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MANAGEMENT OF CAUSE-AND-EFFECT RELATIONSHIPS OF INVESTMENT EFFICIENCY IN THE TRADING BUSINESS OF UKRAINE

JEL classification: C15

Abstract

At the operating stage of the investment cycle problems of evaluation of capital investments efficiency do not rise. At the same time, the development of the concepts of corporate management provides the ability to apply them in the performance management by approach of companies-objects of capital investments.

During the research were used the methods: Statistical Simulation Methods, correlation-regression analysis, the system of lump-sum equations, direct functional relationships.

The attempt to justify the management of efficiency system of capital investments from the position of the object of capital investments for the operational phase of the investment cycle was made. The technique of constructing a model of cause-and-effect relationship of efficiency system of capital investments was proposed, its strengths and weaknesses was identified. The number of indicators of capital investments and exogenous factors can be greatly expanded.

Keywords: efficiency, investments of capital, cause-and-effect relationships.

1. INTRODUCTION

In the transitional economy of Ukraine is given significant attention to the promotion of investment activity of enterprises and individuals (Верховна Рада України, 1991). Under these conditions, management of current and long-term effectiveness of real and financial investments is highly relevant.

In the world of economic science and practice some calculations of capital investment efficiency are carried out mainly in the pre-investment and investment stages of the investment cycle (Беренс, В., Хавранек, П., 1995, Бланк, И.А., 1995, Бондар, М.І., 2008, Бромвич, М., 1996, Бушанский, С.П., 2003, Крупка, Я.Д., 2001, Липчанська. О.В., 2008). For this purpose evaluation of investment projects efficiency, of investment attractiveness, of the probability of bankruptcy, of creditworthiness, of market value of companies and their securities, of analytical financial ratios, etc. are using.

From the moment of the capital investment and throughout the life cycle of enterprises as objects of capital investments investors are not insured against loss of invested funds since performance indicators in such techniques are calculated on the basis of historical data, financial reporting and do not allow to forecast the effectiveness of capital investments for the full business-cycle life of objects of capital investments in the long term.

At the operating and liquidating stages of the investment cycle problems evaluation of capital investments efficiency do not rise. At the operating stage we are talking about the effectiveness of the company or enterprise management, at the liquidating stage – about the division of property between the parties concerned.

At the same time, the development of the concepts of corporate management provides the ability to apply them in the performance management by approach of companies-objects of capital investment (Мескон, М.Х., Альберт, М., Хедоури, Ф., 1992, Петров, М.А., 2004).

The aim of the research is to validate the feasibility of the performance management of capital investments on the operating stage of the investment cycle by approach of companies-objects of capital investment is based on a model of cause-effect relationships of performance indicators.

1.1. Model and Data

This approach was chosen by the author in 1997 with the completion of the candidate's thesis on "Accounting and analysis of costs, revenues and financial performance of trade enterprises." After solving the problems in the thesis the author has expanded the object of study in their further research.

Thus, if the activities of the company described in the accounting such financial and economic categories as costs, revenues and financial results and a

result of their analysis are defined profitability, then a more extensive than a combination of three basic concepts that reflect the most important aspects of a business are the investments in the object and more broader concept than a profitability is the term "efficiency" (Fig. 1).

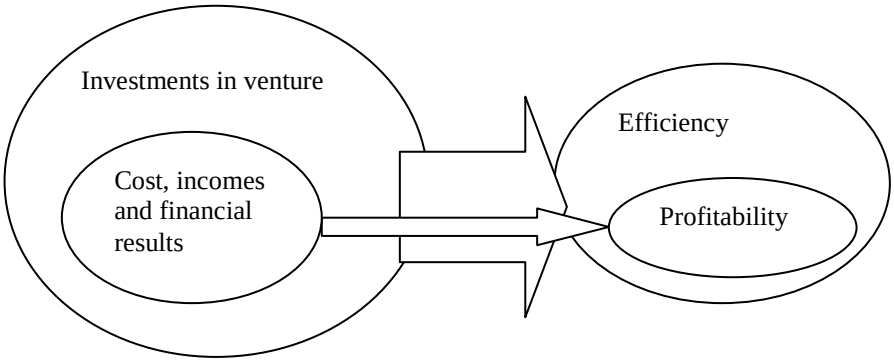

Figure 1 Justification of the choice of the object of research

According to the law of Ukraine "On investment activity" investment activity is defined as a aggregate of actions of citizens, legal persons and the state of the disposal of investments. In accounting, the concept of investment activity is used in relation to capital investments in the capital assets and financial assets of other business entities, but as a result of capital investments by investors of the company have been changing the monetary value of the company's capital.

