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The Formation of the Cumulative Demand for Innovations by the Business Sector and Households

Marina Viktorovna Gruzdova and Mikhaleva Ekaterina Pavlovna

Bryansk State University named after Academician I.G. Petrovsky, Bryansk, Russia

Abstract: The article substantiates the necessity of transition to the innovative development through the formation of the cumulative demand for innovations. The measures undertaken in this area are proposed for the business sector and the households. The acceleration of the diffusion of innovations requires the transition to the policy based on particular demand. In this article, we introduce two coefficients to evaluate the innovative potential: marginal propensity to consumption of innovations ***(MPC_{inn})*** which characterizes the changes of the volume of consumption of innovative commodities at the change of the current income per unit and the coefficient of marginal propensity to implementation of innovations ***(MRK_{inn})*** which indicates the changes of the volume of the implemented innovative technologies related with the production of a new product or entering the new markets at the change of the current income per unit. We allocated the innovative components using these coefficients in the traditional function of cumulative demand - $AD = C + G + I + X_n$ which allows the identification of the function of the cumulative demand for innovations $AD_{inn} = G_{inn} + I_{inn} + G_{inn} + X_{inn}$. The article proposes a number of measures aimed at intensification of cumulative innovation demand of households and the business sector.

Key words: Innovative development · Cumulative innovative demand · The marginal propensity to consumption of innovations · The function of consumption of innovative products · Measures to boost the cumulative innovative consumer demand · The coefficient of marginal propensity to implementation of innovations · Investment function taking into account the innovation component · Measures to boost the cumulative demand for technological innovations

INTRODUCTION

The transition to the innovative development is the most important national goal, posed by the state leaders and caused by a complex of objective factors. The key decision factor is the formation of the cumulative demand for innovations. This article is to provide the theoretical substantiation and elaborate the practical measures to intensify the innovative processes in the Russian Federation.

The solution of the problems of survival of Russia, the necessity of transition to a postindustrial society and the convergence to an indicator of gross national product (GNP) of the Western countries based on increase of labour productivity imposes a question of the development of the innovation market extremely topical and timely. The formation of effective market innovations, ensuring of an intensive cumulative demand for innovative commodities, materials and technologies are the most important conditions of transition to the innovative development. The demand for innovative commodities is the basis of qualitative economic growth and the redistribution of resources. Consequently, there is a new fundamental basis for the development of equilibrium models of development through innovations [1].

Among the foreign scientists-economists who study the problems of the market of innovations and demand for innovative commodities and services, the most known are H. Mensch, A.H. Kleinknecht, p. Freeman, J. Clark, L. Suite and M. Porter and among Russian economists – A.I. Prigozhin, A.I. Anchishkin, I. Artemyev, Yu.V. Yakovets and S.Y. Glazyev.

Corresponding Author: Gruzdova, Bryansk State University named after Academician I.G. Petrovsky, Bezhitskaya street 14, Bryansk, 241036 Russia.

Golichenko O. and Klavdienko V. believe that dominant role in formation of the total demand for innovations belongs to the state therefore, "a significant factor of innovative activity includes internal motivation stipulated by the laws of the market system (including the laws of competition) and extrinsic motivation (promotion) of this incentive by the state" [2, p. 34]. This statement is also supported by V. Kelle - "activity of the state should play a major role in solving of the most important problems of financing of innovative activity" [3, p. 56].

This theoretical approach of formation of the innovative market is rather underdeveloped. It is embodied in a number of national models of state regulation of innovative activity. The countries that joined the development of the innovation sector later than the other (Japan, Korea and others in the 50–70's) used for the formation of demand for innovative products mainly the mechanisms associated with the strategic direct planning such as stimulation of specific innovative projects, introduction of the system of state procurements, target subsidies, implementation of the developed system of grants, benefits and guarantees for credits.

Other countries such as the United States and countries of Western Europe relied on the indirect regulation of the innovation market in formation of demand for innovative products which supposes the involvement of the development and promotion of scientific and technical cooperation, the formation of innovation infrastructure, development of long-term technological forecasts and simplification of procedures for the creation of innovative companies.

According to V.M. Kudrov, Russia "which historically is not an innovative country" requires that "the national economy has undergone the qualitative changes including legal protection of business, competitive environment and private property, as well as the active state, which is able to promote and initiate the innovative demand" [4, p. 15].

