14	16391	0.00	16574.90	0.029%	302.23	294.09	0.023	144.07	140.14	0.0229	0.0163
The land area of 18,987 sq cadastral number 39:18:01 00 31:20 plot number 8	17033	0.00	17223.49	0.031%	314.06	305.60	0.024	149.71	145.63	0.0238	0.0170
The land area of 20787 square meters cadastral number 39:18:01 00 31:21 plot number 9	18647	0.00	18 856.31	0.033%	343.84	334.57	0.026	163.90	159.43	0.0260	0.0186
The land area of 276 sq cadastral number 39:18:01 00 31:32 PLOT № 17/3	248	0.00	250.36	0.000%	4.57	4.44	0.000	2.18	2.12	0.0003	0.0002
Land area of 3222 sq Kadastr.№ 39:18:08 00 04:84 Sv-in 39-AA №746097 from 15/10 / 09g.	507500	0.00	513188.04	0.910%	9357.72	9105.67	0.700	4460.69	4339.09	0.7078	0.5056
The land area of 42740 square meters	38341	0.00	38770.32	0.069%	706.96	687.92	0.053	337.00	327.81	0.0535	0.0382

cadastral number 39:18:01 00 31:18 №6 LAND											
The land area of 67434 sq.m. cadastral number 39:18:00 00 00: 0030 plot number 17	479241	0.00	484612.32	0.859%	8836.65	8598.65	0.661	4212.31	4097.48	0.6684	0.4775
The land area of 67,710 sq cadastral number 39:18:01 00 31:14 station number 2	60740	0.00	61421.12	0.109%	1119.98	1089.82	0.084	533.88	519.33	0.0847	0.0605
Land area of 70 sq.m. under the well №2791 Kadastr.№ 39:18:08 00 12: 0059	32500	0.00	32864.26	0.058%	599.26	583.12	0.045	285.66	277.87	0.0453	0.0324
Land area of 70 sq.m. under the well №2792 Kadastr.№ 39:18:08 00 12: 0060	32500	0.00	32864.26	0.058%	599.26	583.12	0.045	285.66	277.87	0.0453	0.0324
The land area of 72,144 sq cadastral number 39:18:01 00 31:16 plot number 4	64718	0.00	65443.29	0.116%	1193.32	1 161.18	0.089	568.84	553.33	0.0903	0.0645
Land area of 7315 sq cadastral number 39:18:01 00 31:17 plot number 5	6562	0.00	6635.59	0.012%	121.00	117.74	0.009	57.68	56.11	0.0092	0.0065
Land area of 8094 sq cad. №39: 18: 080004: 92 of 39 St-AA №818853 from 07.06.2010	350970	0.00	354903.66	0.629%	6471.48	6297.18	0.484	3084.86	3000.77	0.4895	0.3497
Land area of 8800 sq cadastral number 39:18:00 00 00:58 UASTOK number 1	7894	0.00	7982.66	0.014%	145.56	141.64	0.011	69.39	67.49	0.0110	0.0079
Land area of 8812 sq cadastral number 39:18:01 00 31:25 HOUSE №13	7905	0.00	7993.55	0.014%	145.76	141.83	0.011	69.48	67.59	0.0110	0.0079
Land area of 9092 sq.m. cadastral number 39:18:01 00 31:34	8156	0.00	8247.53	0.015%	150.39	146.34	0.011	71.69	69.73	0.0114	0.0081

