

# “Lending as motivation for innovative activity of a modern enterprise”

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## LENDING AS MOTIVATION FOR INNOVATIVE ACTIVITY OF A MODERN ENTERPRISE

### Abstract

The most important motivating factor for enhancing innovation activity is lending as a stimulus for the development of a modern enterprise. The motivation of the Ukrainian enterprise, based on the need for innovative activity lending in ensuring the efficiency of its economic activity, was explored. The authors use different methods of research, for example, analysis and synthesis methods, method of scientific substantiation and comparison of the main indicators of the activity of the investigated enterprise, as well as correlation and regression analysis method. Here is also used the method of correlation and regression analysis to determine the effect of changes in the average annual cost of fixed assets and investments in their modernization on the motivation to increase revenue from the sale of products (goods, products, services), as well as to characterize the functional relationship between income from the sales of products and capital, expenses, investments. The results of the study indicate a close relationship between the indicators, thus there is a high dependence on the increase of the volume of income from the sale of products due to the need to attract financing in the form of lending to innovative products of the investigated enterprise.

Lending of innovative activity contributes to the increase of sales volumes and the emergence of its new products, and also serves as a form of strengthening the motivation of enterprise development. As a result of the research, the theoretical principles of using Ukrainian enterprise motivational space with lending involvement for the introduction of innovations have been substantiated.

### Keywords

financing, loan security, motivational space, innovation,  
production activity, enterprise

### JEL Classification

O31, G21, G32

## INTRODUCTION

The main factors holding back the development of the lending system are the lack of economic interest in the implementation of investment projects and the inability to mobilize a sufficient amount of long-term financial resources at acceptable interest rates. The current state of investment support for innovations is generally unsatisfactory, so there is a problem of financing innovative activity in the form of lending.

Innovative activity development at enterprises enables not only to change the nature of production activity, but also to provide it with new content and value. Innovation activity is aimed at creating innovations, moving to a rational organizational and technological structure of production and ensuring the competitiveness of products on the markets. This circumstance requires not only a reasonable choice of innovations, but also an effective financial and credit support for innovation activity of enterprises.

For a stable functioning of the production process, domestic enterprises should have certain stocks of material and financial resources. A natural phenomenon for Ukrainian enterprises is the formation of resources, first of all, at the expense of their own sources, however, due to various circumstances, both general and specific for each production enterprise, the need for additional financial resources can suddenly and rapidly increase, which also determines the need for obtaining loan. Therefore, the lending process issues as forms of stimulation of innovation activity of enterprises remain controversial.

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## 1. LITERATURE REVIEW

For effective development and functioning in a competitive environment, the company faces the need to introduce innovations that are directly related to financing, first of all, there are own financial resources of enterprises, but the issues of increasing the share of lending in financing the innovative activity of Ukrainian enterprises are relevant.

Botvina (2016) fairly notes that in practice, the lending of enterprises by domestic banks has not yet become widespread. This is due to many reasons, among which the most significant is the financial condition of the borrower and his ability to secure a loan repayment. Therefore, there is a need to search for new segments for lending investment and innovation development of enterprises.

First of all, there are own financial resources of enterprises, but the issues of increasing the share of lending in financing the innovative activity of Ukrainian enterprises are relevant. Mykytiuk's (2008) researches cover the problem of financial provision of investment and innovation activity, in particular, the volumes of long-term lending to the economy show that Ukrainian banks prefer those projects that can make profits in the shortest possible time, while short-term bank loans do not have investment and innovation orientation. Pschyk's and Sukharevich's (2008) work is worthwhile pointing out where they consider the sources and problems of financial and credit provision of innovation activity in Ukraine. The authors suggest a system of measures to stimulate the activities of financial and credit institutions, aimed at the development of innovative processes. The proposed structure of financial and credit provision mechanism of innovation activity deserves attention. Pashova (2012) explores the place of bank investment lending in the overall structure of sources of financing for innovation activities,

performs a thorough analysis of the bank volume investment loans for innovation activities and notes the main obstacles to the development of bank investment loans for innovation in Ukraine that require urgent resolution, by introducing effective measures of a stabilizing nature.

