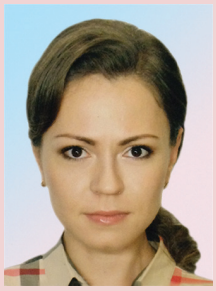
DOI: 10.15838/esc.2018.3.57.10
UDC 338.439.4.053.3, LBC 65.325.2

Building a Conceptual Model of Sector Development and Assessment of the System-Building Effect



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Abstract. The article is devoted to forming a strategic vision of rabbit breeding sector taking into account the state priorities. The relevance of the topic is caused by the growing shortage of dietary meat consumption in Russia, which leads to deteriorating quality of food and reduces the quality of life. According to analysis of domestic research on the current problem, more attention is paid to studying the Soviet experience of planning, production and resource analysis of the sector and the need for its development. Lack of experience in strategic planning in rabbit breeding in domestic science has become the cause of vulnerability during the perestroika (reformation) period, resulting in a dramatic decline in production. In this regard, there is a need to improve the mechanisms of integrated development of the sector taking into account the general theory of strategizing. The purpose for the study is to develop a model of sustainable development of the rabbit breeding sector taking into account the assessment of the system-building effect of related activities.

For citation: Shakleina M.V., Shaklein K.I. Building a conceptual model of sector development and assessment of the system-building effect. *Economic and Social Changes: Facts, Trends, Forecast*, 2018, vol. 11, no. 3, pp. 145–161. DOI: 10.15838/esc.2018.3.57.10

The research novelty of the study lies in building a conceptual model for improving business processes in the Russian rabbit breeding sector, providing for the implementation of resource-reproduction processes and the formation of autonomous resource security for fully sustainable development of the sector. The model systematizes approaches to the development of the market of related products and necessitates the establishment of the farming institution in rabbit breeding. The paper evaluates the system-building effect of the sector development. With the help of plotting the impulse response function using the vector autoregression model it is shown that with the development of rabbit breeding the sectors determining the resource base and related activities (crop production, consumer industry) will also develop. Moreover, partial implementation of state priorities in terms of increasing tax revenues and reducing population outflow from rural to urban areas has been established. In this study, attention is paid to developing the demand for rabbit breeding products. The main constraint of studying the demand for these products is lack of statistics on their retail prices and retail sales. To address the mentioned problem it is necessary to conduct sociological surveys devoted to studying consumer preferences in consumption of meat products, which will be the further research area.

Key words: rabbit breeding development, conceptual model, system-building effect, vector autoregression model, strategic development of industry.

Introduction. Rabbit breeding in Russia is currently still at the stage of formation despite its active development in European countries and China. Being among the underdeveloped sectors of Russia, rabbit breeding has a great potential for development. The products of rabbit breeding belong are dietary, their consumption rate in Russia is extremely low (1.3 kilos per person a year). According to the World Health Organization, the consumption rate of dietary meat is 4–5 kilos a year. The consumption rate of rabbit meat in meat intake of the population of the leading European countries reaches 7–9 kilos a year. Moreover, amid complex geopolitical situation, aggravation of economic and trade relations between Russia and most European countries and the U.S. poses a threat to food security of Russia. The development of this sector as one of the most productive and profitable among other livestock industries can help implement the two major state priorities being: improving food security and the quality of life.

The purpose of the research is to elaborate a model of sustainable development of rabbit breeding taking into account the assessment of the system-forming effect of related activities.

To achieve this goal, the following objectives are defined:

1) identify the features of the strategy for rabbit breeding development in developed and developing countries;

2) study the historical experience of rabbit breeding in the USSR, determine what caused the recession in this sector;

3) develop a conceptual model of rabbit breeding sustainable development in Russia taking into account the peculiarities of agro-industrial functioning and the general theory of strategy;

4) explore the applied opportunities of using the vector autoregressive model to assess the impact of rabbit breeding development in related activities;

5) calculate the system-forming effect of the sector taking into account the plotted impulse response function.

The research novelty of the study is to develop a conceptual model for improving business processes of rabbit breeding in Russia, which would ensure the implementation of resource-reproduction processes and the formation of autonomous resource security for full sustainable sector development. The model systematizes the approaches to developing the market of related products, and necessitates the establishment of the farming institution in rabbit breeding.

The potential opportunities of this sector in ensuring food security were defined more than four decades ago. Many poverty alleviation programs in developing countries give priority to rabbit breeding as an effective tool as it requires little investment with a short payback period.

In the framework of World Rabbit Science Association (WRSA) international conferences on rabbit breeding zoologists in their reports announce the beneficial effects of implementing rabbit breeding development projects related to:

1) poverty alleviation [1];
2) development of agricultural areas [2];
3) reducing rural-urban migration [3];
4) development of population's entrepreneurial skills [4];
5) empowerment of women through active participation in rabbit breeding and keeping [1].

Food and Agriculture Organization of the United Nations (FAO) provides support and assistance to the development of rabbit breeding in developing countries. Since 1978, international rabbit breeding seminars have been held in various countries in Africa (Tanzania, Sudan, Mozambique, Togo, Ghana, Zambia, Cameroon, and Mauritius).

During the past 4 decades several successful examples of implementation of national programs to promote rabbit breeding development have been registered in Africa [5].