The problems of evaluating the effectiveness of investments have been investigating mainly in investment management. In the investment management for a determine of investments as a dynamic process uses the term "investment cycle (process)." Most of sourses on the investment management listed in the investment cycle only the life cycle stages of the investment project, which culminates of his realization. But, the stages of the life cycle of enterprise-investment object is also advisable to include to the stages of the investment cycle.

In the process of implementation of the investment project the investments go into the sphere of business, which provides investors with economic benefits. Therefore we need to track farther the movement of investment in the business, where the objects of the investment activity of the investor are converted into objects of economic activity of the enterprise (in particular, into the assets of the company) and the investor as the subject of an investment activity are entered into legal relations with the subject of property business (equity of company) (Fig. 2).

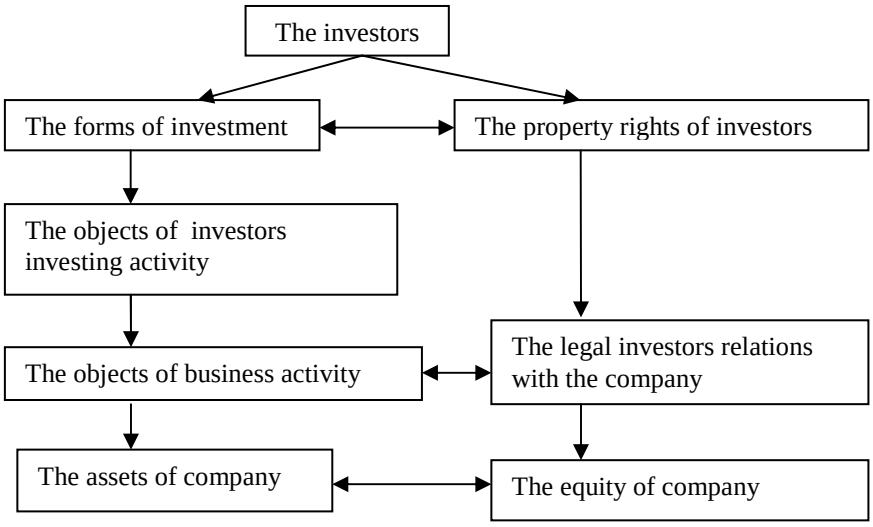

Figure 2 The transformation of investments by investors into the objects of enterprise accounting

According to the Commercial Code of Ukraine companies-objects of capital investments are generated by the decision of the owner (s) of the property or authorized by him (them) of the body, as well as by the decision of other agencies, organizations and individuals through the establishment of a new, through the reorganization (merger, acquisition, isolation, separation, transformation,) existing enterprise (s). The termination of a business entity have been happening through its reorganization (merger, accession, division, transformation) or its liquidation.

Thus, the life cycle of the investments from the point of view of investors includes stages that are recorded in the accounting of company-object of capital investment, namely: 1) the transformation of investment activity objects of investors into the business activity objects and the entry of investors into the legal relations with the company, 2) the change in the transmitted business activity objects and in the property rights of investors to the objects, 3) an exception of investment activity objects of investors from asset of company and a termination investor property relations with the company (Fig. 3).

Thus, the investment cycle should include the following stages: pre-investment, investment, operational and liquidation. On investment, operational and liquidation stages the problem of assessing the effectiveness of capital investments is the object of study as part of the passport of a scientific specialty 08.00.09 "Accounting and Audit", however by this approach on these stages of the investment process, it has not been investigated.

