

MEASURING THE DIGITAL ECONOMY: INTERNATIONAL EXPERIENCE AND PRACTICES IN VIETNAM**Bui Xuan Chung***Vietnam Women's Academy*

ARTICLE INFO	ABSTRACT
Received: 23/7/2025	The global shift towards a digital economy requires accurate measurement tools to guide policy and promote sustainable development. This study synthesizes theoretical frameworks from the OECD, the United States, China, the EU, and ASEAN to assess their applicability in Vietnam. Vietnam's digital economy is developing rapidly, with e-commerce reaching US\$16.4 billion and cashless payments accounting for 65% in 2023. However, measurement faces challenges: inconsistent definitions, limited data, methodological gaps, and weak coordination. Current indicators lack standardization and overlook cross-border flows. The study proposes a multidimensional framework integrating traditional statistics with big data, and building a Digital Economy Satellite Account within the National Accounts System. The framework is structured along three axes: input (80% 5G coverage by 2027), process (70% of public services digitized by 2028), and output (contributing 20% of GDP by 2030), encompassing three core sectors, supporting and facilitating digital transformation. Based on the research results, it is recommended to enact a Digital Economy Law and enhance statistical capacity. The framework helps accurately quantify the contribution of the digital economy, aligning with ASEAN's \$1 trillion target by 2030.
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ĐO LƯỜNG KINH TẾ SỐ: KINH NGHIỆM VÀ THỰC TIỄN QUỐC TẾ TẠI VIỆT NAM**Bùi Xuân Chung***Học viện Phụ nữ Việt Nam*

THÔNG TIN BÀI BÁO	TÓM TẮT
Ngày nhận bài: 23/7/2025	Sự chuyển dịch toàn cầu sang nền kinh tế số đòi hỏi công cụ đo lường chính xác để định hướng chính sách và thúc đẩy phát triển bền vững. Nghiên cứu này tổng hợp khung lý thuyết từ OECD, Hoa Kỳ, Trung Quốc, EU và ASEAN nhằm đánh giá khả năng áp dụng tại Việt Nam. Nền kinh tế số Việt Nam phát triển nhanh, thương mại điện tử đạt 16,4 tỷ USD, thanh toán không tiền mặt chiếm 65% năm 2023. Tuy nhiên, đo lường gặp thách thức: định nghĩa chưa thống nhất, dữ liệu hạn chế, lỗ hổng phương pháp và phối hợp yếu. Các chỉ số hiện hành thiếu chuẩn hóa, bỏ sót dòng chảy xuyên biên giới. Nghiên cứu đề xuất khung đa chiều tích hợp thống kê truyền thống với big data, xây dựng Tài khoản vệ tinh kinh tế số trong Hệ thống tài khoản quốc gia. Khung cấu trúc theo ba trục: đầu vào (phủ sóng 5G 80% năm 2027), quá trình (70% dịch vụ công số hóa năm 2028), đầu ra (đóng góp 20% GDP năm 2030), bao quát ba nhóm ngành cốt lõi, hỗ trợ và chuyển đổi số. Dựa trên kết quả nghiên cứu, tác giả khuyến nghị nên ban hành Luật Kinh tế số, nâng cao năng lực thống kê. Khung đề xuất giúp định lượng chính xác đóng góp kinh tế số, đồng hành mục tiêu 1.000 tỷ USD của ASEAN năm 2030.
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1. Introduction

The digital economy has transformed global economic landscapes, driving growth, innovation, and competitiveness through digital platforms, big data, artificial intelligence (AI), and information and communication technology (ICT) infrastructure [1]. The OECD defines it as “economic activities reliant on or significantly enabled by digital technologies, particularly leveraging the Internet, digital platforms, ICT infrastructure, and data” [1]. Its transformative potential is evident in new business models, such as e-commerce, sharing economies, and digital services, which transcend traditional boundaries [2]. However, measuring its scale and socio-economic impact is complex due to inconsistent definitions, overlaps between digital and non-digital sectors, and fragmented data systems [2], [3]. For instance, distinguishing digital transactions within hybrid models (e.g., retail with e-commerce) and capturing cross-border digital flows, such as digital advertising or cloud services, remain problematic [4].

