# SCIENTIFIC ASSESSMENT METHODS FOR DIVERSIFICATION IN THE SERVICE ACTIVITIES OF COMMUNICATIONS ENTERPRISES

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**Abstract.** *At a time when communication services have become a strategic support sector in the dynamically changing layers of the modern economy, the need to diversify the spectrum of services is manifested not only as a technological requirement, but also as a fundamental condition for socio-economic stability. In particular, the tasks of "deepening the digital economy" and "tripling the volume of services exports" were set within the framework of the "Uzbekistan-2030" development strategy of the President of the Republic of Uzbekistan, approved in 2022, which require the transformation of the activities of communication enterprises. In this regard, scientific methods for assessing the diversification of services — for example, statistical and analytical approaches such as the Herfindahl–Hirschman Index (HHI), Cross-Referral ROI, Technological Diversity Index (TDI) — are emerging as an important tool for telecommunications companies in making strategic decisions. In global practice, communication operators in France, South Korea, Italy and Singapore have managed to transform their service portfolios based on these approaches, increasing the number of customers and strengthening their market share. Therefore, not only implementing diversification, but also evaluating it using scientifically based methods is an indispensable mechanism for the sustainable digital growth of the communications sector.*

**Keywords:** *Communications enterprises, diversification of services, digital growth, domestic product, communications sector.*

At the same time, the transformation of the communications sector in Uzbekistan is not only a technological upgrade, but also a strategic process of economic and social importance, since the diversification of services is becoming a means of increasing employment, creating new jobs and expanding digital opportunities for all segments of the population. As stipulated in the "Uzbekistan - 2030" strategy, it is envisaged to increase the share of the services sector in GDP to more than 50 percent, which, in turn, requires communications companies to develop their service portfolio in a multi-directional and integrated manner. In this context, scientific approaches aimed at determining the effectiveness of the diversification strategy will allow digitizing company management, deepening user experience and using resources more efficiently. By determining the level of diversification of digital services, companies will anticipate market needs, more accurately define customer segmentation and, as a result, form an export-oriented service

model. Therefore, diversification should be considered as a key tool for promoting economic transformation not only by expanding the scope of services, but also by assessing and managing them on a scientific basis.

The "Technological Diversity" theory, put forward by American economist Douglas Miller in 2006, proposes a concept for assessing the diversification of services of information and communication companies through technological patents. "He believes that companies can measure the degree of diversification of digital services by assessing the structural diversity of patent portfolios based on technological innovations. This approach gives the company a competitive advantage in technological reliability, product innovation, and expanding the range of services." He proposes the following formula for this assessment:

$$TDI = \sum\left(\left(\frac{patentcitations}{totalcitations}\right)\right) \times patentcount$$

This approach has been tested in practice, and French and Italian MVNO (Mobile Virtual Network Operator) companies were able to increase their technological diversification index from 0.3 to 0.7. As a result, their revenue increased by 15 percent. This experience shows that expanding the technological patent portfolio allows a company to develop innovative services cost-effectively and quickly adapt to user needs. This methodology creates a strong theoretical and practical basis for achieving diversification through scientific and technical resources in the services sector. Based on the theory of export diversification put forward by Chilean economist Agosin in 2009, Beninese economist Gnangnon proposed an analytical approach based on the Herfindahl–Hirschman Index (HHI) formula for statistically assessing the level of diversification of services exports in 2021. "According to this theory, a high concentration of services exports in one or two sectors increases economic vulnerability, while, conversely, a balanced share of different types of services in exports increases macroeconomic stability." Gnangnon measures the concentration of services exports using the following formula:

$$HHI = \sum\left(\frac{x_k}{X}\right)^2,$$

$x_k$ — volume of k-type service exports;

X — volume of total service exports.

The lower the HHI index, the higher the level of diversification. Gnangnon's analysis of 131 countries based on the GMM (Generalized Method of Moments) model showed that when the HHI decreases by 1 unit, the real economic growth rate increases by an average of 0.01 percentage points. This statistical relationship confirms that diversification in the services sector has become a direct growth factor. This approach has been used in practice, in particular in ASEAN countries, Morocco and Colombia, to formulate policies for managing service exports in a multi-sectoral manner. As a result, their economic growth

indicators have stabilized. This model allows us to measure the effectiveness of using diversification in the services sector on a clear, empirical and theoretical basis.