Considering great attention, which is being paid by economists, it should be noted that financial and credit support for innovation requires new approaches. So, Palcevich (2010) reveals the essence of sources of financial support for innovation activities and mechanisms for their involvement. The author describes the peculiarities of state financing of innovation development, lending of innovative programs, and the use of leasing as a form of innovation financing.

Koroljova-Kazanska (2010) explores the sources of funding for innovative enterprise projects and identifies the features of attracting borrowed financial resources as the main source of financing for innovation projects. The author focuses on long-term commercial loans, which are provided for the period of implementation of the innovation project, the terms of lending are agreed directly between the bank and the borrower company.

In this spectrum of research conducted, Fedorenko and Pinchuk (2011) determine the alternative financing options, which are long-term lending without state guarantees and financial leasing. The authors substantiate that one of the most important arguments in the selection of innovative projects is their compliance with the priority directions of foreign loans use and economic development.

One should pay attention to Professor Maznev's (2014) profound studies that paid much attention to the problems of financial support for innovation development, examining the volume of lending of enterprises, average interest rates on loans,

financing of investment and innovation projects. Also, Chemodurov (2013) devotes his works to the problems of financing innovation activity of enterprises, focusing on the possibilities of expanding funding and their effective use. Significant potential for attracting additional financial resources, which remain unused today, is revealed, and proposals for its use are substantiated.

Klimova (2009) evaluates the financial and credit support of innovation activity in Ukraine and abroad, using financial and credit leverage for state support of innovation, supporting enterprises and facilitating the development of enterprises in Ukraine. Komelina (2009) suggests directions for improving the financial mechanism for ensuring innovation and investment activity in Ukraine under the conditions of deepening global financial and economic crisis.

In turn, Korniychuk (2014) notes the use in practice of lending by commercial banks of such a loan product as a credit line, which will increase investment volume and innovative lending. The requested credit line contributes to savings on interest for the borrower, and the bank receives reliable borrowers for the long-term period.

Boyarinova (2009) examines the financial support of Ukraine innovation development and distinguishes the sources of funding for innovative lending activity. The author notes that the share of such financing is low because of the high risk of lending of innovative projects, so banks provide short-term or medium-term loans.

Maidanevich and Rudenko (2016) consider the issues of investment lending for enterprises development and suggest the introduction of special conditions for compensation of interest rates on long-term loans, stimulating those enterprises to develop and implement long-term investment and innovation projects, which will result in an increase in gross output, as well as the quality and competitiveness of this product and the creation of its new types.

Pshyk (2003) highlights a series of stages at which the bank will work on lending of innovative projects and notes that one of the mechanisms that would be appropriate to use for revitalizing the

processes of lending of innovation in Ukraine may be the application of subsidies to interest rates for loans granted by the state to banks under the conditions of investing funds in scientific and technical and innovation activities of priority industries and enterprises.

In the context of the study of topical issues of bank lending for innovation, a group of authors led by Podderiyogina (2009) proposed areas of financial support for the food industry of Ukraine innovative development, pointing out the need for targeted state support and attracting bank loans and loans from international financial institutions.

Emanuele Brancati (2015) states the need and effectiveness of establishing close relationship between the lending bank and the company to overcome the financial barriers to innovation.

Savchuk and Grydzhiuk (2017) investigate the tendencies of banking system development in the Ukrainian economy, noting the increase in the level of lending of business and population; lowering the key interest rate of the National Bank of Ukraine, which creates positive conditions for raising the level of the economy, reducing interest rates on deposits, increasing retail lending and increasing the loan portfolios of individuals.

The group of authors, Girma Sourafel, Gong Yundan, and Görg Holger (2008), explores the relationship between FDI and enterprise innovation. Their findings show that enterprises with foreign capital participation or with possible access to domestic bank loans implement more innovations than others.

