

Cluster Associations as a Factor of Innovative and Integrative Development of the Economy

Oksana Bakulina, Iryna Legan (Lehan), Ivan Bakhov

Abstract: *The purpose of the article is to substantiate the motivational preferences of the cluster formation participants, as well as to determine the influence of clusters on the enterprise's performance and socio-economic development of regions. Based on the study of the preferences of the creation and functioning of the clusters, it has been revealed that cluster formations allow each of the participants to benefit from the synergy effect arising in the course of combining efforts for the sake of production scaling. The obtained results show that cluster formations are characterized by an emphasis on increasing employee satisfaction due to the integration of motivational preferences of the cluster association participants (production, financial, marketing, innovative, personnel, socio-psychological, environmental, and other preferences) and the formation of qualitatively new opportunities for the implementation of corporate and personal needs of employees. The assessment of the possibilities of forming clusters made it possible to identify the most important factors, such as the development of entrepreneurial culture, which in turn affected the formation of the enterprise's image, the trust of communities, the implementation of innovations, and access to new markets. Based on the conducted study, the authors have determined the formation mechanism of cluster associations, which includes economic, organizational, social, and environmental components.*

Index Terms: *cluster associations, clustering, integration, motivational advantages, synergetic effect.*

I. INTRODUCTION

Stability of social and economic development of Ukraine, as well as the increase of competitiveness of regions, depend in many respects on regional development features of territories, their resource potential, concentration, cooperation, and specialization of business entities. However, in modern conditions in most regions of the country, there is an increase in unemployment, a decrease in income of the population, an increase in labor apathy, and alteration of labor values, which is a serious obstacle to the development of economic entities. In this context, the development of cluster formations is a modern sign of progressive changes in regional development and increasing the competitiveness of companies. The relevance of the research topic is that cluster structures are an effective tool for innovative development of the economy, contributing to the production, economic, social, and other benefits, for both business entities of various forms of activity and the state. However, despite the whole range of scientific and methodological approaches related to the clusters development and functioning, it is important to assess the motivational preferences of the cluster association participants, aimed at the effective implementation of

resource and labor potential, achieving high standards in quality of life, ensuring the competitiveness of production and the formation of qualitatively new opportunities for the implementation of corporate and personal needs of employees. In view of the above, the purpose of the article is to substantiate the motivational prerogatives of the cluster formation participants and to establish the impact of clusters on the effective activities of companies, as well as the socio-economic development of regions.

Literature review. The works of L. Andreeva, M. Voynarenko, M. Gasanov, J.M. Keynes, Yu.Kirilov, M. Porter, S. Rosenfeld, G. Swan, S.I. Sokolenko, O. Solvel, N. Komar, S. Okutaeva, E. Zavorotin, A. Crossman, M. Künzel, G. Meier zu Köcker, T. Köhler, Lauterwasser and Ortiz, P.G. Piperopoulos, P. Smertenko, L. Chernyshev, and I. Bilan are dealing with the study of theoretical, methodological, and practical aspects of the cluster formations development and functioning [1] - [16]. The relevance of the research topic is that cluster structures are an effective tool for innovative development of the economy contributing to the production, economic, social and other benefits for business entities of various forms of activity, as well as for the state. However, despite the whole range of scientific and methodological approaches related to the clusters development and functioning, it is important to assess the motivational preferences of the cluster association participants, aimed at the effective implementation of resource and labor potential, achieving high standards in quality of life, ensuring the competitiveness of production and the formation of qualitatively new opportunities for the implementation of corporate and personal needs of employees.

The purpose of the article is to substantiate the motivational preferences of the cluster formation participants, as well as to determine the impact of clusters on the efficiency of enterprises and socio-economic development of regions.

II. METHODS

A. General description

The theoretical and methodological basis of the research is a systematic approach to the study of the fundamental provisions of economic science regarding the creation and functioning of cluster formations, as well as the identification of their impact on the efficiency of enterprises and socio-economic development of the regions in general.