Similar programs were implemented in Latin America: Brazil, Argentina, and Uruguay. In Brazil, for example, the support of farmers involved in rabbit breeding has been provided since 1960–s. Since 2010, this sector has demonstrated significant success: the rabbit population and investment attractiveness increased, rural residents began to show more interest. In the same year, rabbit breeding was strongly stimulated by various advertising campaigns, mainly through TV. Currently, a group of rabbit breeding farmers in Brasilia region of complex development together with the federal government sell rabbit meat to schools and kindergartens as an excellent dietary and healthy product for children [6].

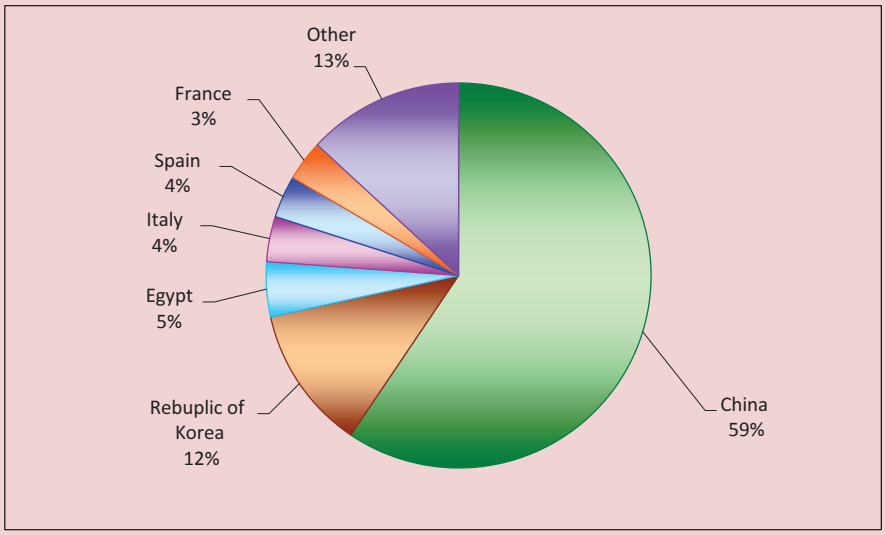
Certain countries in the global market space (GMS) have some experience in strategic development and increasing rabbit breeding efficiency. The study of international experience of rabbit breeding strategy represents a very important stage according to the basic principles of strategy [7]. V.L. Kvint recommends using the experience of successfully implemented strategies and analyzing advantageous strategic ideas with previously unsuccessful attempts to implement.

A review of the main practices and experience of rabbit breeding strategy in developed and developing countries leads to the following main conclusions.

1. On a global scale, there is a zone development of rabbit breeding, which is largely due to the traditions of nutrition, and the countries' general economic and culture level.

According to FAO statistics, the amount of rabbit products has increased annually by 3.1% since 2000 and in 2016 amounted to 1428.1 thousand tons. The world producers of rabbit products are China (59%), the Republic of Korea (12%), Egypt (4.5%), while Russia's share in world production in 2016 comprised 1.3% (*Fig. 1*).

Figure 1. Structure of world production of rabbit meat in 2016, %



Source: Food and Agriculture Organization of the United Nations. Available at: http://www.fao.org/

2. Rabbit breeding development strategies in developed and developing countries differ significantly due to different strategic objectives [8]. In developing countries (China, Argentina, Mexico, African countries) rabbit breeding is represented in the form of small multi-purpose farms for family consumption, established to improve the quality of families' own diets [9; 10]. National programs for rabbit farming development implemented in developing countries solve the problems of poverty, unemployment, agricultural areas development [11; 12; 13; 14].

International organizations are directly involved in the development of rabbit breeding and related projects and strategies in these countries. The emergence and development of rabbit breeding in developing countries is impossible without the participation of public authorities as it is associated with economic and business risks [15]. Assistance at the state level in breeding rabbits, for example, in China is carried out in various forms: financial support (micro-finance), provision of land for breeding, cooperative fund, research projects, and legal support. However, one of the most significant projects is the publication of professional rules for breeding rabbits for farmers [15]. The peculiarity of rabbit breeding in developing countries is its small-scale form and organization in the form of rabbit-farming associations – farmer cooperatives. The advantages of small-scale production include the small size of farms and therefore minimal exposure to economic and business risks, as well as the low cost of management – factors that are more adaptable to changes in the economic environment. However, a characteristic feature of organization and promotion of the sector in developing countries is an impetus from the government, i.e., the impulse for implementing projects related to rabbit breeding development in developing countries is a top-to-bottom initiative.

3. In developed countries with a historically high demand for rabbit products (Spain, Italy,

France, Hungary, etc.), the main goal of its development is to meet the mass demand in national and international markets [16]. In these countries, rabbit breeding is developing on an industrial scale. The initiators of implementing projects on rabbit breeding development are not only public authorities, but also private investors. In developed countries, the rules of rabbit farming are strictly regulated. Due to this, even lower-rank personnel are highly professional, providing uniform quality production standards [17].

