

EMPLOYING THE THEORY OF DYNAMIC INFORMATION SYSTEMS WITH A VIEW TO PUTTING TOGETHER A PROPER CONCEPTUAL AND CATEGORICAL FRAMEWORK IN THE AREA OF IMPORT SUBSTITUTION

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ABSTRACT

This study aims to analyze the category 'import substitution' using specific tools from the theory of dynamic systems that provide for an optimal balance in terms of preserving content-related and conceptual specificity and mathematical rigor within the context of the cognition of complex objects. The authors analyze and classify existing approaches to defining the category 'import substitution' by reference to the content-related, conceptual, and functional aspects that are reflected, in one way or another, in definitions employed. Using tools from the theory of dynamic information systems the authors put together a definition of the category 'import substitution' of their own. To this end, the authors utilize a triadic method intended to reflect the category in question in three first-level derived categories which characterize it most completely. Each of the three first-level derived categories is decrypted using second-level categories, and then all the derived categories are used to define the base category 'import substitution'. The subsequent raising of the decryption level helps take a more deliberate approach to defining the category 'import substitution'. To this end, the authors also decrypt each of the second-level derived categories, which results in that the overall number of third level categories characterizing the base category comes to 27. Using all the derivatives the authors manage to fine-tune and expand the definition of the category 'import substitution' and reflect in it certain aspects which previously used to be left out of consideration by scholars exploring import substitution.

Keywords: *Import Substitution, Category, Concept, Theory Of Dynamic Information Systems, Triadic Method For Decrypting Categories*

1. INTRODUCTION

The foundations of the theory of import substitution were laid down by the representatives of early Mercantilism W. Stafford, M.A. de Santis, and G. Scaruffi between the 15th and 16th centuries, when they created monetary balance theory. Under this theory, all the money should be spent domestically on domestic products to prevent capital from flowing out of the country. The actual founders of the theory of import substitution were the representatives of late Mercantilism T. Mun and A. de Montchrestien, who created and developed the theory of the active balance of trade. This theory is grounded in protectionist measures aimed at hindering the inflow of imported industrial goods and stimulating the development of export [18].

With the development of entrepreneurial activity and its spread across many a sector of industry and production in the late 17th century,

there emerged, and further evolved, classical political economics, which subjected protectionism to criticism and declared it to be an ineffective instrument for economic development.

The scientific community revisited the topic of import substitution only in the period 1929 to 1933, a time of severe global economic recession. Since then, and to date, the issue of import substitution has consistently remained in the focus of scientific research around the world, its relevance waxing and waning alternately in the setting of the various periods of global economic development and depending on the then-current economic development level of specific nations. From a scientific standpoint, this process has been governed by the vying of two alternative takes on economic development – that of neoliberalism and that of Keynesianism.

Despite a keen interest in the issue globally, the present conceptual and categorical framework

of the theory of import substitution appears to be too diverse, which may require applying the latest methodological approaches in the treatment of the scientific issue of defining the category ‘import substitution’ and systematizing derived concepts. The national and foreign literature offers over 100 definitions of the term “import substitution”, which factor in the various attributes characterizing both the content-related and functional aspects of the category under examination. This diversity is, on the one hand, governed by the desire to approach the study of the issue of import substitution in the most complete and systematic fashion, and, on the other, it has to do with a set of objective circumstances associated with the transformation of scientific methodology and the need to factor in such characteristics of present-day scientific research as information surfeit, use of multiple scenarios, and interdisciplinarity [17].

Within the context of import substitution, information surfeit is reflected in the considerable number of publications. Over the last 25 years, Russian publications alone have featured over 20,000 papers devoted to issues related to import substitution, with as many as 8,000 works published in the period between 2011 and the present. These papers characterize the category ‘import substitution’ from different angles and contain sets of derived concepts. This diversity creates difficulties in the process of intellectual analysis and generalization of knowledge that is available already and requires employing special methodological research techniques.