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B. Algorithm

To solve the set problems, the following general scientific methods were used: the analysis and synthesis method (to clarify the nature of the problems of cluster formations creation and functioning), scientific abstraction, induction and deduction (when generalizing the international practices in the cluster formations creation and development); as well as special methods, such as abstract-logical approach (for theoretical generalization of research results and formulation of conclusions), monographic method (for the in-depth study of motivational preferences of cluster formation participants on the example of best practices of individual business entities), sociological method (when conducting sample survey of enterprises personnel), SWOT analysis, score system (to identify mechanisms for improving the socio-economic development of regions based on the creation of cluster formations), etc.

Tables and figures are based on the official data of the State Statistics Service of Ukraine, the results of sociological research, FAOSTAT and Eurostat statistical and analytical materials. The survey to identify the motivational preferences of cluster formation participants is based on the analysis of data obtained as a result of the survey. The survey involved 368 respondents in four categories of personnel: managers, professionals, specialists, and workers.

The results of the study are presented in the form of diagrams, tables, and graphic images.

III. RESULTS AND DISCUSSION

Clustering of the economies of different countries has become widespread in the last two decades (more than 50% of the economies are covered by the cluster structures creation and operation processes) primarily as a means of improving

the competitiveness of enterprises, as well as a mechanism of flexible response to the situation on world markets, the growth of performance stability through the integration of the competitive advantages of economic entities. Thus, it should be noted that the classic definition of *cluster* is the one offered by M. Porter, namely, a cluster is geographically concentrated groups of interconnected companies, specialized service providers, firms in their respective industries, as well as related organizations (e.g. universities, standardization agencies, trade blocs) in certain areas that compete but also work together [4]. In addition, J.M. Keynes noted that the cluster provoked a multiplier effect, i.e. the ability of the money invested in the business to increase both production and in-house consumption, and, as a result, to produce new money by providing a synergetic effect in joint activities among the cluster participants [2]. V. Tretyak, among the features of the cluster association, distinguishes the sectoral and geographical concentration of enterprises, which produce and sell through joint efforts a number of related or complementary products. Migranyan A. characterizes the cluster as a concentration of the most efficient and interrelated economic activities, i.e. a set of interrelated groups, successfully competing firms, which form the golden section of the entire economic system of the state, and provide a competitive position in the sectoral, national, and global markets [17].

It should be noted that there are different approaches to assess national competitiveness. In particular, to assess the cluster development in Ukraine, one can use the global competitiveness index, based on the study of the World Economic Forum. Fig. 1 presents the global competitiveness index (GCI) components.

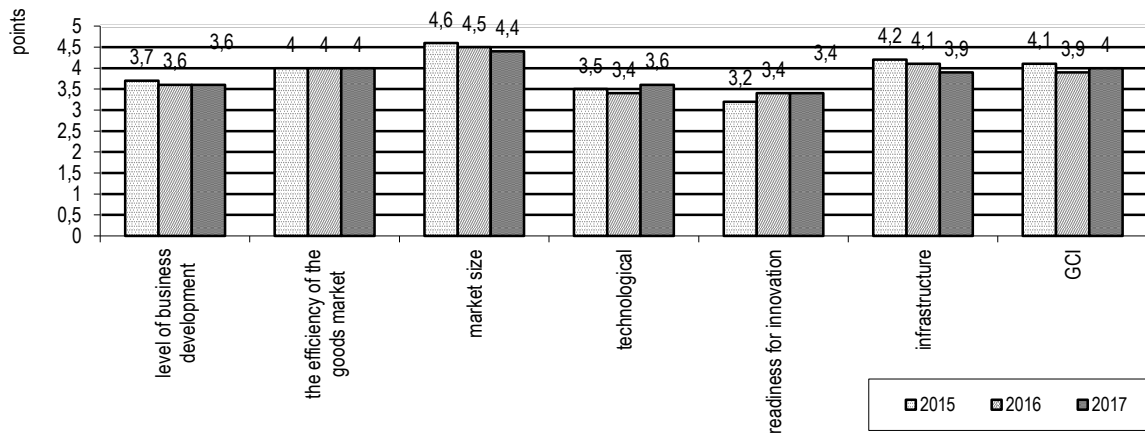


Fig. 1: Ranking of GCI components which characterize the status of the clustering potential of Ukraine

Sources: Compiled by the authors based on the Global Competitiveness Report, 2017 [18]

According to the figure, the position of Ukraine indicates a low level of cluster development. So, if comparing with other countries, the highest position is held by the United States (5.6), UAE (5.4), China (5.4), and Germany (5.4) (Fig. 2). In

recent years, Ukraine has not occupied a leading position in the ranking. Moreover, for the period under review, there was a negative trend – minus six positions.