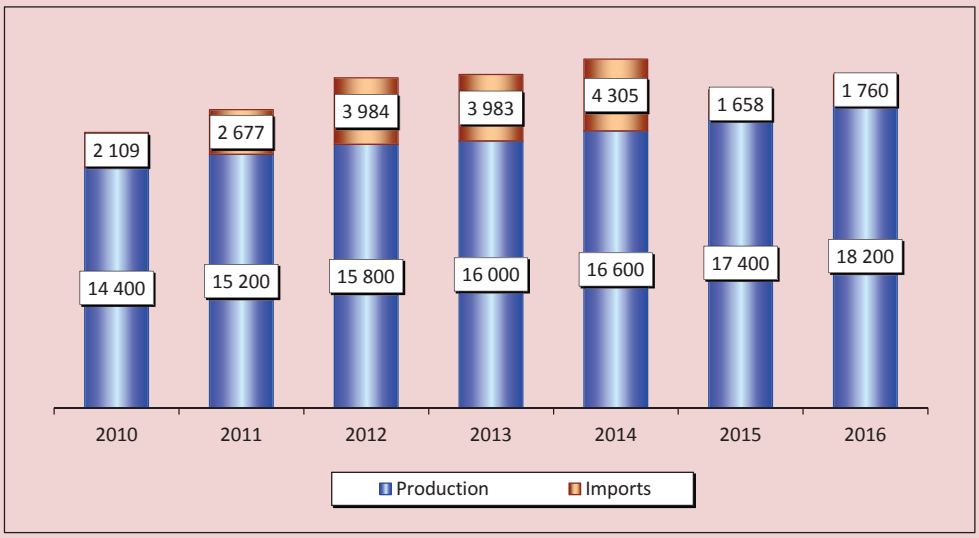
4. In Russia, during the period of command economy rabbit breeding development took place according to five-year plans which were based on final output indicators. At the same time, insufficient attention was paid to selection and genetic work, breeding meat rabbits, which made the sector less profitable [18; 19; 20]. More than 90% of rabbit products was supplied by rabbit farms which were poorly equipped and without any common standards of product quality. Lack of experience in strategy development of the sector made it vulnerable during the perestroika period, resulting in a dramatic decline in production volumes.

In Russia, the volume of rabbit products in 2016 amounted to 18.2 thousand tons (*Fig. 2*); since 2010, the average annual growth rate of own production comprised 104%, which is higher than the growth rate of meat production in the country as a whole.

Own production in 2016 reached 91.6% of the total market volume, which corresponds to the standard values specified in the Food Security Doctrine. According to the Federal Sate Statistics Service, own production of rabbit meat is concentrated in the Central (28%) and Volga (22%) federal districts, which is largely due to the high population density and high disposable per capita income (*Fig. 3*).

In addition to domestic producers, according to the Federal Customs Service, the market presents products from China (68.9%), Hungary (28.8%) and the Czech Republic (2.3%) (*Fig. 4*). The total volume of imported products in the domestic market in 2016 amounted to 8.4%.

Figure 2. Structure of Russian market of rabbit meat in 2010–2016 in real terms, tons



Source: Federal State Statistics Service. Available at: http://www.gks.ru/

Figure 3. Rabbit meat production in federal districts (FD) in 2016, %

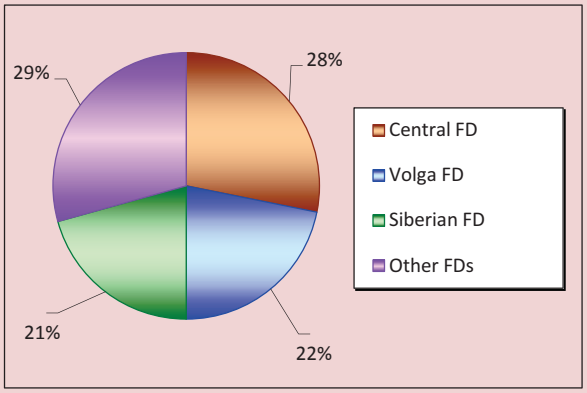
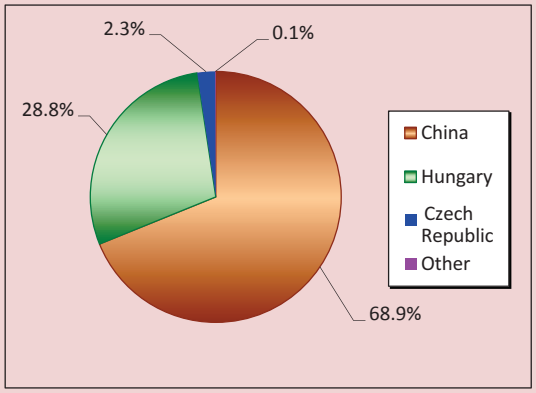


Figure 4. Structure of main suppliers to Russia, %



Source: Federal State Statistics Service. Available at: http://www.gks.ru/).

Some works of foreign researchers show the positive effect of rabbit industry breeding on improving food security, food quality and, as a result, the quality of life. At the same time, domestic studies present rabbit breeding statically, characterizing production technology, quality of the resource base, features of sector development in modern market situation. These works lack strategic vision of the future in this sector taking into account the state priorities. In this regard, there is a need to improve the mechanisms of integrated development of rabbit breeding taking into account the general theory of strategy.

Research methodology. The study is based on the general theory of strategy proposed by Professor V.L. Kvint [7]. In the modern world strategic thinking is often not given much importance despite the fact that it has always been applied, primarily in military practice. The very phenomenon of *strategy* is misunderstood and misinterpreted. Some use the term *strategy* as a synonym to *forecasting*, while others identify *strategy* as *planning*. Due to lack of in-depth research into the theory of strategy and the fact that strategy as a science is relatively young, the importance and strength of the theory and practice of strategy remains underestimated. However, recommendations derived from country's sectoral analysis using strategic methodology will be particularly useful for implementштп strategic priorities in the national market space.

One of the basic laws of the general theory of strategy is optimization of available limited resources using the time factor as a determinant. Therefore, when forming a conceptual model of optimization and improving the efficiency of the sector it is necessary to solve optimization problems.