Table 11

Total IZU

Name of passive fixed assets	Distance from Kaliningrad, km-	Bi-length of access roads the way from the station to the complex	B- distance from Kaliningrad and logistics infrastructure ligament (car, train availability/ dvetki, the availability of access to the sea, the Gulf)	- alternative area of land	the actual area of land (%)	– Deviation of land area	– electricity capacity of	the productivity of the local aqueduct tonnes per hour, or boiler, posted on the site of an alternative land	the productivity of local structures placed (LSP)on the territory of an alternative land	fact productivity of local structures placed on the territory of the actual land	deflection characteristics of communication on the comparison and alternative land plot (%)	The population of the settlement of the actual land (0<250<500>...)	K	IZU (%)
Land area of 1000 sq cadastral number 39:18:01 00 31:27 HOUSE №15	14	15	4428	4425	0.07	22	105	98	645	640	8	105000	5.4	4.72
The land area of 12,000 sq.m. cadastral number 39:18:04 00 05: 0004 plot number 18	127	137	40326	40298	1.00	200	956	892	5874	5828	73	956233	49	43
The land area of 13082 square meters cadastral number 39:18:01 00 31:19 station number 7	183	196	57927	57888	1.00	288	1374	1282	8438	8372	105	1373604	71	62
The land area of 14032 square meters cadastral number 39:18:01 00 31:23 plot number 11	196	210	62133	62091	1.00	309	1473	1375	9051	8980	112	1473353	76	66
The land area of 16369 square meters cadastral number 39:18:01 00 31:22 plot number 10	229	246	72482	72432	1.00	360	1719	1604	10558	10476	131	1718737	88	77
The land area of 16614 square meters cadastral number 39:18:01 00 31:28 plot number 16	233	249	73566	73517	1.00	366	1744	1628	10716	10633	133	1744462	90	78
The land area of 18272 square meters cadastral number 39:18:01 00 31:26 plot number 14	256	274	80908	80853	1.0	402	1919	1791	11785	11694	146	1918551	99	86
The land	266	285	84074	84017	1.00	418	1994	1861	12247	12152	152	1993626	103	90

area of 18,987 sq cadastral number 39:18:01 00 31:20 plot number 8														
The land area of 20787 square meters cadastral number 39:18:01 00 31:21 plot number 9	291	312	92044	91982	1.00	457	2183	2037	13408	13304	166	2182625	112	98
The land area of 216,260.0 square meters cadastral number 39:18:00 00 00: 0021 plot number 19	305	327	96455	96389	2.00	479	2287	2135	14050	13941	174	2287205	118	103
The land area of 21,783 sq cadastral number 39:18:01 00 31:15 plot number 3	320	342	101076	101008	2.00	502	2397	2237	14723	14609	183	2396796	123	108
Land area of 2660 sq Kadastr.№ 39:18:08 00 04:75 Sv-in 39-AA №746096 from 15/10/09 Mr.	335	359	105919	105848	2.00	526	2512	2344	15429	15309	191	2511637	129	113
The land area of 276 sq cadastral number 39:18:01 00 31:32 PLOT № 17/3	4	5	1342	1341	0.00	7	32	30	195	194	2	31823	2	1
The land area of 67,710 sq cadastral number 39:18:01 00 31:14 station number 2	1 041	1115	329238	329015	5.00	1636	7807	7287	47958	47586	595	7807141	402	351
Land area of 70 sq.m. under the well №2791 Kadastr.№ 39:18:08 00 12: 0059	557	597	176164	176044	3.00	875	4177	3899	25661	25462	318	4177324	215	188
Land area of 70 sq.m. under the well №2792 Kadastr.№ 39:18:08 00 12: 0060	557	597	176164	176044	3.00	875	4177	3899	25661	25462	318	4177324	215	188
The land area of 72,144 sq	1109	1188	350799	350561	6.00	1743	8318	7764	51099	50703	634	8318393	428	374

cadastral number 39:18:01 00 31:16 plot number 4														
Land area of 7315 sq cadastral number 39:18:01 00 31:17 plot number 5	112	120	35 569	35 545	1.00	177	843	787	5 181	5 141	64	843439	43	38
Land area of 8800 sq cadastral number 39:18:00 00 00:58 UASTOK number 1	135	145	42790	42761	1.00	213	1015	947	6233	6185	77	1014663	52	46
Land area of 8812 sq cadastral number 39:18:01 00 31:25 HOUSE №13	135	145	42848	42819	1.00	213	1016	948	6241	6193	77	1 016047	52	46
Land area of 9092 sq.m. cadastral number 39:18:01 00 31:34	140	150	44 210	44 180	1.00	220	1048	978	6440	6390	80	1048331	54	47