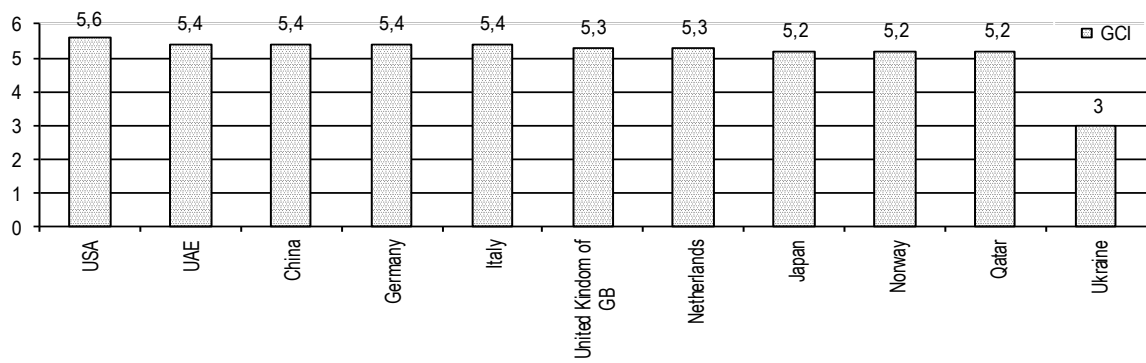


Fig. 2: Analysis of the cluster development level (GCI) in 2017

Sources: Compiled by the authors based on the Global Competitiveness Report, 2017 [18]

It should be noted that the most famous clusters include Silicon Valley in the field of computer technology (Silicon Valley, CA, USA), the American auto industry in Detroit (Detroit, United States), Center of nanotechnology, biotechnology, renewable energy and digital printing in New Mexico (New Mexico, USA), Dhahran Techno-Valley, provider of integrated energy services in the Middle East (Dhahran Techno-Valley, Saudi Arabia), London's City financial sector (The City, East London, UK), the aerospace cluster in Toulouse (France), Heidelberg Technology Park for mechanical engineering for the printing industry (Heidelberg, Germany), etc. [19].

Certainly, the purpose of the enterprises' operation, regardless of organizational and legal forms, is to make a profit. Thus, in modern conditions to improve the efficiency of enterprises as well as the socio-economic development of the regions in general, it is necessary to search for alternative ways to increase the profitability of business entities, reduce the complexity of work, and the rational use of existing production, financial and human resources. The research results suggest that one of the promising directions when solving noted problems, taking into account the experience of different countries, is the voluntary association of efforts and resources of producers on a cluster basis.

The development of clusters contributes to the creation of new forms of interaction of various organizational structures (high-tech and knowledge-intensive associations with a closed production cycle), as well as improves their competitiveness and quality at the international level, contributes to the development of social and industrial infrastructure of territories, creates new jobs, initiates the implementation of innovations and emergence of new industries and consumers, reduces the outflow of residents, contributes to the growth of cultural and educational level of the population, as well as to the development of related sectors of the economy, increases employment of human resources, and promotes to conservation of natural resources.

Given this, it should be noted that the cluster policy should be based on the active cooperation of the authorities, enterprises, organizations, universities, and other relevant structures at the regional level to improve the competitiveness of organizations and regions.

From the experience of clustering in various countries, it is known that for the present, many projects aiming at the development of regions united by a system of production clusters have been developed and approved. From time to time, competitions are held for projects to create new high-tech clusters and stimulate the patenting of inventions of enterprises. The state plays a special role, providing opportunities and making every effort to support existing clusters and creating new networks of enterprises that have not been in contact with each other before. In particular, the analysis of the best practices on clustering shows that the main programs of state support include direct financial support for cluster structures (in France, 50% of expenses for the creation and maintenance of new products and technologies are covered by the state); extension of loans, including those without interest payments (Sweden); free loans (in Germany up to 50% of costs); provision of knowledge or other constituent structures; organization of public events; creation of networks with involved universities and organizations; reduction of the state duties for individual research (Austria and Germany) [19]. In addition to state support, the presence of scientific potential and active research institutions has significant impact on the activities of clusters. Membership in chambers of commerce and industry representing the interests of entrepreneurs is also quite beneficial and contributes to the creation of a favorable business environment for cluster structures. In Ukraine, membership of enterprises in the chambers of commerce and industry is not mandatory.