The process for promoting the development of innovative demand should include replacement of the outdated equipment initiated by the state. According to V.A. Seltsovskiy, "the capital investments in fixed assets in 2008 amounted to 60% of the level of 1990. The part of investment into gross domestic products (GDP) has reached 20%, while in developed countries this figure exceeds 50%. The average lifetime of equipment in Russia is 20 years (10 years in 1990). According to official statistics, the coefficient of physical deterioration of equipment in Russia is 50% (60% in the oil industry) and the coefficient of updating of the equipment is 3% per year (during the Soviet time – 30% per year). The state plays an important role in solution of this problem" [4, p. 17].

There is an alternative point of view, according to which, a commercial firm is a dominant subject of the innovative demand. For example, A. Semenova believes that "the emergence of large companies interested in the constant updating of the production structure under the pressure of competitive environment is the key factor in the effective functioning of the innovation system in market conditions of Russia" [5, p. 37].

The author notes that the organization of innovation processes in the world market is available only for large companies and corporations become the main consumer of inventions and innovations of small business. V. Garcia shares this point of view and identifies two main types of product – innovative and functional. The strategies of the enterprises for the supply of these commodities should be different. Innovative products require a quick response to demand and functional products require the lower production costs. Researchers noted that the demand for innovative products is extremely uncertain and even large firms meet difficulties in defined strategy of delivery of innovative products on the market [6].

L. Gokhberg also supports the point of view that "the main driving force of innovations is competition. In the conditions of strong competition, the companies are obliged to introduce the new products, new services, new technologies and new methods of production organization to leave behind the competitors. This activity in case of success brings them the so-called innovation rents when they can gain competitive advantages during some time" [7].

In addition, V. Ivanchenko believes that the world market creates a demand for innovations and determines the nature of the competition itself: "all types of innovative production should be based on the creation and development of new products, competitive on the world market. The main mechanism of competition is innovations based on the achievements of scientific and technical progress. Competition forces a manufacturer to create new products, since delay with innovation doomed to destruction".

Foreign researchers focus their attention on the activation of consumer demand: "The slow development of innovations and low productivity require the new methods of development of innovation that requires the changes of the policy based on innovations to the policy based on demand. Many countries use state

procurements, regulations, standards and leading market initiatives, as well as consumer policy and innovation initiatives, which focus on final consumers" [8].

However, considering the innovation demand, the household sector as final consumer of innovative products, which demand ensures the readiness of the economy to innovations has not been analyzed.

Meanwhile, the innovative market can hardly base only on the state as the subject of the innovative demand. Similarly, it is impossible to create the innovative demand-based company as the subject of market economy. Innovative market, as any other market characterizes by effective demand of households, the system of the business sector and the state and the world market.

In reality, there is a coherent group of these factors determining the demand for innovative products. It provides an integral cumulative impact on the character of the innovation demand, provides the readiness of the Russian Federation for the transition to the innovative development and intensity of this process. However, in the present, the complex conditions ensuring this transition is not created, i.e. the transition to the innovative development is not prepared. According to V. May "the Russian economy is hardly perceptive to innovations. The fact is that the Russia has never been ready for innovations neither in Soviet period nor in tsarism, nor during the Golden Horde times. Some innovative bursts were particularly breakthroughs, when the power focused on specific areas and ensured the bursts by rough and rigorous measures" [5].

The theoretical principles of the analysis of cumulative demand were laid by J.M. Keynes. He distinguished four subjects of analysis: the state, firms, households and net exports. He studied the cumulative demand in general, without dividing it by the nature of the product: the cumulative demand for consumption commodities or production means and the cumulative demand for services or technology.

Meanwhile, the structure of cumulative demand by type of commodities and services determines the nature of economic development in general. Domination of commodities in the structure of cumulative demand indicates the presence of a mass consumption society. Where the production means dominate in the cumulative product, we can talk about industrial societies. If services dominate in the cumulative demand, we can talk about post-industrial society. Finally, where the demand for innovative commodities or services is dominant, we can talk about the innovative character of the economy. This determines the character and content of the transition to innovative development.

Considering the cumulative demand from this point of view, we can conditionally divide all bulk of produced commodities and services in society as elements of demand into two parts: the first part is the cumulative demand for traditional commodities or services and the second part, – the cumulative demand for innovative commodities, technologies, or services. The cumulative demand - the demand for innovative commodities or services will be considered further. It is considered as a "cumulative innovative demand". This is a part of the cumulative demand of all subjects of economics only for innovative commodities or services: commodities, means of production, technologies, machines, equipment, means of transport, etc.

We have considered the cumulative demand of household and business sectors, the state and the rest of the world for innovative commodities selected by Keynes.

Subjects of households demand the following innovative commodities and services: new consumer commodities such as cars, transport, new construction materials, materials with certain properties etc.