Table 12

The cost of buildings and IZZSU

Name of buildings	Val_roof	K_seismic	Val_(exterior walls standart)	Val_(fill openings standart)	Val_(trim standart)	Clim_standart	V_(standart)	P_standart	h_standart	IZZSU (%)
Complex purification of soybean oil 400 tons / a	1	1	1	1.02	0.88	21%	1344	16532229	22.00	66
Block waste bins 26.9 m2	0.03	0.03	0.03	0.03	0.03	0.01	41.32	508253.70	0.68	77
Post Control 121.9 MT2	0.11	0.11	0.11	0.11	0.09	0.02	144.62	1778984.41	2.37	78
Tower norijnye open 67.9 m2	0.11	0.11	0.11	0.11	0.09	0.02	143.14	1760741.52	2.34	86
Tower norijnye open 62.8 m2	0.14	0.14	0.14	0.14	0.12	0.03	189.30	2328539.35	3.10	90
overland conveyor Gallery (elevator for storage of soybeans)	0.04	0.04	0.04	0.04	0.04	0.01	55.54	683232.65	0.91	98
Overpass ground conveyor (Elevator to store soybeans)	0.01	0.01	0.01	0.01	0.01	0.00	13.96	171695.92	0.23	103
Overland conveyor Gallery (elevator for storage of soybeans)	0.03	0.03	0.03	0.04	0.03	0.01	46.87	576571.47	0.77	108

Overpass ground conveyor (Elevator to store soybeans)	0.01	0.01	0.01	0.01	0.01	0.00	19.55	240419.27	0.32	113
The tower cleaning and weighing 421.5 MT2 closed	0.23	0.23	0.23	0.24	0.20	0.05	309.71	3809723.84	5.07	1
Silos for storage of soybeans (elevator for storage of soybeans)	0.28	0.28	0.28	0.29	0.25	0.06	378.98	4661799.01	6.20	351
Silos for storage of soybeans (grain elevator for storage of soybeans)	0.28	0.28	0.28	0.29	0.25	0.06	378.98	4661799.01	6.20	188
Silos for storage of soybeans (grain elevator for storage of soybeans)	0.28	0.28	0.28	0.29	0.25	0.06	378.98	4661799.01	6.20	188
Silos for storage of soybeans (grain elevator for storage of soybeans)	0.28	0.28	0.28	0.29	0.25	0.06	378.98	4661799.00	6.20	374
Silos for storage of soybeans (elevator for storage of soybeans)	0.28	0.28	0.28	0.29	0.25	0.06	378.98	4661799.01	6.20	38
Overpass conveyor 141.1 m	0.32	0.32	0.32	0.32	0.28	0.07	423.71	5212013.42	6.94	46
Overpass conveyor 265.2 m2	0.01	0.01	0.01	0.01	0.01	0.00	18.93	232853.72	0.31	374
Warm water reservoir V = 1h100m3	0.03	0.03	0.03	0.03	0.02	0.01	34.86	428776.48	0.57	38
Cooling towers 10.10.A extraction housing GRD-350 (on the roof)	0.07	0.07	0.07	0.07	0.06	0.01	90.77	1116554.95	1.49	46
Chilled water tank V = 1h100m3	0.07	0.07	0.07	0.07	0.06	0.01	88.76	1091820.62	1.45	46

Table 14

Optimal period of depreciation for Building and Land

Name of buildings and land	Date of start -up	T_{dep}	Cost of fixed assets	Linear depreciation in accordance to T norm	Deprecitation in accordance to T dep	Period depreciation holidays for straight-line method of depreciation	Deviation of CAPEX if fixed assets will be replace in accordance to optiomal period of depreciation (T dep)
Complex purification of soybean oil 400 tons / a	30.06.2008	30	65175633	2163831	1438029	2	17419248.79
Block waste bins 26.9 m2	31.10.2008	30	897	29.78	19.79	0.00	239.76
Post Control 121.9 MT2	13.11.2008	30	8170	271.23	180.25	0.00	2183.46
Tower norijnye open 67.9 m2	31.10.2008	30	11735	389.62	258.93	0.00	3136.48
Tower norijnye open 62.8 m2	31.10.2008	30	12588	417.91	277.73	0.00	3364.25
Land area of 1000 sq cadastral number 39:18:01 00 31:27 HOUSE №15	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 12,000 sq.m. cadastral number 39:18:04 00 05: 0004 plot number 18	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 13082 square meters cadastral number 39:18:01 00 31:19 station number 7	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 14032 square meters cadastral number 39:18:01 00 31:23 plot number 11	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 16369 square meters cadastral number 39:18:01 00 31:22 plot number 10	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 16614 square meters cadastral number 39:18:01 00 31:28 plot number 16	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 18272 square meters cadastral number 39:18:01 00 31:26 plot number 14	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 18,987 sq cadastral number 39:18:01 00 31:20 plot number 8	31.10.2008	30	18378387	610162.44	405498.98	0.57	4911923.05
The land area of 20787 square meters cadastral number 39:18:01 00 31:21 plot number 9	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28
The land area of 276 sq cadastral number 39:18:01 00 31:32 PLOT № 17/3	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28
Land area of 3222 sq Kadastr.№ 39:18:08 00 04:84 Sv-in 39-AA №746097 from 15/10 / 09g.	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28
The land area of 42740 square meters cadastral number 39:18:01 00 31:18 №6 LAND	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28
The land area of 67434 sq.m. cadastral number 39:18:00 00 00: 0030 plot number 17	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28
The land area of 67,710 sq cadastral number 39:18:01 00 31:14 station number 2	30.11.2008	30	14281694	474152.25	315109.95	0.44	3817015.28