The use of multiple scenarios in the setting of import substitution implies the possibility of creating multiple derived concepts characterizing the base category, each of which possesses unique characteristics, and the combined analysis of these concepts can be considered from the standpoint of the systemic completeness of the definition of the category ‘import substitution’.

The need to factor in a large number of aspects when exploring issues related to import substitution, including the legal, social, economic, technical-technological, and environmental aspects, requires implementing an interdisciplinary approach in research.

In implementing the procedure for describing the category ‘import substitution’ as the object of theoretical-economic research, the optimal completeness of the object under examination can be achieved through the use of the theory of dynamic information systems [17].

The aim of this study is to analyze the category ‘import substitution’ using tools from the

theory of dynamic systems that provide for an optimal balance in terms of preserving content-related and conceptual specificity and mathematical rigor within the context of the cognition of complex objects.

To achieve this, the authors carried out the following procedures:

1) analyzing and classifying existing approaches to defining the category ‘import substitution’;

2) decrypting, using tools from the theory of dynamic information systems, the category ‘import substitution’ into a triad, which helped obtain a set of derived categories and fine-tune the linkages between them;

3) fine-tuning the definition of the base category ‘import substitution’ based on an increase in the level of triadic decryption.

A key research purpose of this work is to systematize existing theoretical approaches to the content of the category ‘import substitution’.

2. METHODS

The basis for the analysis and classification of existing approaches to defining the category ‘import substitution’ were definitions used by Russian and foreign authors as part of work on issues related to boosting the competitiveness of the national and regional economies, and particular sectors of the economy, and issues related to substituting products turned out by national manufacturers for foreign ones. As part of the classification procedure, the authors factored in the content-related, conceptual, and functional aspects of import substitution, reflected in one way or another in definitions employed.

Next, using tools from the theory of dynamic information systems the authors constructed a definition of the category ‘import substitution’. To this end, they employed a triadic method designed to reflect the category in question in three first-level derived categories characterizing it most completely [19]. Each of the three derived first-level categories was decrypted using a total of 9 second-level categories, and then the authors utilized all of the derived categories to define the base category ‘import substitution’.

The subsequent raising of the decryption level helped take a more deliberate approach to defining the category ‘import substitution’. To this end, the authors also decrypted each of the second-level derived categories, which resulted in the overall number of third level categories characterizing the base category coming to 27.

Using all of the derivatives the authors managed to fine-tune and expand the definition of the category ‘import substitution’, and reflect in it certain aspects that previously used to be left out of consideration by scholars exploring import substitution.

3. RESULTS

3.1 Analysis And Classification Of Approaches To Defining The Category ‘Import Substitution’

Initially, the category ‘import substitution’ emerged and was introduced into scientific circulation within the context of fostering a nation’s positive trade balance using measures of protectionist policy [18]. Many researchers construe import substitution as the state’s policy or strategy aimed at ensuring economic growth via the creation of competitive internal production oriented toward the substitution of imported products in both the national and external markets (Table 1). The differences in definitions proposed by different researchers as part of this approach are reflected in

the breakdown of the principal objective in import substitution as a policy. In the view of various authors, substituting domestic products for foreign ones helps gain economic independence and derive economic benefits [5], minimize external risks [6] achieve high and sustainable economic growth rates [14], ensure innovation-based economic development [15], etc.

The second approach reflects the processual essence of import substitution and is a consequence of the development of notions of the development and implementation of import substitution policy. As a process import substitution characterizes the category’s content-related side and helps determine key areas of focus and instruments for the implementation of policy aimed at import substitution. This group’s definitions are distinctly inclusive of the following sub-processes, which are considered both collectively and separately from each other, being the different aspects of the same process: 1) reduction or total discontinuation of the import of products into the country; 2) augmentation of the production of the same or similar products inside the country.