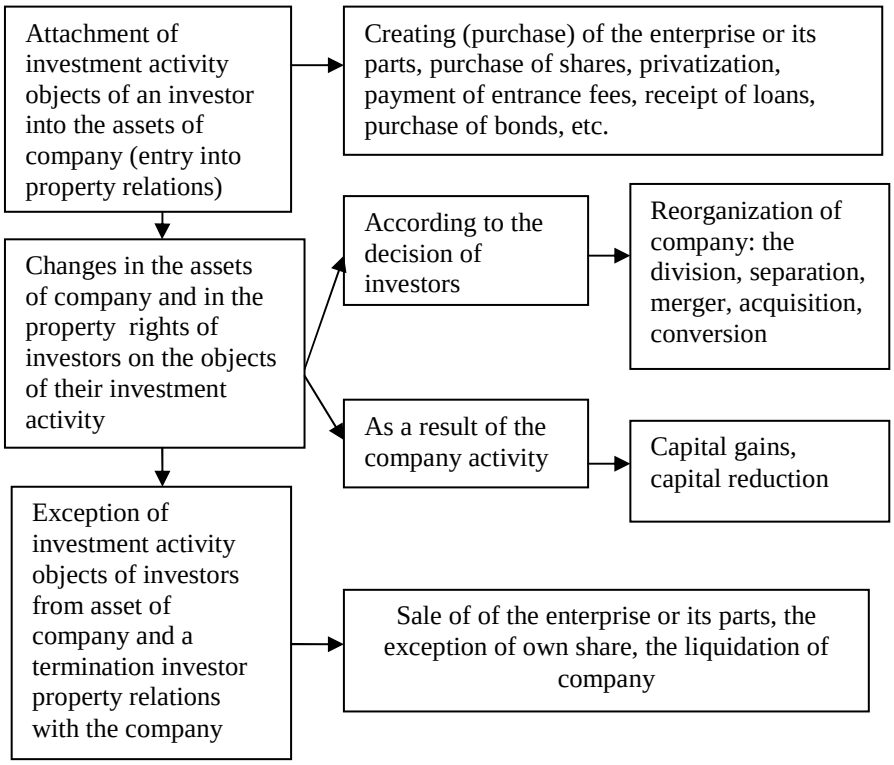

Figure 3 The stages of the life cycle of real investments from the point of view of investors

At the pre-investment stage of the investment process to evaluate the effectiveness of capital investments, mostly used methods for assessing the effectiveness of investment projects and of stock market instruments. At the operating stage of the investment process for these purposes are using the different approaches to evaluating the effectiveness of the enterprise. They can be classified as economic approaches, financial approaches, accounting approaches. In particular, there are using a different approaches to determining the value of the enterprise, its competitiveness and attractiveness, the probability of bankruptcy, creditworthiness, profitability, market share price, financial stability, business activity, liquidity and solvency, efficiency, productivity, clients satisfaction index and personnel satisfaction index, etc.

The effectiveness of capital investments may be determined by one index or by scorecard system that depends on the approach to the definition of the term "efficiency". The author investigated this concept in previous work (Деньга, С.М., 2012) and determined that from the point of view of investors, the effectiveness of capital investments into the company should be understood as the degree of satisfaction of the interests of investors, to the restrictions in the form of

a system of indicators that characterize the degree of satisfaction of the interests of key stakeholder groups of company in a time perspectives. From the point of view of enterprise management, the effectiveness of capital investments into it should be understood an achieving of interests balance of key stakeholder groups in a time perspectives. The author's definition of efficiency of capital investments was based on the concept of stakeholders, which found widespread in corporate management (Петров, М.А., 2004) and synthesized by other approaches that are used to evaluate of efficiency of enterprise management (Мескон, М.Х., Альберт, М., Хедоури, Ф., 1992).

Thus, the effectiveness of capital investments into the company can be determined by using a methodology for assessing the effectiveness of real investment projects in the case of real investments and of stock market instruments in the event of long-term financial investments, as well by using of indicators of the efficiency of enterprises activity, in which was invested, and by using of indicators of the efficiency of enterprise management.

The next scientific concept that influenced on the course of the study, was the theory of evolution, which originated as a biological theory, but over time has been introduced into the sociological and economic sciences. By this concept in economic theory examines genetic model of economic systems. The author have been offering an information representation of genetic model of microeconomic system, which is designed to manage the development of micro-economic system, and is described by the financial and economic indicators (Деньга, С.М., 2008). The proposed model was tested on the statistic indicators of the trading business of Ukraine. In the absence of most of the indicators this experiment looks very modest, but at the same time proves the feasibility of the using of the developed model for performance management of investments into company, into branches and into the economy, not only at the micro level, but also at the region, state or international business.