The conceptual model of competitive environment development formation and regulation is being developed with the help of a systematic approach to improving the business process of a sector and forming the resource-reproduction processes.

The econometric model of vector (VAR-model) autoregression is presented as a justification for the system-forming effect of rabbit breeding. In this study, the VAR-model

is used to analyze the dynamic impact of disturbances in rabbit breeding on related areas associated with its development. A distinctive feature of the VAR-model is that it obtains empirical evidence of the reaction of economic and social variables to shocks in the sector's development.

Vector autoregression (VAR) is a system of simultaneous equations which consists of one-dimensional ARMA models. The main VAR advantage is the efficiency of the model due to fewer lags (compared to traditional ARMA). The model does not require dividing dependent and independent variables. The model can be estimated by simple OLS, the estimates will be consistent. A relatively simple tool provides an excellent opportunity to systematically and internally coherently capture a positive performance of multivariable time series. The disadvantage of the VAR-model is a large number of parameters which can adversely affect the quality of the model.

The popularization of these models began in the 1980–s from the work by C. Sims [21] who later won the Nobel Prize in Economic Sciences (2011). However, according to 22….. Christiano L., VAR-models currently play an important role [22]. In most cases, such models are used to simulate the impact of the monetary policy on macro-economic variables [23; 24; 25; 26; 27; 28; 29]. However, the universal nature of the model makes it applicable to other scientific spheres: capital market [30], financial analysis of enterprises [31], public finance [32], etc.

The two-dimensional VAR-model may look as follows:

$$\begin{cases} Y_{1t} = a_{11} + b_{11}Y_{t-1} + b_{12}X_{t-1} + \varepsilon_{1t}, \\ X_{2t} = a_{21} + b_{21}Y_{t-1} + b_{22}X_{t-1} + \varepsilon_{2t}, \end{cases} \quad (1)$$

where Y_{1t}, X_{2t} are variables;

a_{11}, a_{21} are constants of the first and second equations in the system, respectively;

b_{11}, b_{12},b_{21}, b_{22} are coefficients in system equations;

ε_{1t}, ε_{2t} is white noise that can be correlated.

Each system equation is an autoregressive model of distributed lags. According to the structure of equations, the interpretation of VAR parameters is determined. For example, a non-zero value of b_{11} indicates autocorrelation in the Y_{1t} series, and a non-zero value of b_{12} indicates that the previous values of X_{t-1} affect the current Y_{1t} process.

The matrix form of the two-dimensional VAR-model looks as follows. Consider system (1) in matrix form.

Suppose

$$Y_t = \begin{pmatrix} Y_t \\ X_t \end{pmatrix}; \alpha = \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix}; \quad B = \begin{pmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{pmatrix}; \quad Y_{t-1} = \begin{pmatrix} Y_{t-1} \\ X_t - 1 \end{pmatrix}; \varepsilon_t = \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}, \quad (2)$$

then system (1) will take the following form:

$$Y_t = a + B_1 Y_{t-1} + \varepsilon_t . \quad (3)$$

Exogenous variables are often included in this model to improve the overall quality of the model. Studying the effect of exogenous variables on endogenous variables is not included in the objectives of the research. The algorithm for constructing a VAR-model is similar to that used for ARIMA model. At the first stage, time series are tested for stationarity using, for example, the extended Dickey–Fuller test. The informational framework of the research is data from the Unified interdepartmental information and analytical system (EMISS).

The following socio-economic indicators (*Table*) serve as model variables.

VAR-model variables

Code	Variable
PROD	Volume of rabbit meat production, thousand tons
LABOR	Average number of employees in the full range of organizations in animal breeding
INVEST	Fixed capital investment in agriculture, mln RUB
GDP	Per capita GDP in fixed prices of 2010, bln RUB
X_1	Rabbit mixed fodder production, thousand tons
X_2	Rural migration gain, thousand people
X_3	Wool production in animal breeding, tons
X_4	Organic fertilizer treatment for cultivation, thousand tons
X_5	Number of researchers in Agriculture, people
X_6	Tax imputation and collection in agriculture

As a result, several VAR-model systems were obtained. The variables common in all models are: fixed capital investment in agriculture, volume of rabbit meat production, average number of employees in the full range of organizations in animal breeding, per capita GDP in fixed prices of 2010. During the modeling process the hypothesis of influence of rabbit breeding in Russia on related areas of socio-economic development is tested. In this regard, the constructed systems of VAR-models differ in one factor characterizing the development of related activities or socio-economic areas. Let us present all the estimated VAR systems:

$$\begin{pmatrix} PROD_t \\ LABOR_t \\ INVEST_t \\ X\_i_t \end{pmatrix} = A \times \begin{pmatrix} PROD_{t-1} \\ LABOR_{t-1} \\ INVEST_{t-1} \\ X\_i_{t-1} \end{pmatrix} + c \times GDP_t + \varepsilon_t, \quad (4)$$

where $i \in [1; 6]$.

Note that exogenous factor of the model is per capita GDP which accumulates a set of macro-factors that affect rabbit breeding development in Russia.

Main stages of VAR modeling.