Land area of 70 sq.m. under the well №2791 Kadastr.№ 39:18:08 00 12: 0059	31.10.2008	30	20547518	682177.60	453358.49	0.63	5491658.65
Land area of 70 sq.m. under the well №2792 Kadastr.№ 39:18:08 00 12: 0060	30.11.2008	30	917988	30477.20	20254.40	0.03	245347.25
The land area of 72,144 sq cadastral number 39:18:01 00 31:16 plot number 4	30.11.2008	30	1690382	56120.68	37296.42	0.05	451782.05
Land area of 7315 sq cadastral number 39:18:01 00 31:17 plot number 5	30.11.2008	30	4401837	146140.98	97121.71	0.14	1176462.56
Land area of 8094 sq cad. №39: 18: 080004: 92 of 39 St-AA №818853 from 07.06.2010	30.11.2008	30	4304326	142903.62	94970.24	0.13	1150401.14
Land area of 8800 sq cadastral number 39:18:00 00 00:58 UASTOK number 1	31.12.2008	30	1407483	46728.44	31054.57	0.04	376172.78
Land area of 8812 sq cadastral number 39:18:01 00 31:25 HOUSE №13	31.12.2008	30	13090213	434595.06	288821.21	0.40	3498572.42
Land area of 9092 sq.m. cadastral number 39:18:01 00 31:34	30.11.2008	30	19044300	632270.74	420191.62	0.59	5089899.05
Land area of 1000 sq cadastral number 39:18:01 00 31:27 HOUSE №15	31.12.2008	30	11208959	372137.45	247313.42	0.34	2995776.88
The land area of 12,000 sq.m. cadastral number 39:18:04 00 05: 0004 plot number 18	31.12.2008	30	18990878	630497.16	419012.93	0.58	5075621.35
The land area of 13082 square meters cadastral number 39:18:01 00 31:19 station number 7	30.06.2008	30	8276063	274765.29	182602.27	0.25	2211912.53
The land area of 14032 square meters cadastral number 39:18:01 00 31:23 plot number 11	30.06.2008	30	978023	32470.37	21579.01	0.03	261392.63
The land area of 16369 square meters cadastral number 39:18:01 00 31:22 plot number 10	30.06.2008	30	555114	18429.79	12247.98	0.02	148363.28
The land area of 16614 square meters cadastral number 39:18:01 00 31:28 plot number 16	30.06.2008	30	589232	19562.50	13000.76	0.02	157481.81
The land area of 18272 square meters cadastral number 39:18:01 00 31:26 plot number 14	30.06.2008	30	582944	19353.74	12862.02	0.02	155801.26
The land area of 18,987 sq cadastral number 39:18:01 00 31:20 plot number 8	30.06.2008	30	582944	19353.74	12862.02	0.02	155801.26
The land area of 20787 square meters cadastral number 39:18:01 00 31:21 plot number 9	30.06.2008	30	956331	31750.20	21100.41	0.03	255595.15
The land area of 276 sq cadastral number 39:18:01 00 31:32 PLOT № 17/3	30.06.2008	30	862586	28637.86	19032.02	0.03	230540.22
Land area of 3222 sq Kadastr.№ 39:18:08 00 04:84 Sv-in 39-AA	30.06.2008	30	1697435	56354.84	37452.04	0.05	453667.12