Table 1. Classification of approaches to defining the category ‘import substitution’

Definition of the category ‘import substitution’	Author
<i>Approach 1: Import substitution as a strategy or policy</i>	
The policy of substituting domestic products for foreign ones using quotas and tariffs, which is operated to help develop the nation’s own production, ensure economic independence, and derive economic benefits.	Lozovskii et al., 1997
The process of optimizing the structure of the economy [as an economic strategy] of a country and a region as part of creating new competitive production operations that help minimize external risks.	Semykin et al., 2014 [6]
“The process of import substitution is a component part of a strategy for boosting the competitiveness of the national agri-food complex”.	Ermolova, 2015 [11]
“It is one of the types of radical government intervention in the economy with a view to helping achieve high and sustainable growth rates in a climate when a country that follows a more liberal model is having major difficulties in its economic development”.	Mukhin, 2016 [14]
The element of the state’s innovation policy which ensures the country’s accelerated passage through the stage of imitating advanced technology and innovation and its shift to the stage of the formation and domination of science-driven industries.	Kurbanov, 2015 [15]
<i>Approach 2: Import substitution as a process</i>	
Reducing or discontinuing the import of a certain product through the manufacture and turn-out of the same product or similar ones.	Raizberg, Lozovskii, & Starodubtseva, 2007 [1]; Azoev, Zav’yalov, Lozovskii, Porshev, & Raizberg, 2000 [4]
Reducing or discontinuing the import of a certain product through the development of national (internal) production of a similar product.	Rumyantseva, 2006 [2]
The process of substituting domestic products for imported ones.	Matantsev, 2003 [3]

“Import substitution, under present-day conditions, is the process of ramping up the internal production of goods while minimizing import consumption”.	Gorokhov, Medvedeva, & Goncharenko, 2016 [12]
“Import substitution is construed as substituting goods produced by domestic manufacturers for imported ones”.	Plyushchev, 2015 [13]
<i>Approach 3: Import substitution as a result</i>	
A crucial factor in the economic development of regions that ensures the production of a planned amount of goods of proper quality that are expected to reduce the share of imported goods in the nation’s consumption.	Makarov, 2011 [7]; Zaitsev, 2002 [8]; Ismagilova, 2004 [9]
A system of measures ensuring an enterprise’s attainment of its goals in terms of the volumes and structure of import substitution as part of enhancing the efficiency of its activity.	Volkodavova, 2009 [10]
The result of the implementation of government policy which incorporates the reduction of the degree of the economy’s dependence on raw materials and turn-out of higher added-value products capable of competing with foreign ones.	Soldatova, 2015 [16]

The third approach to defining the category ‘import substitution’ implies shifting the conceptual focus onto the result to be achieved. Researchers favoring this approach focus on derived concepts characterizing the attainment of a goal set or an effect from import substitution. Such results may include producing a planned amount of goods of proper quality intended to substitute imported goods [7-9], boosting the efficiency of the enterprise’s activity through the attainment of its goals in terms of the volumes and structure of import substitution [10], reducing the extent of the economy’s dependence on raw materials, and manufacturing competitive products [16].

Thus, the conducted analysis and systematization of existing approaches to defining the category ‘import substitution’ helped identify three derived concepts forming the basis of definitions proposed by multiple authors: policy (strategy), process, and result.

3.2 Decryption Of The Category ‘Import Substitution’ Using Tools From The Theory Of Dynamic Information Systems

3.2.1 Constructing a two-tier triadic scheme for the category

The above analysis of the definitions of the category ‘import substitution’ helped identify three major approaches to constructing the category in question: import substitution as a policy or strategy, import substitution as a process, and import

substitution as a result. These approaches characterize three major aspects of import substitution. The first one holds that any economic processes or phenomena are subjective by their nature, and, therefore, to manifest most efficiently, they require creating a preliminary action plan which, if executed, will ensure the necessary efficiency. An example of this is the development of a strategy for economic activity that is needed both at the level of particular enterprises and sectors and at the level of the economy as a whole. Economic strategy is linked inseparably with economic policy – it is developed and implemented as part of economic policy. For this reason, the first derived category of import substitution is a plan as a sort of program of action aimed at implementation and developed as part of a certain economic policy.