Nick Rees (2017) conducts an applied research on lending, defining a strategy to achieve long-term capital growth, seeking to minimize the risk of loss through strategic investment of capital into an actively managed portfolio of private loans to companies in Latin America. The portfolio consists mainly of medium-term current assets for export, medium-term asset-based loans, import financing and working capital loans. All loans are provided with various assets, including export contracts, warehouse receipts and accounts receivable.

Based on high positive evaluation of scientific research on this issue, some aspects of investing in innovation in the future related to lending remain controversial and require a comprehensive scientific study.

The purpose of the article is to study theoretical and methodological approaches of solving the problem of lending as a means for ensuring effective activity by motivating business entities innovation activity.

## 2. METHODS

In order to achieve scientific research goal, the following methods have been used: analysis and synthesis method for the research of credit support for investing in innovations; scientific substantiation method and comparison of main indicators of the activity of the investigated enterprise; the method of correlation and regression analysis to characterize the functional relationship between income from sales of products and capital, costs, investments.

## 3. RESULTS

Considering development of the economy under the conditions of European integration, the innovative component “requires large-scale investment, which is impossible without sufficient credit

provision” (Mayorova & Urvantseva, 2014, p. 30). The authors support Krupki’s (2009) opinion that lending of innovation is an important element in national economy development, and credit is an incentive to work and a source of investment.

The authors conduct a thorough research of the innovative enterprise PJSC “Plasmatek”, which forms the motivational space through the implementation of the need to avoid over-spending during the period 2012–2016, which allows us to conclude on the entire period of the research 2008–2016, based on the policy of investing in innovations in the form of modernization and acquisition of new equipment, attracting loans. And although information on significant investment in human capital is officially provided (Stock market infrastructure development agency of Ukraine (SMIDA)), however, real calculations show the motivating advantage of fixed assets renewal. It looks like upgrading and acquiring real estate, upgrading equipment, purchasing new equipment.

So till 2016, innovations relate to the production and sales of five types of welding electrodes, as well as the production of kaolin equipment and products.

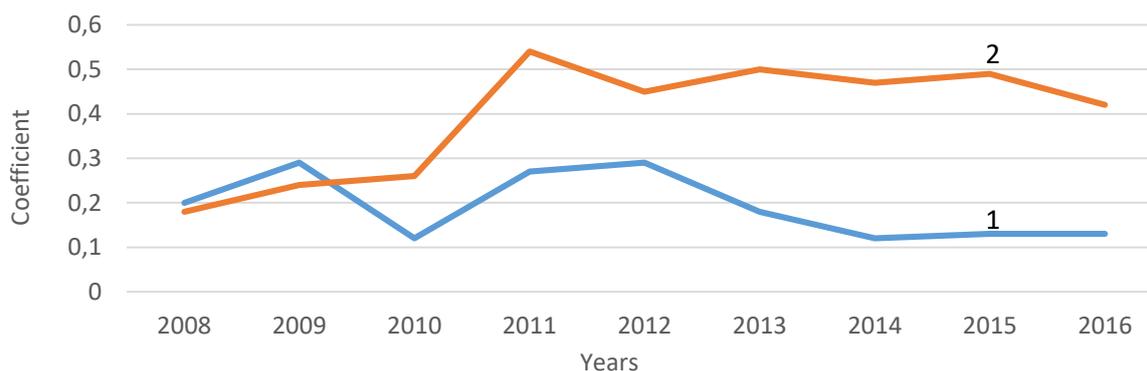
The motivational space of PJSC “Plasmatek” is an orientation towards the production and sale of products through the use of both conventional and upgraded equipment, but without taking into account the motivation of hired workers (Table 1).