1. Estimate the stationarity of time series of variables under study. For convenience of interpretation and approximation of time series to a stationary form, initial time series were taken as growth rates, rather than levels. For example, we take rabbit meat production growth rates measured in percent as an indicator, rather than the volume of rabbit meat production (Y), which is measured in thousand tons:

$$R_{growth} = \left(\frac{Y_t}{Y_{t-1}} - 1\right) \times 100\%. \quad (5)$$

The stationarity of time series is estimated through using the extended Dickey–Fuller test. The null hypothesis of the test – the time series is a non-stationary process. According to test results the 5% significance level rejects the hypothesis of non-stationarity of a single time series.

2. Determine the order of the VAR model. In practice, Akaike and Schwartz information criteria are commonly used to find an optimal lag of the model. However, due to short time series it is pointless to set the lag length over 2. In this regard, the lag length in the study does not exceed 1.

3. Check the roots of the model for stability. The task is to determine whether the roots of the corresponding characteristic equation lie outside the unit circle. The test showed that the constructed model is stable.

4. Check model residuals. Lagrange multiplier test helps check whether the residuals are white noise. The test shows that the null hypothesis about lack of serial correlation is not rejected at the 5% level of significance; therefore, the regression residuals in the model are white noise. In addition, residuals were estimated for compliance with the normal distribution law. Within this model we failed the residuals to be subject to the normal law.

The coefficients of the obtained models are not interpreted, so the functions of impulse responses are constructed. An impulse is a single disturbance given to one of the parameters [33]. The impulse response function is the reaction of a dynamic series in response to a single disturbance (shock) from the i-th variable. As a result, the impulse response function demonstrates the time of return of the endogenous variable to the equilibrium state at a single shock from another variable [34]. The response of an endogenous variable to a single shock of an exogenous variable is often called a multiplier. In our case, the response (multiplier) is understood as the response of the related activity to the impulse expressed in increased growth rates of "rabbit meat production" indicator.

Research results. Detailed strategic analysis of the external and internal environment, OTSW-analysis, the process of forming the general purpose of the sector and its main strategic priorities taking into account competitive advantages are presented in the previous works of the author [35; 36], so this study is based on the results already presented to the scientific community. One of the ways to implement the strategic priorities is to improve inefficient business processes of the sector under study. Therefore, we construct a conceptual model of rabbit breeding optimization in Russia (*Fig. 5*).

One of the problems of sector development is insufficient evaluation of the resource base. The developed measures of the state economic policy in agriculture aim to increase main production; the support for the resource-forming sector of the sector is insufficient. Thus, it is assumed that provision of financial and legislative resources in a certain amount should ensure the sector's sustainable development. However, this approach seems to be incorrect because the sector cannot fully operate under a limited number of resources. In this regard, the conceptual model of optimization and improvement of sector efficiency begins with the development of the resource base.

The main cost items in rabbit meat production are: mixed feed consumption, purchase of breeding samples for the breeding stock, veterinary drugs, and labor resources [19].

At the moment, due to lack of own breeding, selection and genetic centers agricultural organizations have to import breeding stock from France. The breeding stock is renewed once every three years. Thus, regular supplies of imported livestock for domestic production pose certain currency risks, which, due to exchange rate volatility, affect the price policy of producers. In addition, there is a risk of livestock mortality during the adaptive period, which also has a direct impact on profitability. The consequence is the low market share of farm enterprises (hereinafter – FE) because with the existing business process the profitability of FE production becomes negative.

Within the framework of the proposed model, the state should create domestic breeding and genetic centers in Russia taking into account the financial resources provided by the Strategy for meat farming development. Investment attractiveness at the initial stage of these organizations is low, so the entire investment load should be distributed to federal and regional budgets. The main objective of selection and genetic centers is to conduct selection and breeding activities to improve rabbit breeds using scientifically sound selection and biological tools.

The establishment of these centers will improve the efficiency and competitiveness of domestic rabbit breeding by improving