The implementation of any plan is a process that is the second derivative of the category import substitution. The process as a category of import substitution has been singled out explicitly by a great many authors in constructing their definitions (Table 1).

Any process begins with planning the execution and ends producing a certain result – thus, the third derived category of import substitution is the result, which is reflected in a number of definitions provided in Table 1.

Figure 1 features a two-tier triadic decryption of the category ‘import substitution’.

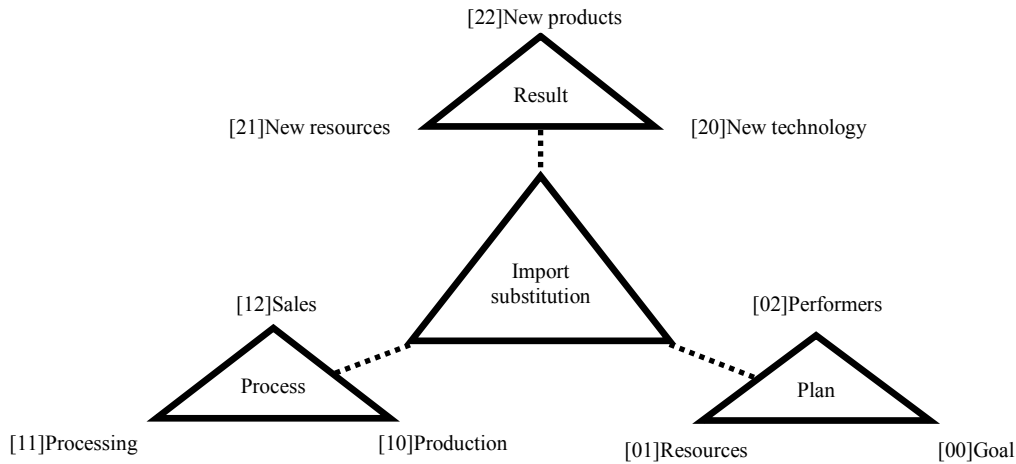


Figure 1. Diagram Illustrating A Two-Tier Triadic Decryption Of The Category 'Import Substitution'.

3.2.2 Analysis of the two-tier triadic scheme for the category

The first level of decryption features three derived categories: plan, process, and result. At the second level, there are three concepts identified as dealing with each of the derived categories, which characterize each of these categories most completely.

It is worth noting here separately that under the theory of dynamic information systems the difference between a category and a concept consists in the need for and the possibility of decrypting: each category is subjected to decryption until we have a situation where acting as derivatives are specific concepts which it is impossible or impractical to decrypt. The decryption level depends on the aims of research, but, in any case, the greater the number of decryption levels the more complete the definition of the category being decrypted. Numeric notations are used to help ease further work on category decryption as part of carrying out mutations. Switching the derived concepts and categories helps move on to the synthesis of the categories, when the triad winds down to a new category characterized by a new combination of concepts.

According to Figure 1, the derived category 'Plan' is decrypted through the concepts '[00]Goal', '[01]Resources', and '[02]Performers'. The plan for the development of import substitution ought to be grounded in a specific goal whose attainment is ensured by the engagement of relevant resources and performers with a proper level of competencies.