The performance management problems were researched also by developing of custom software for performance management (information systems BPM/CPM). The composition of these systems include the modules of multidimensional business analysis, of strategic analysis, of budgeting, of balanced score card (BSC), of project analysis and of others that track performance indicators. The proposed methodology for managing cause-and-effect relationships of scorecards of capital investments efficiency in the composition of BPM / CPM-system will contribute to the achievement of targets on the operational, on the tactical and on the strategic levels of management.

For the purpose of modeling causality model indicators are grouped as follows: exogenous factors, capital investments, income and the effects produced, performance (can be grouped by time prospects and investor groups) (Fig.4).

Groups of model indicators are interrelated, in particular, the indicators of the external potential and external factors influence on the indicators of investment capital and the indicators of revenues and effects, and the indicators of

capital investments, for its part, also influence on the indicators of revenues and effects. The effect of these factors can only be measured using statistical methods. In turn, the indicators of investment capital and the indicators of revenues and effects influence on performance indicators. The last relationship can be described by a direct functional linkages.

To build the model in chronological aspect were collected statistics data for the years 1996-2011 in three groups of indicators [2,3,4,14].

In particular, the data about the external factors (xi) were covered: the volume measures of GDP at current prices (x1), the population of Ukraine (x2), population incomes (x3), the consumer price index (x4), the average official exchange rate of the national currency to the U.S. dollar (x5), the NBU discount rate (x6), the average rate for loans (x7), the Human Development Index (x8), the index of economic freedom (x9) and its components (x10-x16).

Data about capital investments (ki) were presented: total capital (k1), own capital (k2), a non-current capital (k3), fixed assets (k4), current assets (k5), the annual average number of employees (k6), the number of retail traders (k7), their trade area (k8), the volume of investment in fixed assets (k9).

The data about the income and the effects (ei) were covered the revenue of retail trade (e1), the financial result from ordinary activities before tax (e2).

In the first phase of construction of a model the sequence of determination of mathematical functions was chosen the following: 1) there were calculated correlation coefficients between the indicators, 2) on the factors that have a correlation coefficient above 0.7, were built the regression models, 3) the accuracy of the model was checked by Fischer test, 4) the accuracy of the coefficients of the model were tested by Student's t-test, 5) if the function was being tested on the above criteria, it was chosen for the system of equations, 6) if the function was not validated by the criterias of Fisher and Student's, was found another models.

If the function is not validated by the criterias of Fisher and Student's, then it is likely that it is non-linear. In this case it is advisable to choose the non-linear equation using analytical package «Statistika» or build a nonlinear equation of the two factors in Excel.

In the second phase of construction of a model we can build a direct functional relationship of performance, obtained effects and capital investments indicators.

In the third phase can build the system of lump-sum equations (1), which covers the stochastic dependences of capital investments and exogenous factors, stochastic dependences of the effects, capital investments and exogenous factors and direct functional dependences of the performance, the effects and capital investments.