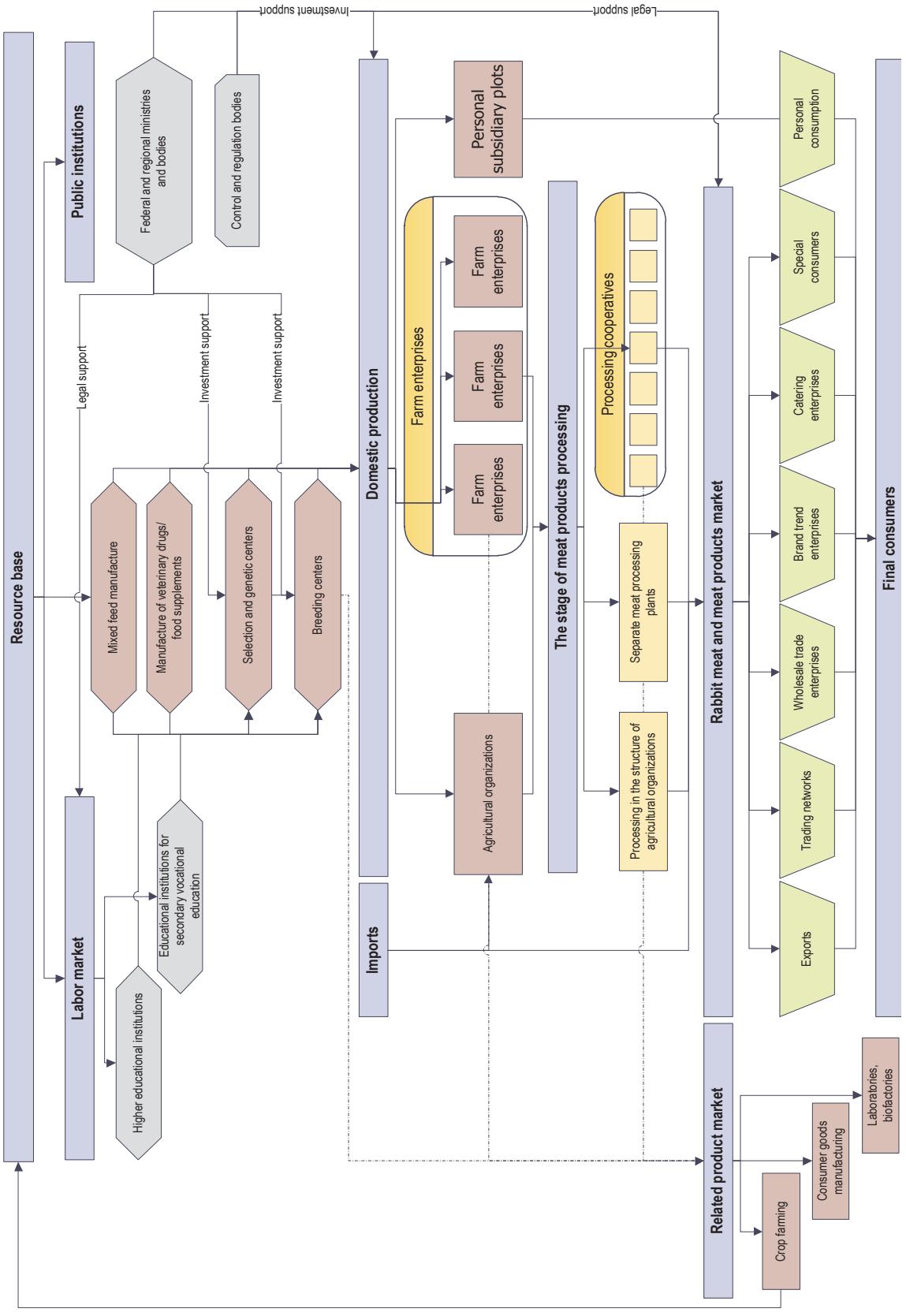


Figure 5. Conceptual model of rabbit breeding optimization in Russia

Source: compiled by the author.

productive qualities, address the needs of agricultural organizations in producing offspring with the specified characteristics.

In this regard, a new segment of the market is being created – market of breeding stock, lost after social and economic reforms in the late 20th century. Successful experience of introducing breeding and genetic centers in rabbit breeding can be retransmitted to other types of meat livestock in the future.

The next step in increasing value added is the formation of breeding stock from the already obtained highly productive breeding herd. To do this, the state needs to build breeding centers using financial resources provided by the Strategy for meat livestock development. The main objective of the breeding centers should be formation of feeder stock, as well as its commercial sale at further production stages. In addition, it is necessary to provide subsidiary types of commercial activities:

1) formation of the feeding formula for feeder livestock;

2) veterinary and phytosanitary surveillance and consulting of producers;

3) supply of rabbit species to the market of related products to laboratories and biofactories.

One of the main conclusions of analyzing the labor resources is that theere are trend that characterize the professional re-focus of specialists between animal breeding sectors. This approach has only a short-term effect as with professional re-focus of specialists a shortage of labor resources in certain animal breeding areas takes place. In this regard, the focus on long-term sustainable development of the sector is necessary to form own scientific and labor potential to provide the sector with qualified personnel. Human resources support for breeding and selection and genetic centers should be carried out at the expense of institutions of higher and secondary vocational education. In addition, retraining and advanced training should be carried out in already formed breeding, selection and genetic centers. However, both resource centers and agricultural organizations are in need of qualified specialists.

The next stage in value added formation for rabbit products is domestic production and imports. All domestic production can be divided into three forms: agricultural organizations, farm enterprises and personal subsidiary plots.

In some agricultural organizations, the existing business processes remain unchanged except for certain aspects. In particular, agricultural organizations due to lack of domestic breeding stock are forced to import it. The main importers in this area are France and China.

Regular livestock renewal in agricultural organizations increases the risk associated with exchange rate differences between purchasing and selling prices, assumed by the producer.

In addition, due to certain circumstances such as growth and livestock mortality agricultural organizations are faced with production risks where producers cannot provide uniform product supplies. Thus, if shortage of products takes place the manufacturer pays penalty fees; in case of commodity surplus in warehouses they suffer losses from reduced selling price. Due to uneven distribution of workload of production capacity direct production costs are increased.

Thus, all of these factors reduce production profitability of agricultural organizations and in the future – the investment attractiveness of this sector of livestock breeding. Agricultural organizations possessing greater financial resources than farm enterprises can take

certain risks and decrease profitability, while farm enterprises cannot afford that. Establishing domestic breeding, selection and genetic centers will help reduce these risks and increase the competitive advantages of domestic products over imported products, as well as over certain types of domestic meat products. As a result, the risks of uneven production process for producers will be reduced.

The category *agricultural organization* is aggregated and can be represented by producers whose product output differs more than 10 times. As a rule, agricultural organizations have their own breeding stock and only buy pedigree stock; they are self-managed and carry out veterinary and phytosanitary control. The authors' approach to optimization of business processes proposes to outsource the office for veterinary and phytosanitary control of medium and small agricultural organizations to breeding centers; this will subsequently ensure cost optimization, reduce risks for all participants of the production process, and therefore, ensures the development of farm enterprises.