The derived category 'Process' is decrypted by the concepts '[10]Production', '[11]Processing', and '[12]Sales'. The import substitution process

ought to always incorporate production or creation of products (technology) or goods intended to substitute imported ones. Created products

(technology) or goods must pass, as part of import substitution, through the stage of being refined, brought to a state or condition when they acquire competitive advantages allowing you to begin the import substitution process in the national market. This stage can be a component part of the production process or can be a separate chain of special operations, but its existence and effectiveness is what determines, in large part, the success of domestic manufacturers in the market. Among the most common practices related to such 'refining' is the institution of additional preferences for a product in the form of various types of state support. Another crucial component part of import substitution is organizing the sale of a product, and it has its own distinctive characteristics related both to promotion channels and to the characteristics of the mode of competition.

The derived category 'Result' is decrypted by the concepts '[20]New technology', '[21]New resources', and '[22]New products'. The result of the development of import substitution can be both positive and negative, as is attested to by the world's experience. You normally get negative results when your import substitution policy has a long-term nature to it and is aimed at creating maximally favorable conditions for internal production through the imposition of artificial restrictions on imported products. This approach justifies itself only in the initial stages, when, thanks to more favorable conditions, national manufacturers are able to save up enough resources and launch innovation processes that are oriented toward boosting the competitiveness of their

products versus imported ones. But when this approach does not let one launch internal competitiveness-enhancing processes, its subsequent implementation leads to the degradation of internal production and its gravitation toward a high level of protectionist measures, which inevitably leads to the collapse of the industry when the state runs out of resources needed to protect it from import.

The successful development of import substitution inevitably leads to the emergence of new technology that creates the basis for the high level of competitiveness of domestic products. Concurrently, there emerge new resources (or resources with new characteristics) that were not inherent to economic relations prior to the implementation of import substitution. A combination of new technology and resources leads to the emergence of new products that can compete successfully with imported ones.

The use of two-tier triadic decryption helps formulate the following definition of the category

‘import substitution’: *import substitution is the process of production, processing, and sale of products which is preplanned and inter-coordinated in terms of goals, resources, and performers and whose end-result is getting into the market new products whose characteristics allow them to compete with their imported counterparts and which are produced domestically using new resources and (or) technology.*

3.3 Constructing a three-tier triadic scheme for decrypting the category ‘import substitution’

The subsequent decryption of the base category using specific triadic schemes helped identify for each derived second-level category three third-level derivatives which in this study represent concepts not subject to further decryption. A scheme for three-tier triadic decryption is displayed in Figure 2.