The development and implementation of the strategic program of clustering the country's economy in order to stimulate the development of new forms of the spatial organization of production should become important for improving competitiveness, creating innovation and investment attractiveness of the economy of Ukraine, taking into account the pan-European trends in the development of the cluster model. Legislative reinforcement of cluster economic development has shown high efficiency in many countries, while in Ukraine it is still in its infancy [20].

In addition, according to a number of scientists and experts, the cluster associations in comparison with other forms of economic activity include



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the following advantages: a significant simplification of access of enterprises to different types of resources; reducing financial and credit risks, on the one hand, and improving the stability and forecasting of cash flows – on the other hand; improving sales efficiency due to the stability of logistics flows among cluster enterprises; reducing transaction costs, which are considered as the cost of business organization, i.e. obtaining information, negotiating, searching for suppliers, concluding and executing contracts, providing legal protection, establishing relationships with both external contractors of the enterprise and internal participants; implementing a qualitative leap in the innovative development of enterprises of the cluster; forming within clusters not only formal but also informal, personal relationships among its participants that facilitates doing business and helps to more effectively coordinate efforts to adapt to changing environmental conditions; implementing innovation forecasting and planning based on timely determination of technological trends; developing information and marketing relations among enterprises of the cluster based on modern technologies, forming within the framework of interregional economic integration of the missing links of the value chain, common standards of

production, supply and management, as well as developing cluster brands [21].

Among the advantages of clusters, it is necessary also to highlight an increase in productivity; the creation of new economic technologies, intellectual processes for the manufacture of new products and goods; activation of entrepreneurial initiative, achievement of synergy in scientific and technological development, as well as investment in specialized research, technology development, information and human resources, infrastructure development, etc.

At the same time, in Ukraine, there are certain solitary examples of cluster creation and functioning. Positive practices of effective performance of the cluster association have been studied by the authors on the example of JSC United Technological Agrarian Company (TACU), which is a successful producer of corn and soybean in Ukraine, as well as the Ukrainian Organic Cluster, which is an agri-food and bio-economic cluster, a public union that unites 19 participants of the organic market of Ukraine. Thus, in the course of the study, a survey of personnel was conducted among the enterprises to identify the main motivational advantages which contributed to improving the efficiency of the activities and functioning of JSC TACU, and the Ukrainian Organic Cluster (Table 1).

Table 1. Main motivational advantages of cluster formation participants
(on the example of JSC TACU, and Ukrainian Organic Cluster)

No	Components	Advantages
1.	Financial	<ul style="list-style-type: none"> - combining the financial capabilities of all cluster participants to ensure obtaining credit resources; - attracting investments by joining efforts of cluster participants; - reliability of partners in financial and investment cooperation; - implementing export activities, accessing foreign markets.
2.	Production	<ul style="list-style-type: none"> - reducing production costs due to effective cooperation among scientific organizations, financial and credit institutions, and industrial enterprises; - implementing high-performance technologies; - producing quality products, and as a result, cooperation with well-known brands (Bunge, Louis Dreyfus Commodities, Cargill, Grinkor, etc.); - using modern machinery and equipment; - implementing repair, sale, and service of agricultural machinery.
3.	Marketing	<ul style="list-style-type: none"> - improving the efficiency of sales and service; - an effective system to access foreign partners and new markets; - increasing the export capacity of the cluster; - strengthening and providing marketing services.
4.	Personnel	<ul style="list-style-type: none"> - an effective system of material and nonmaterial incentives; - reducing labor migration of rural workers; - introducing mechanisms to attract and retain young professionals in rural areas; - conducting professional development and training (courses, secondary and higher education institutions); - participating in international exhibitions, seminars.