**Table 1.** Influence of changes in the average annual cost of fixed assets and investments on their modernization to form the motivation to increase revenue from the sale of products (goods, works and services) of PJSC “Plasmatek”\*

Source: Formed by the authors on the basis of (stock market infrastructure development agency of Ukraine (SMIDA)).

Indicator	Years									Rate of growth, %
	2008	2009	2010	2011	2012	2013	2014	2015	2016	
C / Y**	0.18	0.24	0.26	0.54	0.45	0.5	0.47	0.49	0.42	133.33
Income (revenue) from the sale of electro-viruses (Y1), thousand UAH	117,218	108,714	115,468	212,364	302,654	317,052	408,012	429,092	832,407	610.13
Investments in innovation (C1), thousand UAH	23,227	31,399	13,875	56,860	87,562	57,074	48,990	55,767	109,376	370.90
C1 / Y1***	0.2	0.29	0.12	0.27	0.29	0.18	0.12	0.13	0.13	–35.00
C / Y–C1 / Y1	–0.02	–0.05	0.14	0.27	0.16	0.32	0.35	0.36	0.29	1550.00

Notes: \* PJSC “Plasmatek” is the only one of all machine-building enterprises in the Vinnytsia region, reflecting the results of investing in innovation. \*\* Coefficient of coverage of income (revenue) from the sale of goods (goods, works and services) of capital costs. \*\*\* Coefficient of income coverage (revenue) from the implementation of electrodes investment in innovation.



**Figure 1.** Orientation of PJSC "Plasmatek" in motivating income from the sale of products (goods, works and services) during the period 2008–2016

Compared to year 2008, in 2016, revenue from the sale of electrodes increased by 7.10 times, investment in innovation – by 4.70 times. At the same time, revenue from the sale of products (goods, works and services) of the company increased by 8.90 times, the volume of fixed assets at the residual value – by 20.90 times. Calculating the ratio of growth rates of indicators, we get for the first case  $4.70 / 7.10 = 0.66$ , for the second case –  $20.90 / 8.90 = 2.35$ .

Proceeding from the fact that  $0.66 < 1$  and otherwise  $2.35 > 1$ , one can conclude that innovative activity allows to motivate production at a much faster pace, and therefore, we evaluate the activity of the enterprise by 2009, approximately 2, from 2010 to 2016 – line 1 (Figure 1).

Thus, using the orientation factor, one can determine the likely achievements in using the potential of the motivational space due to changes in the volume of fixed assets and sales of the enterprise (Table 2).

The orientation factor is the lowest point to the abscissa axis. For each of the years studied, these coefficients are 0.18, 0.24, 0.12, 0.27, 0.29, 0.18, 0.12, 0.13, 0.13.

Changing the amount of capital (fixed assets) is the difference for the first two years ( $K_1 - K$ ), for the following ( $K - K_1$ ).

Changes in income from sales of products (goods, works, services) are the difference for the first two years ( $Y_1 - Y$ ), for the following ( $Y - Y_1$ ).

Motivation for reaching the benchmark is the motivation to use (overcome) space as a result of changes in the orientation factor. It is calculated as a percentage, as the ratio of the indicator of change in the amount of capital (sales) to the cost of capital (income (revenue) from the sale of products (goods, works and services)).

In 2008 and 2009, the need to use investments to motivate the achieved capital (fixed assets) is estimated

**Table 2.** Motivation to achieve the amount of capital (fixed assets) and income (revenue) from the sale of products (goods, works and services) of PJSC "Plasmatek" according to the orientation factor

Years	Orientation coefficients	Change in the amount of capital (fixed assets), thousand UAH	Change in income (revenue) from sales of products, thousand UAH	Achievement motivation, %	
				Volume of capital	Income from the sale of products
2008	0.18	4577	13088	24.5	12.6
2009	0.24	1174	-19249	3.9	-15.0
2010	0.12	26230	40601	189.0	35.2
2011	0.27	60675	6003	106.7	2.8
2012	0.29	43294	-12244	49.4	-4.0
2013	0.18	125498	45344	219.9	14.3
2014	0.12	192993	100793	393.9	24.7
2015	0.13	235989	160381	423.2	37.4
2016	0.13	280398	97769	256.4	11.7

at 24.5% and 3.9%, with an appropriate orientation of 18.0% and 24.0%. In subsequent years, the need to motivate the amount of capital (fixed assets) increases due to the intensification of investments, because during all those years except 2012, the value of the indicator exceeds 100% when targeting 12-29%.