$$K_1 = -502190 - 0{,}98*x_1 + 1{,}4*x_3 + 34857*x_5 + 7501* x_{12}$$

$K_2 = -105737 – 0,1*x_1 + 0,1*x_3 + 701*x_5 + 1931* x_{12}$
$K_3 = -100627 – 0,1*x_1 + 0,2*x_3 + 4560*x_5 + 1616* x_{12}$
$K_4 = -5052 + 0,02*x_1 + 0,1*x_3 + 1811*x_5 + 56* x_{12}$
$K_5 = -410773 - x_1 + 1,4*x_3 + 24226*x_5 + 6413* x_{12}$
$K_6 = 578,3 - 28*x_5 + 0,7* x_{12}$
$K_7 = - 394 + 10*x_2 + 0,14*x_6 + 0,14*x_7 – 0,14*x_{10} - 0,01*x_{13}$
$K_8 = 3171 + 37,8*x_4 + 101,7*x_6 – 84,6*x_7 + 12*x_{16}$
$K_9 = -14678 + 0,1*x_1 – 0,08*x_3 – 222,4*x_5 + 154* x_{12}$
$E_1 = -45345,3 + 0,5*x_1 - 0,22*x_3 – 5017,5*x_5 - 38*x_{12} + 0,002*к_1 - -0,47*к_2 + 0,23*к_3 - 0,11*к_4 + 0,05*к_5 + 66*к_6 - 2,26*к_9$
$E_2 = E_1 - B$
$Y_1 = e_1/k_1$
$Y_2 = e_1/k_2$
$Y_3 = e_1/k_3$ (1)
$Y_4 = e_1/k_4$
$Y_5 = e_1/k_5$
$Y_6 = e_1/k_6$
$Y_7 = e_1/k_7*1000$
$Y_8 = e_1/k_8*1000$
$Y_9 = e_1/k_9$
$Y_{10} = (e_2/k_1)*100$
$Y_{11} = (e_2/k_2)*100$
$Y_{12} = (e_2/k_3)*100$
$Y_{13} = (e_2/k_4)*100$
$Y_{14} = (e_2/k_5)*100$
$Y_{15} = e_2/k_6$
$Y_{16} = e_2/k_7$
$Y_{17} = (e_2/k_8*)1000$
$Y_{18} = (e_2/k_9)*100$

where:

X1 - the physical volume of GDP at current prices;

X2 – the numbers of the population of Ukraine;

X3 - incomes of population of Ukraine;

X5 - the average official exchange rate of the national currency to the U.S. dollar;

X6 - the NBU discount rate at the end of the year;

X7 - the average percentage of loans;

X10 - index of business freedom;

X12 – index of tax freedom;

X13 – index of investments freedom;

X16 - the index of freedom from corruption;

K1 - total capital volume of trade enterprises of Ukraine;

K2 – own capital volume of trade enterprises of Ukraine;

K3 – the non-current assets of trade enterprises of Ukraine;

K4 - the fixed assets of trade enterprises of Ukraine;
K5 – the current assets of trade enterprises of Ukraine;
K6 - the annual average number of employees of trade companies of Ukraine;
K7 - the number of retail traders of Ukraine;
K8 - trading area of retail trade enterprises of Ukraine;
K9 - fixed investment of trade business of Ukraine;
B - expenses of ordinary activity of trade business of Ukraine;
E1 - retail trade turnover of trade enterprises of Ukraine;
E2 - the financial result from ordinary activity before taxation;
Y1 - returns on total capital of trade business of Ukraine;
Y2 - returns on own capital of trade business of Ukraine;
Y3 - the return on non-current assets of trade business of Ukraine;
Y4 - the return of fixed assets of trade business of Ukraine;
Y5 – the return on current assets of trade business of Ukraine;
Y6 - labor productivity in the trade of Ukraine;
Y7 - trade turnover per one trade company of Ukraine;
Y8 - turnover per 1 sq. m of retail area of Ukraine;
Y9 - return on fixed investment of trade business of Ukraine;
Y10 - profitability of total capital of trade business of Ukraine;
Y11 - profitability of own capital of trade business of Ukraine;
Y12 - profitability of non-current assets of trade business of Ukraine;
Y13 - profitability of fixed assets of trade business of Ukraine;
Y14 - profitability of current assets of trade business of Ukraine;
Y15 – the profit per one employee of trade of Ukraine;
Y16 – the profit per one retail trader of Ukraine;
Y17 - the profit per 1 square meter of trading area of retail trade enterprises of Ukraine;
Y18 - profitability of fixed investment of trade business of Ukraine.

At the last stage of model building, we are able to predict the performance indicators which are dependent on exogenous factors, capital investments and obtained effects. It is advisable to build an optimistic, pessimistic and realistic forecasts, using the method of factor analysis, which called "if ... then ..." (Tables 1 to 4).

