International Indices (Such As The Network Readiness Index and The Digital Economy and Society Index — Desi) Used to Assess The Level of Digitalization of National Economies and Models For Improving Them

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ABSTRACT

Thi ANNOTATION: This article examines international indices used to assess the level of digitalization of national economies, with particular focus on the Network Readiness Index (NRI) and the Digital Economy and Society Index (DESI). The study highlights the growing importance of these composite indicators as analytical tools for evaluating how effectively countries integrate digital technologies into economic, social, and governance systems. In the context of rapid global digital transformation, such indices have become essential for benchmarking national performance, identifying development gaps, and guiding strategic policy decisions.

The research analyzes the methodological structure of the NRI and DESI, including their key dimensions such as ICT infrastructure, digital skills, government digitalization, business adoption of technology, connectivity, and innovation capacity. It explains how these indicators are constructed using quantitative and qualitative data collected from international organizations, national statistical agencies, and specialized surveys. The article also emphasizes that while both indices aim to measure digital readiness, they differ in scope: NRI provides a broader global comparison framework, whereas DESI focuses primarily on European Union member states, offering a more detailed regional assessment.

Furthermore, the article explores the application of these indices in evaluating the digital competitiveness of national economies. It demonstrates how countries use index rankings to identify weaknesses in digital infrastructure, improve regulatory environments, and invest in human capital development. Special attention is given to the role of digital skills and innovation ecosystems as key determinants of long-term digital growth. The study also discusses how improvements in index performance can lead to increased foreign investment, enhanced productivity, and stronger integration into the global digital economy.

In addition, the article proposes models for improving national digitalization indicators. These include strengthening broadband infrastructure, expanding e-government services, enhancing digital literacy programs, supporting ICT startups, and developing innovation-driven economic policies. The research suggests that coordinated efforts between government institutions, private sector actors, and educational organizations are necessary to achieve sustainable digital transformation.

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However, the article also identifies several limitations associated with international digitalization indices. These include differences in data availability across countries, methodological inconsistencies, and the inability of composite indicators to fully capture informal digital activities or rapidly emerging technologies. Despite these limitations, NRI and DESI remain valuable tools for comparative analysis and policy formulation.

The article concludes that international digitalization indices play a crucial role in shaping national digital strategies. By systematically evaluating digital readiness and identifying areas for improvement, these indices support evidence-based policymaking and contribute to the development of competitive, inclusive, and innovation-oriented digital economies.

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INTRODUCTION

In the context of the global transition toward a knowledge-based and data-driven economy, digitalization has become one of the most important determinants of national competitiveness, economic growth, and social development. Countries across the world are increasingly investing in digital infrastructure, human capital, and regulatory frameworks to enhance their participation in the global digital ecosystem. As a result, measuring the level of digital development has become a critical task for policymakers, researchers, and international organizations.[1]

International indices such as the Network Readiness Index (NRI) and the Digital Economy and Society Index (DESI) have emerged as key analytical tools for assessing and comparing the digital maturity of national economies. These indices provide a structured and standardized framework for evaluating how effectively countries are adopting and utilizing information and communication technologies (ICTs) across various sectors, including government, business, and society. They also enable the identification of strengths and weaknesses in digital transformation strategies, thereby supporting evidence-based policymaking.[2]

The Network Readiness Index, developed by international research institutions, focuses on the role of ICT in driving innovation, economic performance, and social inclusion. It evaluates countries based on pillars such as technology infrastructure, regulatory environment, human capital, and the impact of digital technologies on the economy and society. On the other hand, the Digital Economy and Society Index (DESI), primarily used within the European context, measures digital progress through indicators such as connectivity, digital skills, internet usage, integration of digital technologies in businesses, and digital public services. Both indices provide valuable insights into how well countries are prepared for the challenges and opportunities of the digital age.[3]

The importance of these indices lies not only in ranking countries but also in shaping strategic development models. Governments use these measurements to design and refine national digital transformation programs, allocate investments more effectively, and monitor progress over time. Furthermore, international indices encourage healthy competition among countries, motivating them to accelerate reforms in education, innovation, cybersecurity, and digital infrastructure development.[4]

However, despite their usefulness, these indices also face certain limitations. Differences in methodology, data availability, and socio-economic contexts may affect comparability across countries. In addition, over-reliance on quantitative indicators may overlook qualitative aspects of digital transformation, such as cultural readiness, institutional efficiency, and social inclusion. Therefore, there is a growing need to complement these indices with more adaptive and context-sensitive evaluation models.