The higher stimulation of household's demand for innovative commodities and services, the greater the pressure on their production, the greater the interest of the business sector in the transition to the innovative development. Studying the incentives for innovative development, the Western analysts use the coefficient of innovation capacity, which is a methodological tool for study a wide variety of factors, policies and institutions affecting the strengthening of the innovation process [9]. The customer should be oriented to purchase innovative commodities. To fulfill this goal, a purposeful policy strived to reduction of production costs of innovative products and decrease of its price in relation to similar traditional, not innovative, products should be implemented including reduction of taxes on income obtained from realization of innovative products. Thus, the approval of the list of innovative enterprises with purposeful benefits, reduction of prices of innovative products, development of the system of transfers for development and production of new products, its advertising and sales are required. The allocation of this production of commodities and services in to a special preferential sphere will contribute to the higher demand for them and first of all, due to the price factor. However, a number of non-price factors should be also

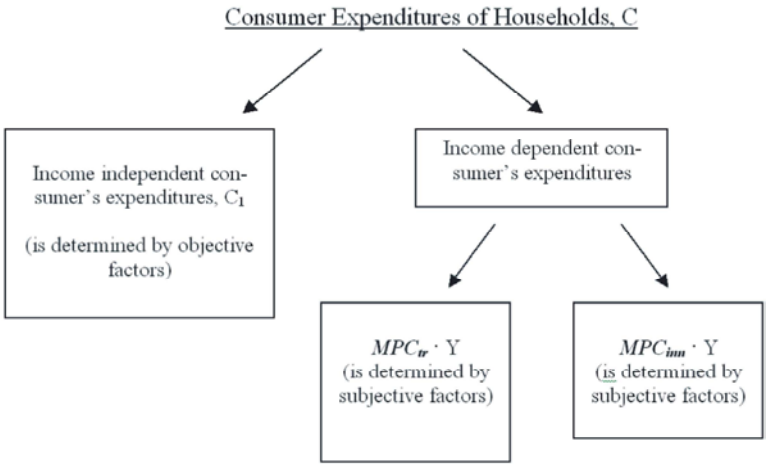

Fig. 1: Structure of the innovation demand in the household sector. MPC_{tr} is the marginal propensity to consumption of traditional commodities, showing the degree of changes in the volume of consumption of traditional commodities changes at changed current income per unit; MPC_{inn} is the marginal propensity to consumption of innovation, i.e. the coefficient showing the degree of changes in the volume of consumption of innovative commodities at the current income per unit.

considered. The innovative demand of households is affected by the following factors: income from participation in production, taxes and transfer payments, the size of the property, the degree of differentiation of the population by income level and size of the property and number and age structure of the population. In our context, we consider a new definition of "marginal propensity to consume innovative products and services" and "the marginal propensity to consume of traditional commodities and services". The structure of the innovation demand in the household sector is shown on Fig. 1.

The most important economic task is an increase of MPC_{inn} or marginal propensity to consumption of innovations by the household sector.

According to J.M. Keynes, the amount of money the society spends on consumption depends on the amount of income from other objective circumstances: subjective needs and psychological propensities and habits of individual members of society and the principles of distribution of total income among the participants in the economic process (the distribution can be modified in case of production expansion).

Thus, the primary task of the state consists in increasing of the income of households by the growth of wages, pensions, allowances and social payments.

The changes in the subjective needs and psychological tendencies and habits are process that is more complicated. The general principle is the re-orientation of consumers – the subjects of households to purchase commodities of innovative demand. In fact, consumers with higher income are faced with a choice: spend the available money to traditional commodities and services, expanding their range and extensively increase their consumption or change it in qualitative way. In general, the growth of income increases the consumption. This is a common function of income. There is some ambivalence in consumption, because consumption of innovative commodities and services is growing but with higher degree.

Such regularity is one of the fundamental for analyze of household demand. It specifies that the demand for innovative commodities and services will grow as incomes rise.

However, this proportionality can be changed, because it can be slowed and accelerated depending on the degree of purposeful influence on this tendency. We discuss the deliberate adjustment of household demand for innovative commodities and services.

A function of consumption in the short term is significant for intensification of the demand for innovative commodities by households: $\tilde{N} = \tilde{N}_1 + MPC_{tr} \cdot Y + MPC_{inn} \cdot Y$.

Activation of customer demand is considered in the works of Lt. Daniel and W. Berger in the framework of innovation diffusion model. In the beginning, the majority of innovations are slowly propagating then their rate is growing and decreases. This adaptation process of

innovations is the diffusion of innovations. The diffusion model of consumption of innovations is both economic and social theory, which assesses the psychological and sociological adaptation models, explains the mechanisms of adaptation and used for forecasting of the success of an innovative product among the population [10].