Table 1

Projections about external factors which influence on the effectiveness of capital investments into the trading business of Ukraine for 2013

Indicators	Forecasts:		
	optimistic	pessimistic	realistic
The physical volume of GDP at current prices, mln.grn (x1)	1400000	1200000	1350000
The numbers of the population of Ukraine, million people (x2)	46	44	45
Incomes of the population of Ukraine, mln. grn (x3)	1500000	1000000	1300000
Indices of consumer prices for all goods to the previous year,% (x4)	110	120	115
Average official exchange rate of hryvnia to U.S. $ 1, set by the NBU (x5)	7,5	10	8
Discount rate at end of period,% (x6)	7	9	8
Interest rates on loans,% (x7)	10	20	12
The index of human development (HDI) (x8)	0,735	0,7	0,73
The index of economic freedom (x9)	50	40	46
The index of business freedom (x10)	50	40	48
The index of free trade (x11)	50	45	48
The index of fiscal freedom (x12)	80	70	78
Freedom of investments (x13)	30	20	25
Financial freedom (x14)	40	30	35
Protection of property rights (x15)	50	20	30
Freedom from corruption (x16)	25	20	23

Source: Calculated on the basis of the Державна Служба Статистики України, 2013, Держкомстат України, 2010 using a system of equations (1)

Table 2

Projections about capital investments in the trade business of Ukraine for the year 2013

Indicators	Forecasts:		
	optimistic	pessimistic	realistic

The total capital of trade enterprises at the end of the year, mln. grn. (k1)	1087318	595450	858744
Own capital volume of trade enterprises at the end of the year, mln. grn.(k2)	275475	227917	256963
The non-current assets at the end of the year, mln. grn. (k3)	252853	158093	212901
Fixed assets at the end of the year, mln. grn. (k4)	191011	140978	170804
Current assets at the end of the year, mln. grn. (k5)	983962	480397	753249
Average annual number of employees in thousands person (k6)	424	347	409
The number of retail traders of Ukraine at the end of the year, thousand units (k7)	61	44	51
Trading area, square meters (k8)	7502	7176	7599
Fixed investment at current prices, mln. grn. (k9)	15974	33878	26555

Source: Calculated on the basis of the Державна Служба Статистики України, 2013, Держкомстат України, 2010 using a system of equations (1)

Table 3

Projections about incomes of trading business of Ukraine for 2013

Forecasts/ Indicators	The volume of retail sales in current prices, mln. grn (e1)	The financial result from ordinary activity before tax, mln.grn (e2)
optimistic	251459,6	25146,0
pessimistic	180702,0	18070,2
realistic	231939,7	23194,0

Source: Calculated on the basis of the Державна Служба Статистики України, 2013, Держкомстат України, 2010 using a system of equations (1)

Table 4

Projections about performance indicators of trading business of Ukraine for 2013

Indicators	Forecasts:

	optimistic	pessimistic	realistic
Returns on total capital of trade business of Ukraine, grn. (y1)	0,2	0,3	0,3
Returns on own capital of trade business of Ukraine, grn. (y2)	0,9	0,8	0,9
The return on non-current assets, grn. (y3)	1	1,1	1,1
Return on fixed assets ,grn. (y4)	1,3	1,3	1,4
Return on current assets , grn. (y5)	0,3	0,4	0,3
Labor productivity, thousand UAH. (y6)	592,6	520,3	567,2
Trade turnover per one enterprise, thousand UAH. (y7)	4150,9	4120	4516,8
Trade turnover per 1 sq. m of retail area, thousand UAH. (y8)	33,5	25,2	30,5
Return on fixed investment, grn (y9)	15,7	5,3	8,7
Profitability of total capital,% (y10)	2,3	3	2,7
Profitability of equity capital,% (y11)	9,1	7,9	9
Profitability of non-current assets,% (y12)	9,9	11,4	10,9
Profitability of fixed assets,% (y13)	13,2	12,8	13,6
Profitability of current assets,% (y14)	2,6	3,8	3,1
Profit per one employee, th. (y15)	59,3	52	56,7
Profits per one retail trader, thousand UAH. (y16)	415,1	412	451,7
Profit per 1square meter of trading area, grn (y17)	3351,7	2518	3052,1
Profitability of fixed investment,% (y18)	157,4	53,3	87,3

Source: Calculated on the basis of the Державна Служба Статистики України, 2013, Держкомстат України, 2010 using a system of equations (1)

According to the results of the correlation-regression analysis we can see the following conclusions.

