This explanation of trade is valid under conditions of monopolistic competition. The external effect of scale implies that the number of enterprises that produce the same goods increases, and while the volume of each of them is changing, this effect leads to the emergence of perfect competition. Thus, the model explains the reasons for international trade in differentiated products of the same industries, that is, intra-industry trade, the share of which is constantly growing. Nevertheless, this approach should still be considered not as a denial, but as an addition to classical theories explaining inter-industry trade [1].

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THE INFLUENCE OF INTEGRATION PROCESSES
ON THE COMPETITIVENESS
OF THE COUNTRY'S NATIONAL ECONOMY

Competitiveness and integration are interrelated processes. When integrating a country into one or another regional grouping, the aim is to obtain a certain positive effect, which should raise the competitiveness of the national economy, its industries and enterprises. However, this goal can be realized only under certain

conditions. In general, the impact of integration on the competitiveness of the national economy can be expressed in the realization of comparative advantages, economic interests, reduction of production costs due to economies of scale of production, improvement of economic performance of enterprises and industries mainly at the regional level.

However, economic integration affects the competitiveness of national economies in different ways: towards dynamism and strengthening, or by exacerbating contradictions and reducing competitiveness. Everything depends on a correctly chosen economic policy, a correct assessment of the economic and political situation in the country, the presence or absence of economic resources. The lack of real prerequisites for the effective practical implementation of economic integration, the immaturity of socio-economic relations, the primitiveness and structural undifferentiation of national economies, the underdevelopment of the market and financial infrastructure can doom a country that joined the union to failure or complete failure. However, in general, the integration process is a powerful tool for accelerating the development of regional economies and increasing competitiveness on the world market of countries that are members of integration groups.

A well-founded theory of the influence of integration on national economies was created by the American scientist of Canadian origin J. Viner. He identified two main types of effects arising from economic integration: the trade creation effect and the trade reorientation effect. The effect of creating trade is to expand trade within the integration association. There is an effect of scale in this: two or more countries together can form a fairly large market, which allows for a reduction in specific production costs. The effect of trade reorientation consists of such economic benefits when a partner country increases the export of its goods to another country, although before the creation of the union these goods were imported from the third countries with lower costs. Thus, the effect of reorientation contributes to the growth of production in the partner exporting country.

J. Meade, a British economist who was awarded the Nobel Prize in Economics in 1977, after critically analyzing the works of J. Viner, supplemented the theory of

the effects of economic integration. The scientist distinguishes the following effects of economic integration: the effect of trade reorientation and the trade-forming effect. Based on the analysis of the steel market in a number of European countries, J. Meade came to the conclusion that as a result of integration, a reorientation of production from low-cost to high-cost, which is uneconomical and inefficient, may occur. As a result, the world production is reduced and in some places there is a drop in the general standard of living. In addition, J. Meade notes that the customs union leads to the diversion of international trade from the rest of the countries in favor of one of the partners, which now, from the point of view of customs barriers, occupies a privileged position in the market of the importing country, it is an uneconomic innovation. However, J. Meade does not deny that the customs union is able to lead to the formation of new directions of international trade, since one of the partners can export to the market of another partner now and beat the prices set by the existing industry. Such an innovation leads to the transfer of resources to a more efficient and economical production system.

Taking into account the trade-forming effect, J. Meade considers it necessary to balance economic benefits from some elements of trade formation with economic losses from other elements of trade distraction. Thus, as a result of the removal of tariffs between countries within the framework of the association, trade expansion in other sectors of the economy may occur, which will lead to a decrease in costs and economic gain. The scientist made his analysis basing on the following research method: multiplying the value of each element of abstract trade increases costs per unit of this type of trade and multiplying the value of each element of newly created trade reduces costs per unit of this created trade. J. Meade believes that the expansion of trade compensates for losses from the distraction of existing trade from low-cost to high-cost trade.

Among the disadvantages of economic integration, J. Meade also refers to the fact that the creation of a customs union for the countries forming this union means a reduction in the revenues received at the expense of customs duties. There may be some losses that can be offset against the gains of trade expansion. Then

the lost customs revenue must be compensated by increasing other forms of taxation: the new tax will cause the same damage here as the old duty caused. In this case, the trade-creating effects of tariff reductions must be greater than the adverse trade-reducing effects of the best alternative methods of revenue generation.