At the moment, the dominant market share is formed in agricultural organizations, the institution of farming is poorly developed. The optimization of the sector's resource base accordance to the conceptual model provides opportunities for the development of the institute of farming. It is assumed that the breeding stock for FE will be purchased in domestic breeding centers rather than imported from France or China. Moreover, consulting services in feeding, rabbit breeding and veterinary and phytosanitary control will reduce direct costs of farm enterprises and transfer them to variable costs. Thus, the owners of FE only need to establish a production platform for feeding and managing rabbits. The main products at this stage are live weight rabbits and natural fertilizers.

The next production stage is slaughter and meat processing. In agricultural organizations, meat processing increases the production costs by 30%, in FE – 50–70%. FE do not withstand the price competition so they have to supply all their products in live weight to agricultural organizations thus not taking part in the formation of value added.

At this stage, it is possible to determine the following sub-sectors of meat processing:

1) meat processing in the structure of the agricultural organization;
2) separate meat processing;
3) meat processing cooperatives.

Meat processing in the structure of the agricultural organization is primarily focused on meat processing of local products which help maximize value added. If local production volume is lower than production capacity in meat processing it is possible to purchase rabbits live weight at FE for processing. However, if production volume of agricultural organizations is higher that production capacity in processing the producers have to supply their products to separate meat processing plants.

The authors propose to improve the existing business processes by creating meat processing cooperatives based on state financial resources provided by the Strategy for meat livestock development, as well as through involvement of FE investment funds in equal shares. This form of ownership is a public-private partnership with a private partnership formed from several FE owners. Such cooperation will reduce the costs by evenly distributing the fixed costs of meat processing among all cooperative members and thus ensure price competition with large agricultural organizations.

All products of the meat processing stage are presented in the form of main and related products. The main products – chilled and frozen meat products – are sent to final users

through main sales channels. Related products – rabbit skins and natural fertilizers – are sent to the market of related products to consumer goods manufacturing and crop production. At the same time, crop production produced with the use of natural fertilizers has high production characteristics and participates in the next stages of production of mixed feed for rabbit breeding. Thus, the iterative production process is provided, i.e. the closed-cycle process, which provides competitive advantages of the participants of the production process in this sector.

This conceptual model ensures the implementation of public interests:

1) in terms of ensuring food security and increasing the level of food supply with dietary meat products;

2) reduction of unemployment;

3) decreased level of urban migration;

4) increased wages in animal breeding;

5) increased production of related sectors;

6) supply of related products to markets for consumer goods and crop production.

To confirm this thesis we calculated the multiplicative effect of rabbit breeding development on all VAR-variables (see table) in accordance with the presented methodology. *Figure 6* presents the functions of impulse responses where the vertical axis shows changes in the corresponding variable in % and the horizontal axis – time period (year) after which after a certain time statistically significant changes will be observed.

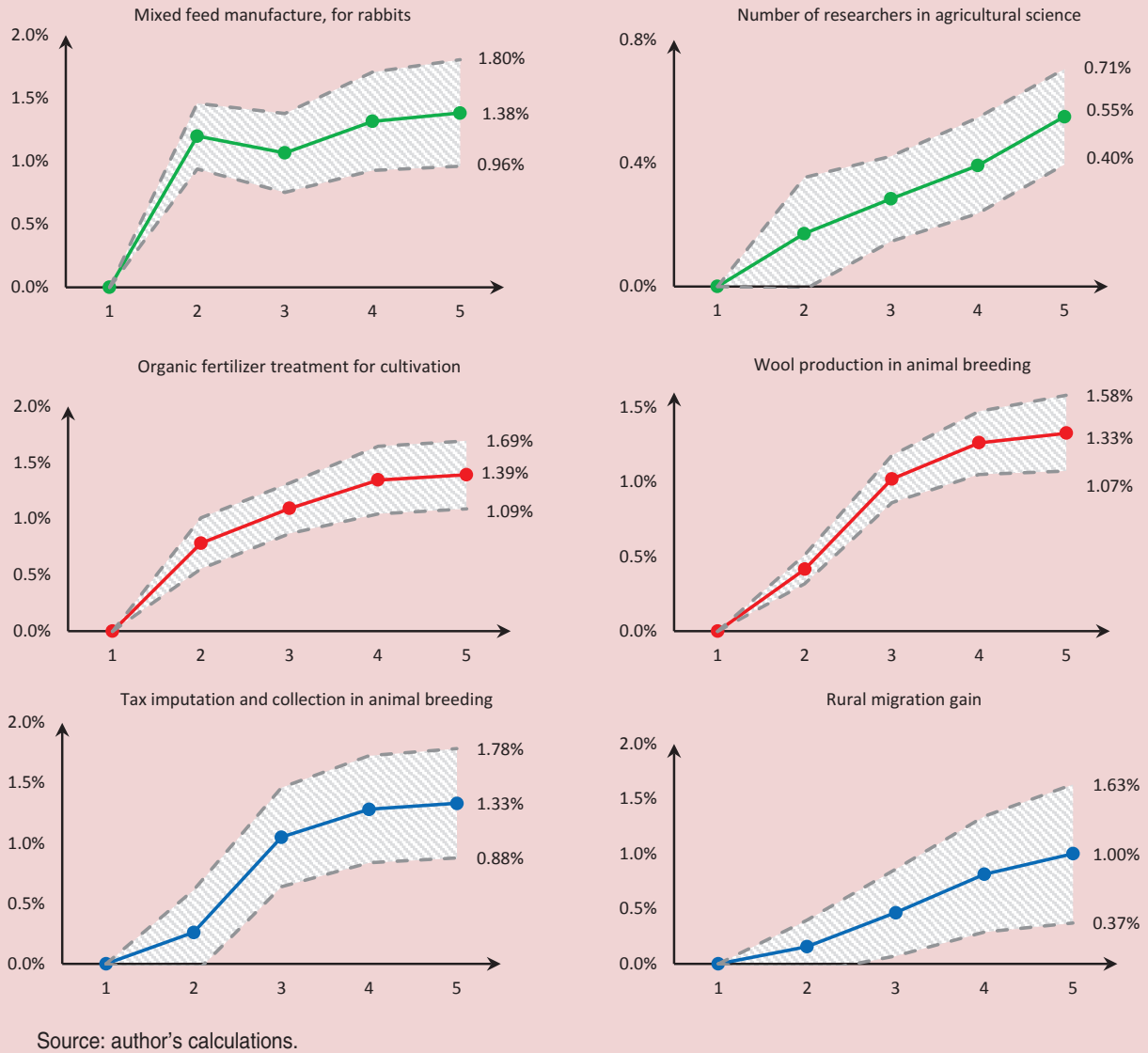
The impulse response functions are presented in the form of cumulative (accumulated) effect of related activities in response to changes in the volume of rabbit meat products (a one percentage point increase in sectoral growth rate). It is possible to note a significant positive effect from the development of rabbit mixed feed base, which will be observed two years later. There is also a statistically significant positive effect on the development of labor resources, which is more long-term. Five years later, the expected number of researchers on an optimistic scenario will increase to 0.71%. The involvement of researchers in agriculture requires time for preparation and retraining in zoo-engineering, genetics etc. Researchers will also provide training and retraining of personnel amid personnel shortage [35], which is necessary for establishing innovation-based production.