№746097 from 15/10 / 09g.							
The land area of 42740 square meters cadastral number 39:18:01 00 31:18 №6 LAND	30.06.2008	30	1757183	58338.47	38770.31	0.05	469635.68
The land area of 67434 sq.m. cadastral number 39:18:00 00 00: 0030 plot number 17	31.07.2008	30	9797598	325280.25	216173.27	0.30	2618567.50
The land area of 67,710 sq cadastral number 39:18:01 00 31:14 station number 2	31.07.2008	30	2184174	72514.56	48191.40	0.07	583755.95
Land area of 70 sq.m. under the well №2791 Kadastr.№ 39:18:08 00 12: 0059	31.07.2008	30	1935940	64273.20	42714.39	0.06	517411.44
Land area of 70 sq.m. under the well №2792 Kadastr.№ 39:18:08 00 12: 0060	31.03.2009	30	79369703	2635074.13	1751205.59	2.44	21212845.05
The land area of 72,144 sq cadastral number 39:18:01 00 31:16 plot number 4	30.11.2008	30	631234	20956.97	13927.49	0.02	168707.61
Land area of 7315 sq cadastral number 39:18:01 00 31:17 plot number 5	30.11.2008	30	36712	1218.85	810.02	0.00	9812.01
Land area of 8094 sq cad. №39: 18: 080004: 92 of 39 St-AA №818853 from 07.06.2010	30.11.2008	30	1433951	47607.16	31638.55	0.04	383246.67
Land area of 8800 sq cadastral number 39:18:00 00 00:58 UASTOK number 1	30.11.2008	30	419591	13930.42	9257.82	0.01	112142.55
Land area of 8812 sq cadastral number 39:18:01 00 31:25 HOUSE №13	30.11.2008	30	404485	13428.91	8924.53	0.01	108105.29
Land area of 9092 sq.m. cadastral number 39:18:01 00 31:34	30.11.2008	30	3543627	117648.40	78186.24	0.11	947091.87
Land area of 1000 sq cadastral number 39:18:01 00 31:27 HOUSE №15	30.04.2009	30	1333705	44279.00	29426.74	0.04	356454.32
The land area of 12,000 sq.m. cadastral number 39:18:04 00 05: 0004 plot number 18	31.12.2008	30	42150	1399.38	929.99	0.00	11265.27
The land area of 13082 square meters cadastral number 39:18:01 00 31:19 station number 7	31.10.2008	30	99308691	3297048.53	2191137.52	3.05	26541864.13

Appendix E

Table 15

Methodological of depreciation in differently types of obsolescence

	Cost of fixed assets with influence of obsolescence of the 1st type – analog fixed assets, mio USD	Cost of fixed assets with influence of obsolescence of the 2nd type – alternative fixed assets, mio USD	Deviation of differently types of obsolescence, %
Active assets (transport vehicles)	528074	505402	-9.52
Passive assets (land)	132494	139827	5.24
Passive assets (buildings)	168454	171420	1.73

Table 16

Income Statement

Indicatives	Unit	Value per year
Revenue	Thousand USD	632761
Increasing revenue due to changing in depreciation policy	%	6.3
COGS	Thousand USD	548397
Fixed cost (repair of fixed assets)	Thousand USD	18753
Decreasing fixed cost due to changing in depreciation policy	%	1.8
EBITDA	Thousand USD	37342
EBITDA margin	%	28.8
Depreciation	Thousand USD	16325
Increasing/decreasing depreciation	%	3
Capital expenditures (CAPEX)	%	35
Net income	Thousand USD	34303
NET WORKING CAPITAL	Thousand USD	88586
CHANGING NWC	Thousand USD	14072
NONDEBT CASH FLOW	Thousand USD	36521
Discount rate	%	13.60
Term of discount	Year	0.5
Discount cash flow	Thousand USD	34266
Total amount of cash flow	Thousand USD	544871
Terminal Value	Thousand USD	33785
Present Value	Thousand USD	10530
Enterprise Value	Thousand USD	555402

Table 17

Competitive level of Sodrugestvo S.A.

Company	Archer-Daniels-Midland	Bunge	Viterra	Sodrugestvo SA	Sodrugestvo SA (changing due to new depreciation policy)
as of	30.06.2014	30.06.2014	30.06.2014	In accordance normative depreciation rate	In accordance proposed depreciation rate
Country	USA	USA	Canada	Russia	Russia
Market capitalisation, $ mio	32108	11884	n/a	n/a	n/a
P/E ratio	19	45	-	n/a	n/a
Revenue, $ mio	87726	61330	8636	1455	92
EBITDA, $ mio	3370	1706	269	117	73
Net profit, $ mio	1650	265	31	61	54
EV/EBITDA	10	12	-	7	2
EBITDA margin (%)	4	3	3	20	8.8
EV, $ mio.	35 230	21 044	n/a	510	555