Motivation estimation to achieve income (revenue) from the sale of products (goods, works and services) through the use of investments during the period 2008–2016 ranges from 2.8% to 37.4% with orientation rates 12.0-29.0%. There is no excess of more than 100%, which indicates the problem of increasing the motivation to increase revenue from the sale of products (goods, works and services) through investments and the justified compliance of the orientation indicator. Negative values of the indicators of motivation of income from sales of products (goods, works and services) in 2009 and 2012 indicate the exhaustion of investment opportunities in the existing development of the enterprise.

Investigations on PJSC “Plasmatek” are carried out with the help of correlation and regression analysis of the influence on motivators of the activity of motivational tools (Table 3).

**Table 3.** Motivation dependence of orientation of PJSC “Plasmatek” for investing in innovation activities

X	Y	Regression equation	Correlation coefficient
K	Y	$Y = 2.0746x + 32582$	0.982
Y1	Y	$Y = 1.1613x - 1540,1$	0.985
K1	Y1	$Y = 6.3566x - 26049$	0.837
K1	K	$Y = 3.2315x - 13448$	0.762

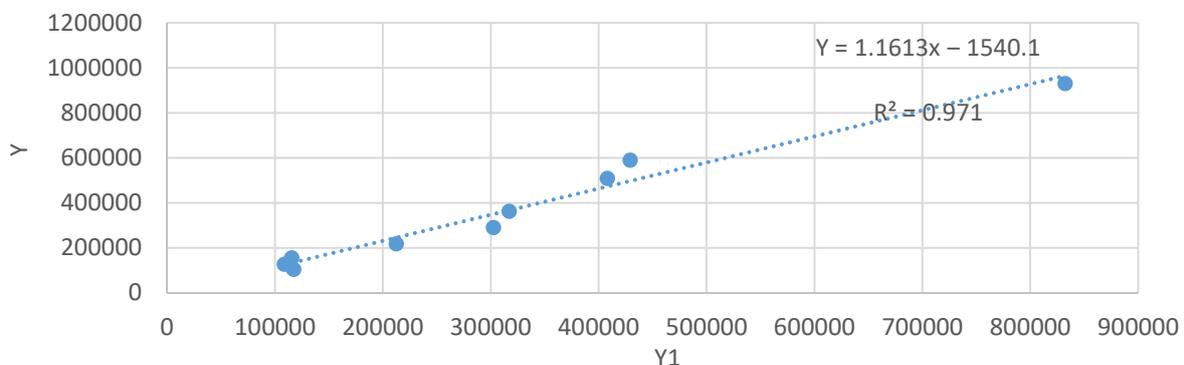
Taking into consideration the peculiarities of determining the reference point in motivating revenue from the sale of products (goods, works and services) of PJSC “Plasmatek” for the period 2008–2016 due to investing in innovation activities (Table 4), it is possible to scale down the correlation coefficients and regression equations to the level of influence on connections between motivational tools and motivators (Figures 2-5).

