



## Article

# Comparative Analysis of Digital Economy Development Indices

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**Abstract:** This paper provides a comparative analysis of major digital economy development indices developed by international organizations and research institutions. It examines their conceptual foundations, dimensions, and methodologies to identify key similarities and differences in how digital development is measured. The findings reveal significant variation across indices and highlight the need for a more integrated and context-sensitive approach to digital economy assessment.

**Keywords:** digital economy, development indices, digital transformation, comparative analysis, measurement methodology.

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## Introduction

Measuring the state and pace of digital economic development has become a central preoccupation of international organisations, national governments, and academic researchers. Policymakers require credible metrics to benchmark performance, diagnose structural gaps, allocate investment, and evaluate the impact of digital strategies. In response, a large and heterogeneous landscape of composite indices has emerged, each offering a distinct lens on the digital economy.

However, the proliferation of indices has also generated confusion. When the ITU ICT Development Index (IDI) ranks a country highly while the IMD World Digital Competitiveness Ranking (WDCR) places it in the middle tier, policymakers face a legitimate puzzle: which measurement framework should guide strategy? These discrepancies are not random; they reflect deeper disagreements about what constitutes digital development, which dimensions matter most, and how data limitations should be handled.

## Methodology

This piece adopts a qualitative, comparative approach based on systematic literature review and conceptual analysis. Key digital economy development indices developed by international organizations and research institutions are selected and examined to identify their underlying structures, dimensions, and measurement approaches. The analysis focuses on comparing the conceptual foundations, data sources, and aggregation methods of each index to highlight similarities and divergences. This approach enables a critical assessment of how different indices reflect varying interpretations of digital economic development

## Literature Review

The measurement of digital economy development has attracted growing attention in both academic and policy-oriented literature. Early contributions primarily focused on ICT infrastructure and access, as reflected in indices such as the ITU's ICT Development Index, which aligns with the digital divide perspective emphasizing connectivity and usage. More recent studies have expanded this view by incorporating broader dimensions, including digital competitiveness, innovation capacity, and institutional readiness, as seen in indices like the IMD World Digital Competitiveness Ranking and the Oxford Insights Government AI Readiness Index. At the same time, organizations such as the World Bank and UNCTAD have developed frameworks that capture digital adoption and e-commerce readiness, respectively, reflecting sector-specific and policy-oriented priorities. Despite these advancements, the literature highlights a lack of conceptual consensus, as different indices are based on varying assumptions regarding what constitutes digital development, leading to inconsistencies in cross-country comparisons and policy interpretation.

Scholars have proposed composite indices to capture multidimensional aspects. For instance, Zhang et al. constructed a digital economy development index for Chinese cities across infrastructure, industry, and application dimensions to analyse its impact on high-quality economic growth [1]. Guo et al. introduced a hierarchical Digital Economy Development Index (DEDI) using an improved data envelopment analysis approach, integrating data resources, digital industrialization, industrial digitalization, and environmental factors [2].

Internationally, the European Commission's Digital Economy and Society Index (DESI) has been widely applied and extended in empirical studies [3]. Other contributions include Ojanperä et al. [4], who developed a Digital Knowledge Economy Index focusing on content creation and platform participation, and frameworks from OECD reports that emphasise broader measurement roadmaps for digital transformation [5].

## Result and Discussion

A range of indices has been developed by scholars, international organizations, and governments to measure digital economy development (See Table 1).

The DAI, introduced in the World Development Report 2016, measures digital technology adoption across three sectors: business, people, and government. Unlike most indices, it explicitly avoids combining sector scores into a single composite, presenting a dashboard to reflect the sectoral heterogeneity of digital adoption. The index draws exclusively on administrative and survey data from 180+ economies, giving it broad coverage but limiting it to adoption rather than outcomes [6].

The IDI, produced by the International Telecommunication Union and published through 2017 (with a revised methodology reintroduced in 2023), benchmarks ICT infrastructure, access, and usage across 176 economies. Its long time series makes it particularly valuable for trend analysis. The 2023 revision restructured the index around Universal Meaningful Connectivity, emphasising quality and affordability alongside penetration rates [7].

Focused specifically on the enabling environment for business-to-consumer e-commerce, this index incorporates four indicators: internet use, secure internet servers, postal reliability, and financial inclusion (account ownership). Its narrow scope makes it a leading indicator for digital trade readiness rather than broader digital development [8].

Since 2019, Oxford Insights has annually rated 193 governments on their readiness to implement AI in public services. The index spans three pillars—Government, Technology Sector, and Data & Infrastructure—each comprising multiple sub-indicators. It captures an

increasingly critical dimension of advanced digital development that older indices did not anticipate [9].

Published annually by the International Institute for Management Development since 2017, the WDCR covers 64 economies and organises 54 indicators across three top-level factors: Knowledge (talent, training, scientific concentration), Technology (regulatory framework, capital, technological framework), and Future Readiness (adaptive attitudes, business agility, IT integration). The index blends hard statistical data (~2/3) with executive survey data (~1/3), weighting all sub-factors equally within their respective categories [10].

Rather than producing a single ranked index, the OECD's framework assesses policy coherence across seven dimensions: access, use, innovation, jobs, trust, market openness, and societal well-being. It is primarily a qualitative diagnostic tool for OECD and partner-country governments, making it less directly comparable with the ranked indices above but rich in policy granularity [11].

**Table 1.** Overview of Key Digital Economy Development Indices [12].

| Index Name                                   | Developed by / Creator                                        | Brief Description                                                                                                                                                                                    |
|----------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Digital Adoption Index (DAI)                 | World Bank (World Development Report)                         | Measures digital technology adoption across business, people, and government sectors; presented as a dashboard rather than a composite index, focusing on adoption levels across 180+ economies.[13] |
| ICT Development Index (IDI)                  | International Telecommunication Union (ITU)                   | Benchmarks ICT infrastructure, access, and usage across 176 economies; updated in 2023 to emphasize Universal Meaningful Connectivity, including quality and affordability.                          |
| E-commerce Readiness Index                   | UNCTAD                                                        | Assesses readiness for business-to-consumer e-commerce based on internet use, secure servers, postal reliability, and financial inclusion; focuses on digital trade preparedness.[14]                |
| Government AI Readiness Index (GAIRI)        | Oxford Insights                                               | Evaluates governments' readiness to implement AI in public services across three pillars: Government, Technology Sector, and Data & Infrastructure.                                                  |
| World Digital Competitiveness Ranking (WDCR) | International Institute for Management Development (IMD)      | Measures digital competitiveness across knowledge, technology, and future readiness using a mix of statistical and survey data for 64 economies.                                                     |
| OECD Digital Economy Framework               | Organisation for Economic Co-operation and Development (OECD) | A qualitative framework assessing digital economy development across seven dimensions, including access, innovation, jobs, trust, and well-being; not a composite index.[15]                         |

*Source: Developed by the author based on literature review*

### Conclusion

In conclusion, digital economy development indices differ significantly in their conceptual foundations, dimensions, and measurement approaches. While some indices emphasize connectivity and access, others focus on competitiveness, innovation, or digital readiness, leading to variations in country rankings and policy implications. The findings

highlight that no single index can fully capture the multidimensional nature of digital economic development. Therefore, a more integrated and context-sensitive approach is required to effectively assess and guide digital transformation strategies.

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