Against this background, this article examines the role of international digitalization indices, particularly NRI and DESI, in assessing national digital economies and explores potential models for

improving their accuracy, relevance, and policy applicability. The study also highlights the importance of integrating these indices with national development strategies to ensure more comprehensive and sustainable digital transformation outcomes.[5]

METHODOLOGY.

This study adopts a mixed-method research design aimed at analyzing international digitalization indices—specifically the Network Readiness Index (NRI) and the Digital Economy and Society Index (DESI)—and their role in assessing the level of digital development of national economies. The methodology combines comparative statistical analysis, index decomposition, and qualitative interpretation of policy frameworks to ensure a comprehensive evaluation of digital readiness and transformation models across countries.[6]

The first stage of the research involves a comparative analytical approach, where the structure, indicators, and calculation logic of the NRI and DESI indices are examined. The Network Readiness Index is analyzed as a multidimensional framework that evaluates countries based on technology, people, governance, and impact dimensions. Similarly, the DESI index is studied as a composite indicator focusing on connectivity, human capital, use of internet services, integration of digital technology in businesses, and digital public services. By comparing these indices, the study identifies common indicators and structural differences that influence the measurement of digitalization levels.[7]

In the second stage, a quantitative data analysis method is applied. Secondary data from international organizations such as the World Economic Forum, the European Commission, the International Telecommunication Union (ITU), and the World Bank are used. Statistical indicators such as broadband penetration, ICT adoption rates, digital skills index values, e-government development, and digital enterprise activity are normalized and analyzed to identify trends in digital transformation across different economies. Descriptive statistics and trend analysis techniques are used to evaluate changes in index scores over time.[8]

The third stage of the methodology involves a comparative country-level assessment, where selected countries with varying levels of digital development are grouped into high-, middle-, and low-performing categories. This classification allows for the identification of structural gaps in digital infrastructure, human capital development, and regulatory readiness. The analysis further explores how policy interventions and investment in ICT infrastructure influence improvements in index performance.[9]

Additionally, a qualitative policy analysis approach is employed to examine national digital strategies and reform programs aimed at improving index performance. Special attention is given to digital transformation strategies, e-government initiatives, innovation policies, and public-private partnerships. This enables the identification of best practices and governance models that contribute to improved digital readiness.[10]

To ensure methodological validity, the study applies indicator triangulation, combining multiple data sources and analytical perspectives. This reduces bias and increases the reliability of conclusions regarding the effectiveness of digitalization models. Furthermore, normalization techniques are used to ensure comparability between different index structures and measurement scales.

Finally, the study proposes a conceptual improvement model for enhancing national digitalization indices. This model integrates infrastructure development, human capital investment, regulatory modernization, and innovation ecosystem strengthening. The model is designed to provide a systematic framework for policymakers aiming to improve national performance in global digital economy rankings.[11]

The methodology ensures a balanced integration of quantitative measurement and qualitative interpretation, allowing for a robust assessment of digital economy development levels and the effectiveness of international benchmarking indices such as NRI and DESI.

RESULTS AND DISCUSSION.

The analysis of international digitalization indices, particularly the Network Readiness Index (NRI) and the Digital Economy and Society Index (DESI), demonstrates that these instruments play a critical role in measuring the level of digital transformation of national economies. The study reveals that such indices provide a comprehensive framework for evaluating not only technological infrastructure but also the institutional readiness, human capital development, and economic impact of digital technologies. The

results indicate that countries with higher index scores consistently exhibit stronger digital ecosystems, more efficient public services, and higher levels of innovation-driven economic growth.[12]

One of the key findings is that the Network Readiness Index offers a broad macro-level assessment of digital readiness by focusing on four main pillars: technology, people, governance, and impact. The results show that countries with advanced ICT infrastructure and strong regulatory frameworks tend to achieve higher NRI scores. In particular, investment in broadband connectivity, cybersecurity infrastructure, and digital public services significantly improves national performance. Additionally, the human capital dimension highlights the importance of digital skills and education systems in ensuring long-term competitiveness in the global digital economy.

Similarly, the Digital Economy and Society Index (DESI), which is primarily used within the European context, provides a more detailed and structured evaluation of digital progress across five dimensions: connectivity, human capital, use of internet services, integration of digital technology in businesses, and digital public services. The analysis of DESI indicators shows that countries with balanced development across all five dimensions achieve more sustainable digital growth. In contrast, imbalances—such as strong connectivity but weak digital skills—limit overall performance and reduce the effectiveness of digital transformation policies.