The Cross-Referral ROI model, developed by Harvard Business School in 2011 to assess the effectiveness of diversification in companies, is a modern economic approach based on analyzing the flow of customers obtained through new services. “According to this theory, by diversifying digital services, companies expand their ability to attract new users from their existing customer base. This serves as a direct assessment of the profitability of services.” The following formula is proposed for this:

$$Cross - Referral\ ROI = \frac{Referral\ Count \times Referral\ Value}{Total\ Marketing\ Expenditure},$$

This model has been successfully tested in India, Indonesia and Bangladesh, where telecom operators have been able to reduce costs by 25-30% by using a common infrastructure. They have also simplified the process of introducing new services and have been able to enter market segments faster. This approach is especially relevant for countries with uneven infrastructure distribution or regional disparities. For Uzbekistan, this model also allows for cheap, fast and functional service diversification by combining regional infrastructure in the telecommunications sector. In 2021, Beninese economist S.K. Gnangnon made an innovative contribution to modern macroeconomic modeling by analyzing the complex empirical relationship between service export diversification and economic growth based on the generalized method of moments (GMM). “According to his research, the level of export diversification in the services sector directly affects a country's annual economic growth, but the intensity of this effect depends on the country's trade openness.” The following regression model was developed based on the research:

$$Growth = \alpha^0 + \alpha^1 Growth^{t-1} + \alpha^2 HHI + \alpha^3 Trade\ Open + \alpha^4 \cdot Control\ Variables$$

The analysis found that in countries with low trade openness (e.g., Ghana, Nepal, Georgia), diversification had a positive impact on economic growth (each 1-unit decrease in HHI increased growth by an average of 0.01 percentage points), while in countries with high trade openness (e.g., Singapore, Chile, Czech Republic), specialization provided higher efficiency. This proves the need for a contextual approach to choosing an economic strategy. This approach is fully consistent with Uzbekistan's "Development Strategy until 2030", which identifies the expansion of digital services exports, the creation of a "digital infrastructure zone", and "integration into international service markets" as priority areas. By measuring service exports by HHI based on the Gnangnon model, our country can simultaneously ensure economic growth and global integration by diversifying its export structure. This approach will become a scientific basis for maintaining strategic balance in the digital economic transformation.

The table below systematically reflects the theoretical approaches and assessment models of leading Uzbek economists on the diversification of the services sector. Each model highlights the formulaic basis, empirically applied regions, achieved economic results, and their integral connection with the “Uzbekistan-2030” strategy. These analyses

serve to make scientifically sound management decisions in the services sector, ensure territorial economic equality, and strengthen national economic stability by diversifying services exports. The approaches in the table are an important methodological support for the integration of digital services, logistics, and service industries in the country.

In the 2020 scientific research of Uzbek economist, Doctor of Economic Sciences Sh.A. Khojayeva, an alternative approach to assessing diversification in the services sector was developed - the "composite diversification coefficient" (KDK) of service activities. In his scientific work "Diversification Opportunities and Development Prospects of the Regional Service System," he analyzed the interdependence of the telecommunications, financial services, and transport logistics sectors in the economic regions of Uzbekistan. He believes that vertical and horizontal integration of services reduces regional differentials in economic growth and stabilizes services exports. He put forward the following formula:

$$KDK = \sqrt{\left[\frac{\Sigma Ri^2}{N}\right]} - D$$ [ix],

This model was applied in the Tashkent region and the Fergana Valley, and in regions with a high diversification index, the growth rate of service exports was on average 12-14 percent. In particular, in cases where the technological connection between telecommunications and financial services is high, costs were reduced by up to 18 percent. This scientific approach is of great importance in the strategic management of the services sector across regions in Uzbekistan.

Another important aspect is that this assessment model is fully consistent with the directions set out in the Uzbekistan-2030 Strategy, such as "Ensuring interregional economic equality", "Increasing the export of digital services" and "Integrating telecommunications infrastructure". This innovative approach of a local scientist allows for scientific planning of the transformation of the service sector in the country and management of diversification. In particular, this formula allows for an accurate assessment of service efficiency not only across sectors, but also across geographical regions.

Diversification in the service sector is currently the focus of attention of economists from the CIS countries, and scientific research in this area offers strategic mechanisms aimed not only at improving economic results, but also at improving the quality of life of people. Russian scientist Alexei Petrov has developed an advanced methodological approach to assessing the revenue and scope of digital services through segmentation among service users. He substantiated the need to take into account the habits, needs and purchasing capabilities of users when creating new services. Kyrgyz researcher Saykal Jumaeva proposed a way to scientifically measure the value of human capital by linking the efficiency of labor resources with the level of diversification in service exports. This

approach has proven the importance of economic planning in the service sector based on the principles of human potential and social inclusion.

In general, this integrated assessment model helps to identify key problems that arise in the diversification of communication services - for example, imbalance in the service portfolio, low investment efficiency, fragmentation of the customer base. Each indicator, as a strategic analysis tool, not only assesses the current situation, but also allows you to identify future risks and opportunities. In addition, based on these indicators, the company can review its diversification policy, identify priority service areas and strategically reallocate resources. As a result, telecommunications companies will have a high level of flexibility in adapting to the digital transformation and competitive environment and the ability to sustainably meet user needs. This assessment methodology offers an effective, systematic and sustainable approach to measuring the success of service diversification in the digital economy.

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