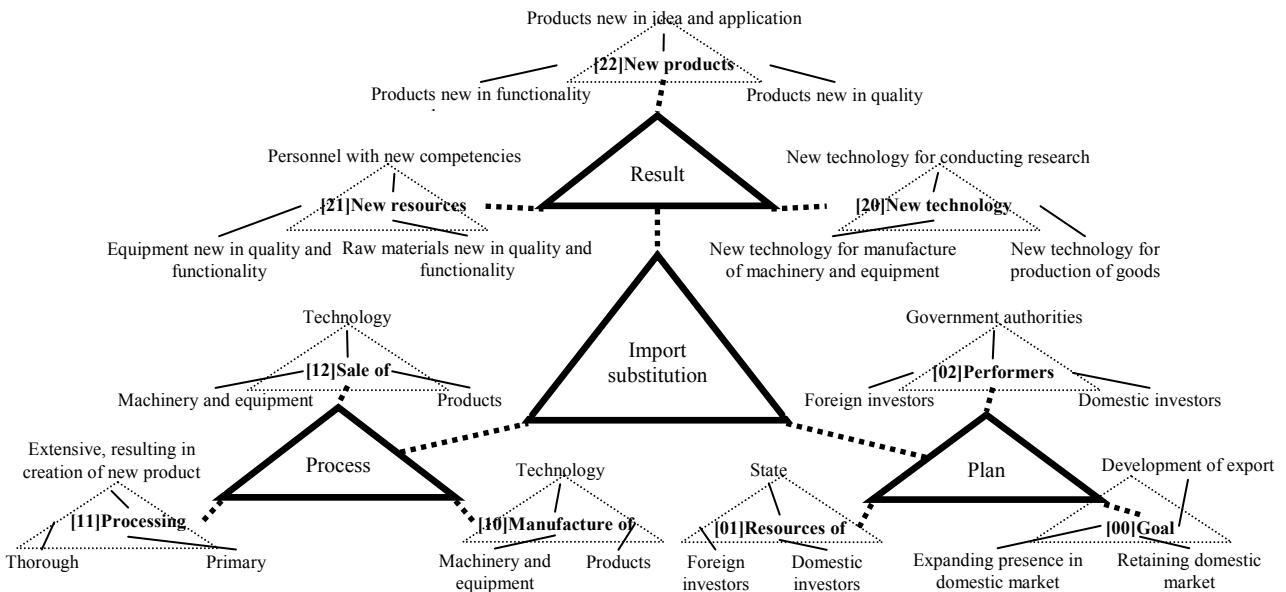


Figure 2. Diagram illustrating a three-tier triadic decryption of the category ‘import substitution’.

The planning of the import substitution process starts with *goalsetting*. The following benchmarks can act as the key ones: (1) retaining the positions in the internal market earned by national manufacturers, (2) expanding the presence of domestic manufacturers in the internal market through driving out foreign competitors, and (3) developing the export of products. Resource support for the attainment of goals set can be provided through funds extended by domestic and foreign investors, as well as by the state. In this

context, among the key performers who could ensure the attainment of goals set are domestic and foreign investors and government authorities – acting both separately from each other and jointly, through the various forms of interaction.

The import substitution process begins with the *production* of import substituting products, such as products that can be geared toward the end-consumer; machinery and equipment needed to manufacture products based on ready-to-use

technology; technology that, if used, can help create import substituting products. Products manufactured for the purposes of import substitution must undergo *refining (processing)*, as a result of which it acquires additional or whole new features that can ensure the proper level of competitiveness versus imported products. Processing can be minor, or primary, (e.g., having vegetables washed and sorted), thorough, when you obtain from raw materials a product that is ready to use, or extensive, which involves creating a product with whole new features. The import substitution process is concluded by *sales* – you may think here of the sale of products intended for end-consumers and of machinery and equipment that can be used to manufacture end-products. A separate item of sale, under the import substitution process, is technology. The import substitution of technology ought to be viewed as the highest form of economic activity that brings the maximum positive effect.

The successful effectuation of the import substitution process results in the implementation and wide-spread use of *new technology* in the economy, which is what is behind the boosts in the efficiency of national production and the competitiveness of domestic manufacturers. Depending on the major characteristics of the import substitution process, new technology can find wide use in the area of production of goods and manufacture of machinery and equipment or in the area of research and development (new technology for creating new technology). The wide use of new technology requires utilizing *new resources*, which can come in the form of new raw materials (new in terms of quality or functional use), new equipment (new also in terms of quality or functional use), and personnel with new competencies. A combination of new technology and new resources helps, as a result of implementing the import substitution process, obtain *new products* that are characterized by varying levels of novelty. This can be well-known products that are of regular functional use but are manufactured at a higher level of quality, products with new functional features, or whole new products in terms of idea and application.

The three-tier decryption of the base category leads to the following definition of it: import substitution is a *pre-planned process* that is *aimed at* retaining or expanding the presence of domestic manufacturers in national markets, which can be followed by entry into external markets and involve the attraction of *resources* from foreign and domestic investors and the direct participation of the government, is grounded in the *production* of

goods, machinery (equipment), and technology, which requires appropriate levels of *refining* (processing) operations that ensure their competitive *sale*, and is oriented toward the wide-spread use, in the national economy, of *new technology* for the production of goods, manufacture of machinery (equipment), and conduct of research using *resources* that are *new* in quality and functionality, its *end-result* being the distribution of *new products* in national markets.