Related activities that will be developed include production of organic fertilizers which in five years can grow by 1.39%. The work by J.I. Mcnitt [16, p. 287] marks a high content of nitrogen, phosphorus and potassium in organic rabbit breeding products, which can later be used to enrich the cultivated soil.

In rabbit breeding there are two possible areas of development – fur and meat sector [18]. At the initial stages of rabbit breeding development it is appropriate breed rabbits not only for dietary meat, but also for skins to develop certain areas of consumer goods manufacturing. The results of simulation demonstrate a significant impulse response for the third year (+1%) from the activity "wool production in animal breeding".

However, the impulse response in rural migration gain and the volume of tax revenues is long-term. During the first years, the impulse response of these indicators is insignificant. This indicates that in the short term the development of farming in rural areas will not solve the problem of migration from rural to urban areas. In order to effectively reduce rural migration and ensure sustainable development of rural areas it is necessary to elaborate a comprehensive concept and program of rural development. But the development of rabbit breeding using the proposed way will already

Figure 6. Impulse response functions, %



Source: author's calculations.

contribute to rural population outflow. Within 5 years migration outflow will be reduced to 1.63% on an optimistic scenario.

Thus, based on the econometric methods we have proved and defined the system-forming effect of rabbit breeding development.

Discussion and conclusions. Analysis of experience of the rabbit breeding strategy in different countries shows that the strategy process is significantly different in developed and developing countries due to different strategic interests. It has been established that each stage of rabbit breeding development has a certain technological level. Countries that are being involved in the sector development require minimum level of technology in rabbit managing, development, vaccination, etc. due to the fact that innovation technology set high standards for labor and financial resources.

For the past 30 years, rabbit breeding industry has been one of the least developed livestock sectors in Russia, yet it has unique

competitive advantages and great development potential. Moreover, the studies of domestic researchers pay little attention to the concept of long-term sustainable development of the sector and do not cover the strategic vision of the future of rabbit breeding.

In this regard, the present paper proposes a conceptual model for improving business processes in rabbit breeding in Russia providing for the implementation of resource-reproduction processes and formation of autonomous resource security for fully sustainable development of the sector. The model systematizes approaches to the development of the market of related products, necessitates the establishment of the institution of farming in rabbit breeding. The proposed improvements in business processes will optimize the level of fixed costs for FE and thereby reduce production costs, and provide price competition with large agricultural organizations.

Analysis of works of foreign researchers marks the positive impact of rabbit breeding on related activities. To test this thesis for the domestic sector, as well as justify the system-forming effect of rabbit breeding, we have presented the econometric model of vector autoregression (VAR-model). According to the simulation results, the development of rabbit breeding will develop industries that determine its resource base. In the medium term, on an optimistic scenario, there is an increase in production volume of rabbit feed to 1.8% and an increase in the number of researchers in agricultural sciences by 0.71%. In addition to the resource-based sectors, the development of the market of related products (crop production – 1.69%, consumer goods manufacture – 1.58%) is also impacted, as well as tax revenues (1.78%) and rural migration gain (1.63%).

The theoretical significance of the study lies in building a conceptual model of rabbit breeding based on the provisions of the general theory of strategy through the implementation of strategic priorities, including the improvement of inefficient business processes in the sector.

The practical significance of the study lies in using the proposed approaches to developing rabbit breeding in elaborating state programs to improve the efficiency of domestic producers and subsequent updating the Strategy of meat livestock development. The elaborated conceptual model systematizes organizational and economic mechanisms of effective functioning of rabbit breeding. Its development will increase population's food supplies of high-quality dietary meat products, which will improve the quality of life.

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Received April 9, 2018.