Moreover, the intensification of demand, the marginal propensity to purchase innovative products largely depends on the stimulation of their sales. It is purposeful policy of reduction of the part of the traditional commodities and services due to the permanent increase in the part of innovative consumer products. The diverse innovative products and services offered by various companies, the higher demand for them. Therefore, it is necessary to create the stimulation system of trade institutions to increase sales of innovative products by reduction of the taxes on selling of particular group of commodities and the service group.

The measures to increase the part of sold innovative commodities and services can be short-term however, this can hardly affect the growth of marginal propensity to consumption of innovative products and services. These measures should be long-term and continuous. Due to the fact that there is no component of autonomous expenditures and the marginal propensity to consumption of traditional commodities is zero, the consumption function for the household sector is: $C = MPC_{inn} \cdot Y$, where MPC_{inn} is the marginal propensity to consumption of innovations, i.e. the coefficient showing the changes of the volume of consumption of innovative commodities at the current income per unit.

This signifies that the parameters of $C_1 + MPC_{tr} \bullet Y$ reduces during the long period.

The second important direction to increase demand for innovative commodities and services of domestic production is reduction of their import. First of all, the government should have a register of produced domestic innovative products and reduce their import. Due to accession of Russia to the WTO, first of all, the growth of the competitiveness of domestic innovative products and services should be promoted by purposeful reduction of prices and growth of their quality. Thus, the interests of domestic manufacturers especially producers of the universally recognized innovative products and services should be supported. The experience of the scientific-research sector in creation and promotion of developed innovative products for internal and external markets should be also considered. These commodities and services should also be included into register of the emerging innovative products and services with the grades and degrees of readiness. First of all, the most finished product innovations in the area of the fifth and sixth technological level, i.e., the creation of consumer commodities based on microelectronics, biotechnology, informatics, robotics and non-traditional energy sources should be promoted on the market.

There is a great opportunity for Russian scientists, engineers and entrepreneurs. Innovations of Russian scientists and inventors are used almost by all entrepreneur research-development and engineering firms. The process of their implementation is one of the important steps for Russian economy.

Therefore, the demand for innovative commodities serves as a function of household incomes, i.e. there is the conscious increasing of household incomes through the growth of social expenditures, increase of average wage, raising the level of minimum wage and transfer payments.

The most important task of increasing of household demands is the growth of their marginal propensity to consumption of commodities and services by increasing the variety of these commodities available to consumers.

Reduction of demand for imported innovative products and services occurs by increasing of the demand for innovative commodities and services produced by enterprises and firms for innovative commodities and services. In the conditions of forming of competitive environment, the companies have to spend the greater part of funds intended to the purchase of the innovative materials and spare parts. This is the basis of their survival.

Increase of working capital aimed at the innovative production of commodities and services, is an objective process related to the features of a functioning of the market economics.

The growth of competitiveness of Russian economy results in increase of the share of working capital spent on the acquisition of fixed assets. For example, the plasma cutting reduces the number of workers and increases the labour productivity i.e. we consider the use of depreciation deductions and the formation of accelerated depreciation.

The main and key factor of the growth of demand of enterprises and firms for innovative commodities and services is their income i.e. the demand for innovations increases with the growth of income. Thus, the higher income results in the higher expenditures for innovative commodities and services. However, the most important feature of the innovative demand by firms is that they demand a special type of commodities.

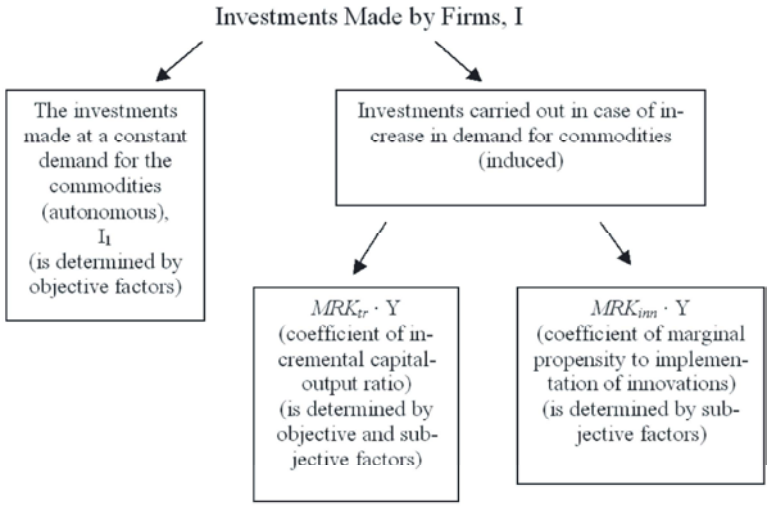

Fig. 2: Types of investments made by firms. MRK_{inn} is the marginal propensity to innovation, i.e. the coefficient characterizing the changes in the volume of the implemented innovative technologies related with the production of a new product or entering the new markets at the current income per unit. MRK_{tr} is a coefficient of incremental capital output ratio, which indicates the amount of necessary investment to increase output from y_1 to y_2, while the firm improves the production technology of the existing commodities without entering the new markets.