Total capital, own capital and non-current capital of trade business, the sum of the fixed assets and of the current assets, as well as the annual average number of employees in the trading business of Ukraine and fixed investments during the years 1996-2011 grew in direct proportion to the volume of GDP, to

incomes of population of Ukraine, to the average the official exchange rate of the hryvnia to the U.S. dollar and to the tax freedom index and inversely proportional to the number of population of Ukraine, to the interest rate on banks loans, to the NBU discount rate and contrary to decrease of the indices of business freedom, of trade freedom and freedom of investments. The dependence of these indicators of capital investments and other exogenous factors was weak.

The presence of retail traders of Ukraine decreased in inverse proportion to the growth of GDP volume, to the growth of incomes of population of Ukraine, of the average official exchange rate of the hryvnia to the U.S. dollar, to changes of economic freedom index, to the growth of tax freedom index. Direct dependence of the amount of retail traders in Ukraine in 1996-2011 years have to seen to the number of population, to indexes of business freedom, of trade freedom and of freedom of investment. With other exogenous factors this indicator was dependent slightly.

Trade area for years 1996-2011 was reduced to 2004, and then began to grow. This indicator showed strong direct dependence with the NBU discount rate and the index of freedom from corruption. Feedback dependence of retail area is set to the index of economic freedom.

The volume of retail trade turnover of Ukraine in 1996-2011 years growing up in close dependence to the volume of GDP, of incomes of population of Ukraine, of the average official exchange rate of the hryvnia to the U.S. dollar, as well as total capital, own capital, non-current assets of trade enterprises of Ukraine, of their fixed assets, of current assets and of fixed investments. The inverse relationship of this parameter is observed during this period with the number of population of Ukraine, with the indexes of business freedom, of trade freedom, of investment freedom, with the amount of retail traders.

In general, we can note the positive trends in the trade sector of the economy: 1) the growth of capital investments and of trade turnover with the growth of GDP and of incomes of population, 2) a direct dependence of capital investments and obtained effects with inflation index, 3) increase of the obtained effects with an increase of capital investments, 4) agglomeration of the trade network.

So, the inverse relationship of capital investments and of the effects of the trade with indices of freedom of investment, of trade freedom and business freedom can not be described positively. This situation is caused by incorrect calculations of these indexes, or the excess of influence of mental factors compared with the economic laws for the process of investing capital in the trading business of Ukraine and entrepreneurship.

The tendencies of stochastic dependence of the investment capital and of the obtained effects undoubtedly manifested in indicators of efficiency. There are some distortions in the understanding of the optimistic and pessimistic forecasts from the point of view of trends in the external environment and trading business

in Ukraine. In particular, the pessimistic forecast of total capital return (0.3 grn.) was better than the optimistic (0.2 grn.), and the same with respect to the turnover on UAH 1 capital. This indicates a decrease of the total capital return of trading companies (more rapid growth of capital investment as compared to the effects obtained from them), with the progressive development of the external environment factors. The same is observed for the non-current assets returns, for fixed assets and current assets returns, and profitability of total capital, of non-current capital, of fixed assets, of current assets, and for the profit per one enterprise. Other trends of performance indicators consistent with the general trends in the development of Ukraine's economy.

2. CONCLUSIONS

Thus, performance management of capital investments in the business at the operational stage of the investment cycle can be carried out by modeling the cause-effect relationships of the system performance indicators and system of exogenous factors, of indicators of capital investments and of the obtained effects. The model can be built on the system of lump-sum equations, which are calculated by the stochastic and functional links between the above indicators. The system performance indicators can be significantly expanded and built in the context of capital investors (stakeholders) and time horizons (short-, medium-and long-term). The number of indicators of capital investments and exogenous factors, too, can be greatly expanded. The system of equations can also include the functional relationship between the planned indicators. Performance management of capital investments in the business from the perspective of the object of capital investments allows to predict, to monitor, and to analyze of the performance indicators system (as opposed to one or more integrated indicators) over the full life cycle of the enterprise-object of capital investments. To some extent, forward-looking indicators of efficiency can be manipulated by changing the parameters of capital investments (dependend management indicators).

The disadvantages of the approach are: 1) the proposed method of construction of the model can be applied only in the context of stable development of the economy, else stochastic communication parameters may not be set, 2) technique requires a large sample of statistical information, 3) it is sometimes difficult to establish the factors that actually have impact on the performance, that is, made calculations may not lead to the identification of mathematical functions.

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