The comparative evaluation of NRI and DESI indicates that while both indices measure digital readiness, they differ in scope and methodological focus. NRI provides a global perspective suitable for cross-country comparison, whereas DESI offers a more granular and policy-oriented framework. This difference suggests that combining both indices can provide a more comprehensive understanding of national digitalization levels. For developing economies, such as those in Central Asia, including Uzbekistan, this combined approach is particularly useful for identifying structural weaknesses and prioritizing policy interventions.[13]

The discussion further highlights that digital indices are not merely descriptive tools but also strategic policy instruments. Governments increasingly use index rankings to benchmark performance, attract foreign investment, and design targeted digital transformation programs. High index scores are often associated with improved investor confidence, stronger innovation ecosystems, and greater participation in the global digital economy. Conversely, low rankings may indicate systemic issues such as insufficient infrastructure, weak regulatory environments, or limited digital literacy among the population.

However, the study also identifies several limitations of these indices. First, the indicators used in NRI and DESI may not fully capture informal digital activities or rapid technological changes such as artificial intelligence adoption and platform-based economies. Second, differences in data collection methods and weighting systems can affect comparability across countries. Third, over-reliance on index rankings may lead policymakers to focus on improving scores rather than addressing deeper structural challenges in the digital economy.[14]

Despite these limitations, the results confirm that international digitalization indices remain essential tools for assessing and guiding national digital transformation strategies. They provide valuable insights into strengths and weaknesses across multiple dimensions of development and help policymakers design evidence-based reforms. The discussion suggests that future improvements to these indices should include more dynamic indicators related to emerging technologies, digital resilience, and sustainability of digital ecosystems.

The findings emphasize that successful digital transformation requires a balanced development of infrastructure, human capital, innovation capacity, and governance quality. Countries that integrate these elements effectively are more likely to achieve higher levels of economic competitiveness and long-term digital sustainability.[15]

CONCLUSION.

In conclusion, international indices such as the Network Readiness Index (NRI), the Digital Economy and Society Index (DESI), and similar global benchmarking tools play a crucial role in evaluating the level of digitalization of national economies. These indices provide a structured and comparative framework for assessing how effectively countries adopt, integrate, and utilize digital technologies across economic, social, and governmental sectors. The analysis shows that such indices are not merely statistical tools, but strategic instruments that influence national digital policies, investment priorities, and long-term development planning.

One of the key insights is that digital readiness is a multidimensional concept that cannot be measured solely through technological infrastructure. Indices such as NRI and DESI incorporate a wide range of indicators, including ICT infrastructure, digital skills, regulatory environment, innovation capacity, and the level of digital adoption in both public and private sectors. This comprehensive approach allows policymakers to identify strengths and weaknesses in their national digital ecosystems and to design targeted reforms aimed at improving overall competitiveness in the global digital economy.

Another important finding is that countries with higher rankings in these indices tend to demonstrate stronger economic performance, higher productivity levels, and more resilient innovation systems. This confirms the close relationship between digital maturity and economic development. In particular, the availability of high-quality digital infrastructure and skilled human capital significantly enhances the ability of economies to attract foreign investment, support digital entrepreneurship, and integrate into global value chains.

At the same time, the study highlights several limitations of existing international indices. Differences in methodology, data availability, and weighting of indicators may lead to variations in rankings that do not always fully reflect national realities. Moreover, some indices may underrepresent informal digital activity or rapidly emerging technologies such as artificial intelligence, blockchain, and platform-based economies. These limitations suggest the need for continuous methodological improvement and adaptation to the fast-changing digital landscape.

In addition, the development of models for improving digitalization indices is essential for guiding national policy reforms. Such models should emphasize not only infrastructure expansion but also human capital development, regulatory modernization, cybersecurity enhancement, and innovation ecosystem strengthening. A balanced approach that integrates technological, institutional, and social dimensions is necessary to achieve sustainable digital transformation.

International digital economy indices serve as important benchmarking tools that help countries evaluate their progress and align their strategies with global standards. However, their effectiveness depends on continuous refinement and contextual adaptation. Future research should focus on developing more dynamic, real-time indicators and incorporating emerging technologies and digital behavior patterns into assessment frameworks. Strengthening the accuracy and relevance of these indices will further support evidence-based policymaking and accelerate global digital development.

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