5.	Socio-psychological	- providing assistance in transport services, repairing roads, offering targeted assistance to the population, organizing and holding holidays; - providing assistance to large families, the disabled, the poor, and the elderly; - providing support to institutions, kindergartens, and paramedic points within the framework of the "Protected society" project; - providing assistance to youth sports teams in the frameworks of "Culture and Sport" project; - providing repairs, purchasing equipment and interior elements for the churches located in various settlements, preserving architectural monuments within the framework of the "Preserving cultural and spiritual heritage" project.
6.	Innovative	- involving educational institutions, and research organizations in cooperation that contributes to the creation of innovations; - the effective nature of collective innovation in knowledge-intensive industries.
7.	Environmental	- implementing eco-friendly technologies, in particular, the North American technology of soil cultivation that allows not only reducing production costs but also preserving soil fertility.

Sources: developed by the authors

In consequence of the study, the following motivational preferences of the cluster participants were identified: production, financial, marketing, innovation, human resources, socio-psychological, and ecological, aimed at effective implementation of the resource and labor potential, the achievement of high standards in the quality of life of the

population, as well as ensuring the competitiveness of production.

The research results of the need for the creation of cluster associations in the region are presented in the form of SWOT analysis (Table 2).

Table 2. SWOT-analysis of the need to create cluster associations in the region

Strengths/benefits	Weaknesses/shortcomings
<p>Significant natural potential; The favorable geographical location of the region, availability of resources; Developed infrastructure of vocational education; Obtaining a synergistic effect; Enhancing opportunities for the development and involvement of small and medium-sized enterprises; Improving the business environment in the region; Forming a positive image of the association, compliance with social responsibility.</p>	<p>Low volumes of financing; The complicated financial situation of enterprises; Obsolete machinery and equipment; Low level of coordination among the participants of the cluster association; Lack of highly qualified personnel; Lack of trust between authorities and businesses; Lack of entrepreneurial culture.</p>
Opportunities/potential	Threats/risks
<p>Implementing regional and state development programs; Developing social infrastructure; Forming competitive advantages of the region, increasing investment attractiveness; Ensuring access to free information flows among the cluster companies; Developing an entrepreneurial culture; Maintaining a flexible pricing policy among companies within the cluster; Implementing innovations based on effective cooperation with scientific and educational institutions.</p>	<p>Inflation threats; Low level of state support; Intensification of hostilities that worsens the overall economic situation in the country; The unpredictability of politics, frequent changes in the legislation and the interference of the authorities into the client's business; Socio-economic instability; The lack and the inadequacy of regulatory mechanisms.</p>

Sources: developed by the authors

Thus, according to the results of the conducted score assessment (10-point scale was used), the strongest advantages (118 points), such as improvement of the business environment through the creation of dialogue between business and government (involvement in the joint implementation of projects, regional business development programs, and promising courses of the region's development); obtaining a synergetic effect from joint activities (increasing cash flows, reducing transaction costs, increasing cooperation with research institutes and

educational institutions, exchanging intellectual capital), most affect the interest when creating cluster associations.

Assessment of the opportunities (capabilities) to create clusters (107 points) allowed distinguishing among the most important factors the following ones: the development of entrepreneurial culture that in turn affected the formation of the enterprise image, the trust of communities; the implementation of innovations (informing about

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scientific developments, the implementation by the research and educational institutions of certain orders of enterprises; and access to new markets).

Threats have the least influence on the formation of cluster associations (72 points), however, the most significant threats are the lack and imperfection of the legislative framework, as well as the low level of state support.

Thus, based on the conducted SWOT analysis, it is revealed that the most adequate mechanism for increasing the

socio-economic development of the regions is the creation of cluster formations.

In this regard, the formation mechanism of cluster associations includes economic, organizational, social, and environmental components, which are manifested through the principles, functions, and regulation methods (Fig. 3).