**Table 4.** Motivators and al tools of motivation in terms of reaching the benchmark of PJSC “Plasmatek”

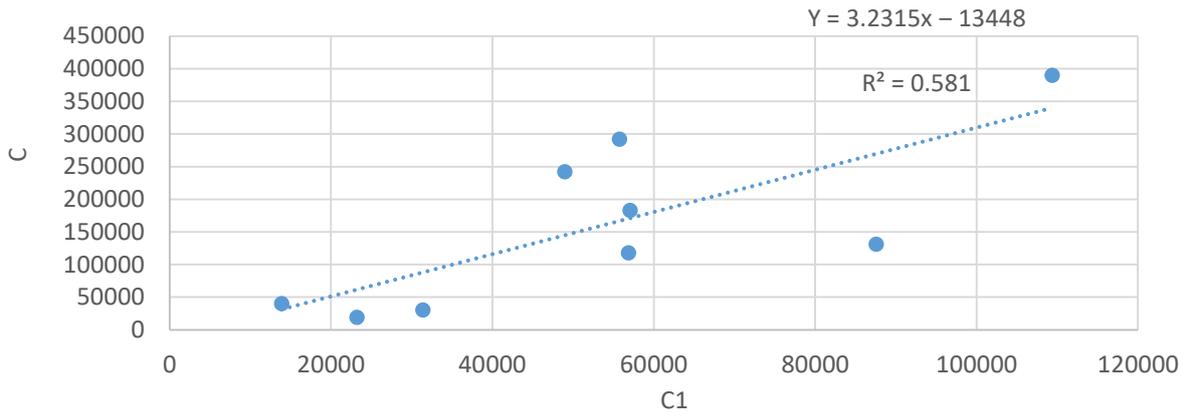
Source: Authors' own development.

Motivator	Motivation tool
Revenue from the sale of all products (Y)	Revenue from the sale of invested products (Y1)
Capital (fixed assets) of the enterprise (C)	Purchased investments (C1)
Revenue from the sale of all products (Y)	Capital (fixed assets) of the enterprise (C)
Revenue from the sale of invested products (Y1)	Purchased investments (C1)

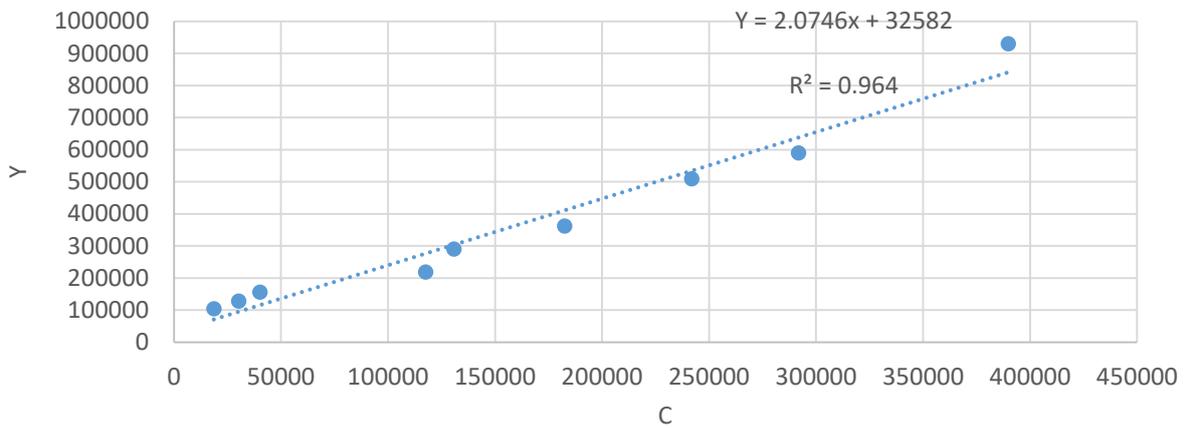
Figure 2 shows the high dependence of the increase of volume of the income from the sale due to the need for growth of investment in innovative products of the investigated enterprise, since the correlation coefficient in this case is the largest, which indicates a close connection. The determination coefficient  $R = 0.9711$  shows that 97.11% of the total volume fluctuation in revenue from the sale is due to differences in investment in innovative products, while the remaining 2.89% are other factors that were not taken into consideration in this case.