The effect of the scale of production as a result of integration is noted by American scientists C. R. McConnell and S. L. Brue. Analyzing the process of integration within the EU, they note that integration creates mass markets, which are necessary for the industries of the countries of the "common market" to achieve economies of scale of production. The more efficient production characteristic of large-scale markets enables industries in European countries to achieve lower costs that have historically been unattainable in narrow, isolated markets. At the same time, they note that the impact of integration on third countries is less defined due to rising tariffs.

Thus, no scientist treats the consequences of integration unambiguously. Integration has both positive and negative effects. The positive consequences include an increase in the demand for goods and services, the spread of trade, the creation of large enterprises, the reorientation of trade in goods from third countries, the transfer of resources to a more economical and efficient production system, the volume of investments from partner countries increases, the development of specialization and the division of labor. So, the access to financial, labor, material resources and the latest technologies is opened. It is also worth remembering the negative consequences that integration leads to: a reduction in state revenues from customs duties, the movement of goods from one country to other more developed partner countries, which will turn it into a backward region, an increase in product prices due to oligopoly, etc.

The *Global Competitiveness Index* is a global study that ranks the countries of the world according to the indicator of economic competitiveness. It is calculated according to the methodology of the World Economic Forum, which is based on a combination of publicly available statistical data and the results of a global survey of company managers. The surveys are conducted annually by the World Economic

Forum together with a network of partner leading research institutes and organizations in the countries analyzed in the report. The study has been conducted since 2004 and is currently the most complete set of indicators of the competitiveness of various countries in the world. The World Economic Forum defines national competitiveness as the ability of a country and its institutions to ensure stable rates of economic growth that would be sustainable in the medium term. Countries with high indicators of national competitiveness, as a rule, ensure a higher level of well-being of their citizens. It is assumed that this index should be used by states seeking to eliminate obstacles to economic development and competitiveness as a tool for analyzing problematic points in their economic policy and developing strategies for achieving sustainable economic progress. Representatives of the World Economic Forum note that the competitiveness of national economies is determined by numerous and diverse factors.

Comparative cross-country analysis based on benchmarking at two levels is widely used in the studies of WEF. At the micro level, the analysis is carried out by means of "reconnaissance" of the company's competitiveness, which makes it possible to assess the effectiveness of activities based on the analysis of its competitive environment, find optimal ways of interacting with counterparties, and take into account their features when forming a corporate strategy. At the macro level, the policy of competitiveness is studied across the entire economy, which allows identifying the most successfully competing companies, industries and sectors in the aggregate of national manufacturers on the international market on the basis of analysis of the competitive environment, as well as factors determining the competitiveness and competitive advantages of the country.

Undoubtedly, inefficient management of state finances and high inflation have a negative impact on the state of the economy, while the protection of intellectual property rights, a developed judicial system, and other measures can have a positive effect. Along with institutional factors, the education and training of the workforce, constant access to new knowledge and technologies can be of decisive importance. The factors that determine the competitiveness of the economy have different effects

on the economic systems of the countries of the world, depending on the starting conditions and the current level of development. It is obvious that the factors themselves change over time.

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MODERN ARCHITECTURE OF DYNAMICALLY TYPED PROGRAMMING LANGUAGEVMS

Dynamically typed programming languages such as Python, Ruby, and JavaScript have become increasingly popular in recent years. Their dynamic nature offers several advantages over their statically typed counterparts, such as rapid prototyping, easy debugging, and the ability to dynamically generate code at runtime. However, it also comes with a performance cost, as the interpreter has to perform additional operations during program executions, for example, type checking and memory management. This work aims to research the ways how modern dynamically typed programming languages are implemented to achieve their performance metrics.

A lot of research that attempted to mitigate the performance cost [1–3] was conducted during the last several decades. Nowadays language virtual machines (VMs) feature sophisticated garbage collectors, efficient bytecode interpreters, and just-in-time (JIT) compilers, that convert frequently executed code into machine