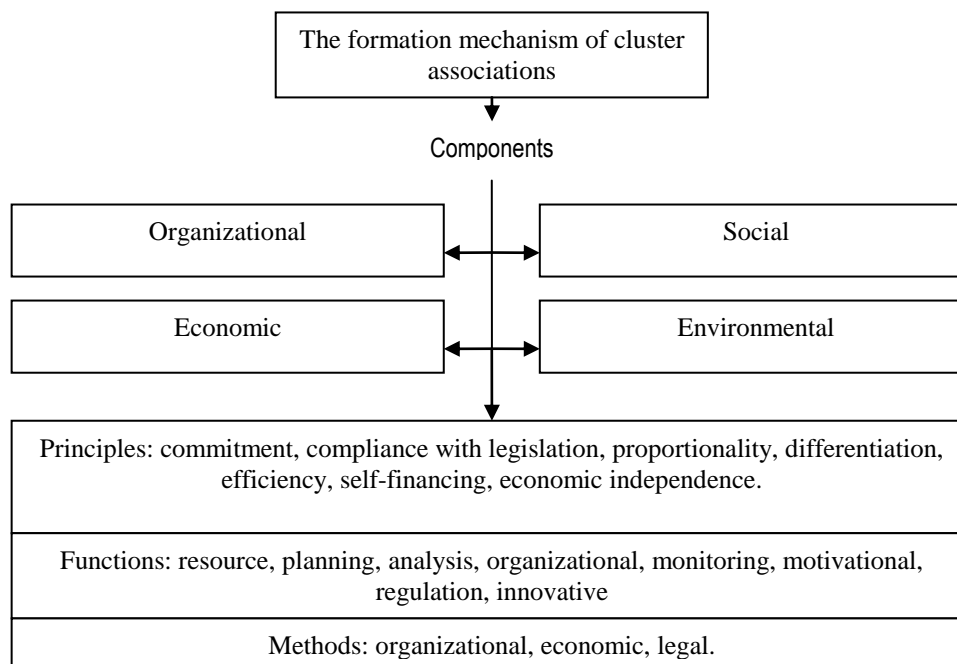


Fig. 3: Components of the cluster associations formation mechanism
Sources: developed by the authors

Thus, the essence of the economic component is to use the tools of the market environment, such as pricing, investment, planning, etc. The organizational function provides a choice of forms of economic activity, regulation and support activities, the functioning of the market infrastructure. The social component forms and acts according to the interests of the cluster participants. The environmental function concerns the use of clean or green technologies, closed-cycle production technologies, replacement of obsolete production technologies and equipment for more productive, resource-saving and energy-saving ones.

IV. CONCLUSION

According to the results of the study, the following conclusions can be drawn. The existing negative trends in the development of socio-economic processes in Ukraine are a serious obstacle to the development of economic entities, manifested in the increase in unemployment, lower incomes of the population, the growth of labor apathy, deformation of labor values, etc.

It is proved that exactly the development of cluster formations is a modern sign of progressive changes in regional development and competitiveness of enterprises. Based on the analysis of the conducted survey, it is established that cluster formations allow each of the

participants to benefit from the synergy effect arising in the course of combining efforts in order to scale up the production. The results obtained suggest that cluster formations are characterized by an emphasis on increasing employee satisfaction due to the integration of motivational preferences of the cluster association participants (production, financial, marketing, innovative, personnel, socio-psychological, environmental, etc.) and the formation of qualitatively new opportunities for the implementation of corporate and personal needs of employees.

The SWOT-analysis and score-based assessment of the cluster formations development provided an opportunity to identify the cause-and-effect relationship between the creation of cluster formations and increasing the competitive opportunities of the region. According to the data obtained, it was found that the greatest influence on the interest in the formation of cluster associations had aspects such as improvement of the business environment through the creation of dialogue between business and government (involvement in the joint implementation of projects, regional business development programs, and promising development courses of the region); obtaining a synergetic effect from joint activities (increasing cash flows, reducing transaction costs, increasing cooperation

with research institutes and educational institutions, and exchanging intellectual capital).

Moreover, assessment of the possibilities of the clusters formation allowed distinguishing the most important factors: the development of an entrepreneurial culture, which, in turn, affected the formation of the enterprises' image, the confidence of the communities; implementation of innovations (informing about scientific developments, the implementation by the research and educational institutions of certain factory orders; and access to new markets). The formation mechanism of cluster associations has been substantiated. It includes economic, organizational, social, and environmental components, which are manifested through the principles, functions, and regulation methods.

Thus, the implementation of the European model of clustering in the economic activities of business entities in Ukraine will lead to increased satisfaction of staff through the integration of motivational preferences of the cluster association participants, aimed at ensuring the effective implementation of resource and labor potential, creating qualitatively new opportunities for the implementation of corporate and personal needs of staff, developing investments, accessing to new markets, achieving high standards of quality of life, and improving competitiveness.

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