4. DISCUSSION

The use of the theory of dynamic information systems in scientific research related to the area of economics helps take a systemic approach, based on mathematical logic, to the analysis of the domain area and construction of the categorical-systematic framework of theoretical research. The availability of a significant number of approaches to the construction of definitions and their use as part of the conduct of scientific research makes it possible to look at the object and subject of research from different angles and characterize them factoring in a variety of aspects. On one hand, this helps characterize most completely a certain domain of research, but, on the other, it can become an obstacle in the way of comprehending the essence of phenomena being explored, since it inevitably leads to the emergence of scores of diverse definitions of base categories belonging to the area of research. Besides, the existence of several definitions of base categories may become an obstacle in the way of putting together a well-shaped scientific theory, since it must be grounded in a system of categories and concepts forming a single conceptual and categorical framework. This problem is especially acute in economic research, where the object of research is viewed from the standpoint of the various economic schools of thought and currents, which oftentimes have diametrically opposite views of the nature of phenomena being explored. This is quite often the case when it comes to the study of issues related to import substitution. Indeed, scientific schools of thought and currents founded on the major postulates of Mercantilism tend to view import substitution from the standpoint of protectionist measures in the context of unquestionable support provided to domestic manufacturers in every way possible. Proponents of the theory of free market relations view import substitution as one of the instruments in competitive struggle. Consequently, the conceptual and categorical framework employed in the area of import substitution is

distinguished by significant diversity and requires systematizing the categories and concepts used.

Triadic decryption, as an instrument for constructing the definitions of concepts and categories, helps take a systematic approach to resolving the issue and factor in as completely as possible the existence of different points of view regarding the issue of import substitution. That being said, the construction of key definitions for the domain area is performed based on the synthesis of existing definitions within the framework of the various scientific approaches and areas of focus.

A substantial limitation of the study's tool for putting together a definition is that a subjective expert opinion approach is taken to the choice of first-level derived category, which influences greatly all further work on deciphering the main category and leads to multivariate results. That being said, the higher the qualifications of researchers utilizing this instrumentarium, the more similar the results. In this regard, the area of this research study one may regard as promising is to further fine-tune and substantiate the base categories – it is based on their analysis that the category under study, 'import substitution', is invested with meaning.

5. CONCLUSION

The definition of the category 'import substitution' obtained as a result of three-tier decryption not only lets you characterize the domain area in a systemic manner but, concurrently, also serves as a basis for constructing a set of derived categories, as well as for identifying classification groups of import substitution processes, distinguished by considerable diversity.

The further formation of a conceptual and categorical framework in the area of import substitution should be possible based on the determination of interrelationships between the derived categories provided in Figure 2 through mutating the triads, i.e. switching the derived concepts using a special algorithm. As a result, you will get 5 more schemes each of which expresses a special aspect of import substitution and requires selecting a new category. Carrying out this work will help put together a universal categorical scheme for import substitution, based on which one will be able to construct, going forward, a relevant scientific theory that meets the requirements of completeness, cohesion, and detail [20].

Being a multi-aspect one, the issue of the development of import substitution requires applying new scientific-research tools that will help overcome the limitations of traditional methods and take a novel look at the object and subject of research. As a methodology for scientific research, the theory of dynamic information systems, which has given a good account of itself in the technical and physico-mathematical sciences, makes it possible to look at the issue of import substitution from the standpoint of mathematical logic and systematize knowledge that has been amassed in the field to date.

The authors see the study's practical significance and economic relevance as follows. Based on data from the Federal Customs Service, in 2016 the volume of imports into the Russian Federation totaled \$183.6 billion, while as much as 30% of imported goods may be replaced with similar domestic products within the next 3–5 years. When it comes to the development and implementation of measures aimed at import substitution, a crucial aspect is how to approach the content of the concept of 'import substitution'. The authors are convinced that only taking an integrated approach to import substitution, like the one brought forward and substantiated in this study, will help derive the maximum of economic benefits from measures implemented to help drive growth in domestic production.

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