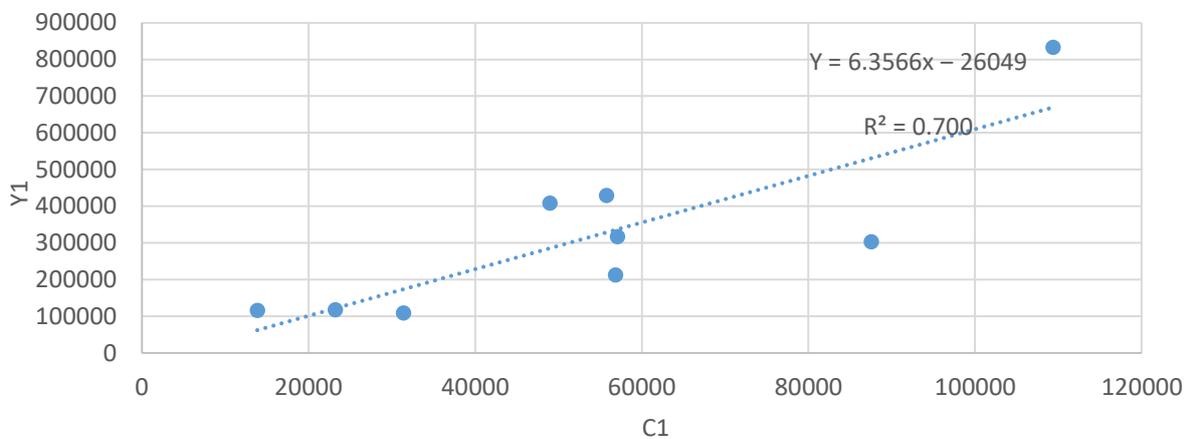
**Figure 2.** Motivation to increase the volume of income from the sale due to the need to increase investment in innovative products of PJSC “Plasmatek”



**Figure 3.** Capital growth motivation (fixed assets) due to the need to increase investment of PJSC "Plasmatek"



**Figure 4.** Growth motivation of volume of income from the sale of products due to the need to increase capital expenditures of PJSC "Plasmatek"



**Figure 5.** Growth motivation of sales of innovative products due to the need to increase the investment costs of PJSC "Plasmatek"

Capital growth motivation (fixed assets) due to the need to increase the investment of PJSC “Plasmatek” is shown in Figure 3. The analysis shows that the density of communication is average. The determination coefficient is 0.5814, therefore, it should be pointed out that the growth of capital (fixed assets) due to the need to increase the investment of PJSC “Plasmatek” depends on 58.14% and 41.86% of the remaining factors.

The motivation to increase the volume of income from the sale of products due to the need to increase the cost of capital for PJSC “Plasmatek” is shown in Figure 4.

Figure 4 indicates a high dependence, that is, a high level of motivation to increase the volume of income (revenue) from the sale of products due to the need to increase the cost of capital for the enterprise.

The motivation to increase the volume of sales of innovative products due to the need to increase the investment costs of PJSC “Plasmatek” is shown in Figure 5.

Dependence of sales volume of innovative products due to the need to increase the cost of investment is high and therefore motivation of the production of innovative products is high, which affects the economic development of the enterprise.

## CONCLUSION

There is a need for the effective use of bank loans in the interest of economic development of enterprises in modern conditions. The insufficiency of own funds to finance innovation activity at enterprises leads to the search for additional external sources of funding, the most available among them are loans.

Lending is a motivating factor for introducing innovations at an enterprise and, in particular, a new direction of research, which involves the use of developments in the practical activity of the enterprise in ensuring the most effective types of activities, which are divided into innovation and investment incentives in effective activities development.

The conducted research of PJSC “Plasmatek” gives grounds to assert that the company is effective, as a result, it is motivated for innovation, which, in its turn, stimulates additional investments that allow to form a new financial policy, in particular, loans as a stimulating investments means.

Investing in innovation activity contributes to increasing the volume of sales of innovative products and the emergence of its new types, and lending acts as a form of investment motivation enhancement.

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