Household demands mainly for consumer commodities and services. Firms and enterprises demand for industrial commodities such as technological innovations, advanced machines and equipment. Thus, the growth of profitability of firms and enterprises is a key factor of the growth of the innovation demand for industrial commodities and services.

In this regard, the state should actively contribute to the growth of yields and profitability of innovative enterprises and firms through the creation of their register. There are about 7% of these enterprises now in Russia. The register will enable to reduce the taxation of enterprises. Moreover, the innovative enterprises adopting the radically new basis innovations should receive the reduced taxation during this period as well as create the register of accounts and updates. The income deferred on these accounts is not a taxation subject. A special system of incentives should be ensured by venture capital companies engaged in development of a completely new product.

Investment policy of firms plays an important role in the formation of the innovation demand. The entire amount of investment is divided into two parts: investments into the traditional and innovative industrial commodities and services, which occur at the constant demand for the commodities and in case of its improvement (Fig. 2).

Investment function has the following form: $I = I_1 + MRK_{tr} \cdot Y + MRK_{inn} \cdot Y$.

Thus, the marginal propensity to implementation production and technological innovation is determined by both conditions of competitive environment and subjective factors such as wiliness to become famous, create a new product, or conquer the world market.

In addition, the entrepreneurs, investing the fund into innovations, receive the opportunity to ensure themselves with liquid resources in case of unforeseen circumstances and the gradual increase in incomes.

The most important measure to increase the demand of enterprises and firms for domestic innovative commodities and services is a purposeful policy to reduce import of foreign innovative products. The production of these missing commodities, components, new technologies may be established in Russian Federation. As a result of scientific-technological policy, the substitution of the part of imported commodities and services to domestic must equal to production, scientific and other opportunities for their substitution.

The policy of limitation of demand for foreign innovative commodities and services at simultaneous increase in production of their domestic analogues requires a number of stimulation measures for domestic manufactures. The transition to new technology of manufacturing is related with high costs. In this case, the entrepreneurs - innovators looses competitive advantages in comparison with their colleagues engaged to production of traditional goods. Innovation involves the

risk related with additional costs. Thus, these entrepreneurs have to be involved into strong competition on the adverse conditions.

The entrepreneurs who promote the transition of the Russian economics to an innovative development risk more and in present conditions have little chance to "survive". In contrast, the businessmen whose professional activities are not related with the risk and additional costs are relatively in the better conditions.

In this situation, the neutral policy of the state contributes to the implementation of simple reproduction, the existing state of affairs and limits the innovation development of economics. Enterprises and firms, which preferred the innovative development and conducting the development and manufacture of new element base compared with Western samples, must be supported by the state or by the Federal subjects, providing both material and scientific and technical assistance to these changes. The purpose of this interaction between business and government is that innovative enterprises were at least equal and as a maximum in more favorable conditions than non-innovative enterprises following the traditional conservative business. Any transition of the firm to a new technology of production and applied innovations, protected by patents and licenses, can mean the simultaneous transition into the group of innovative companies with the system of benefits according to the degree of their innovative development. The higher this parameter, the more taxation and informational benefits received by the firm.

Thus, functional element that characterizes the increase of cumulative demand of enterprises and firms is: $I = I_1 + MRK_{tr} \bullet Y + MRK_{inn} \bullet Y$.

The part of the Russian Federation on the world market of high technology products is 0.35% to 1%. Obviously, the keeping of these rates of development of scientific sectors will leave the Russia behind the foreign economically developed countries in present or in the distant future. In these conditions, the safety of Russia and protection of its sovereignty depend on the speed of transition to the innovative development. To overcome the obstacles of transition to post-industrial society and develop industrial economics, these problems must be solved. The maintenance of existing tendencies of resistance to innovations will not allow the increase of productivity and accelerate the economic growth, comparable with developed countries. Obviously, it is impossible to ensure the transition to the innovative development of Russia without the active demand for innovations.

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