Recent peer-reviewed studies have highlighted these measurement challenges, particularly in developing and emerging economies. Oloyede et al. [5] conducted a systematic review and meta-analysis of digital economy measurement approaches in developing countries, revealing inconsistencies in indicator selection and data availability. Barefoot et al. [6] proposed foundational definitions and measurement strategies for satellite accounts in the U.S. context, adaptable to broader frameworks. Coyle [7] examined persistent challenges in capturing digital transformation effects on productivity and GDP, arguing that traditional metrics undervalue pervasive general-purpose technologies. He et al. [8] developed and applied an entropy-weighted index system to measure digital economy levels, demonstrating its utility in regional comparisons. Nguyen and colleagues [9] quantified Vietnam’s core digital economy and spillover effects using panel models and input-output analysis, providing empirical evidence of GDP contributions. Similarly, another study on Vietnam compared digital economy drivers with Thailand, employing input-output frameworks to identify growth factors and policy implications [10]. These works underscore the need for context-specific, integrated approaches to overcome methodological gaps in emerging markets like Vietnam.

Globally, measurement approaches vary significantly. The OECD’s Going Digital Toolkit provides a multi-pillar framework focusing on digital infrastructure, skills, cybersecurity, and policy, adopted by countries like Finland and South Korea [1]. The U.S. employs Digital Economy Satellite Accounts (DESA) to quantify GDP contributions, integrating data from tax authorities and private firms [11]. China leverages real-time platform data from companies like Alibaba for dynamic monitoring [12], while the EU’s Digital Economy and Society Index (DESI) benchmarks digitalization across connectivity and skills [13]. ASEAN’s Digital Economy Framework Agreement (DEFA) aims to standardize metrics, targeting a \$1 trillion digital economy by 2030 [14]. In Vietnam, Decision 411/QĐ-TTg (2021) emphasizes digital transformation, but the absence of a standardized measurement framework limits comprehensive assessment [15], [16]. The rapid growth of platforms like Shopee and Viettel Money, alongside AI-driven services, underscores the urgency of accurate measurement [17].

This study has three objectives: (1) synthesize global measurement frameworks to identify best practices, (2) critically analyze Vietnam’s current practices and identify gaps, and (3) propose an integrated framework aligned with Vietnam’s System of National Accounts (SNA) to support evidence-based policy-making and global competitiveness. By addressing these objectives, the research aims to provide a scalable approach to quantify Vietnam’s digital economy, fostering sustainable development and alignment with ASEAN’s regional goals.

2. Methods

This study employs a mixed-method approach to develop a comprehensive measurement framework for Vietnam’s digital economy, integrating a systematic literature review, comparative analysis, and stakeholder consultations to ensure robustness and applicability.

2.1. Literature Review

A systematic review was conducted using academic databases (e.g., Scopus, Web of Science, IEEE Xplore) with keywords such as “digital economy measurement,” “satellite accounts,” “big data integration,” and “digital transformation.” Over 60 peer-reviewed articles, policy reports, and working papers from 2018 to 2025 were analyzed to identify best practices and gaps in frameworks from the OECD, U.S., China, EU, and ASEAN [1], [2], [16], [17].

2.2. Data Collection

Data sources for Vietnam’s digital economy included:

Official Statistics: General Statistics Office (GSO) economic reports, Ministry of Information and Communications (MIC) ICT data, Ministry of Industry and Trade (MOIT) e-commerce statistics, and State Bank of Vietnam (SBV) financial indicators (e.g., non-cash payment ratios).

Indices: Digital Transformation Index (DTI), E-Commerce Index (EBI), and Global Innovation Index (GII), providing insights into digitalization levels across provinces and sectors.

Platform Data: Limited transactional and user data from domestic platforms (e.g., Tiki, VNPay, Viettel Money) due to restricted access to cross-border platforms (e.g., Shopee, TikTok, Google), which complicates comprehensive data collection [4].

Surveys: Household and enterprise surveys on digital adoption conducted by GSO and MIC in 2023–2024, covering 5,000 firms and 10,000 households, focusing on ICT usage, e-commerce, and digital skills.

2.3. Analytical Framework

The proposed framework adapts Bukht and Heeks’ three-tier classification [2]:

Core Digital Economy: Industries producing digital technologies (e.g., hardware, software, telecommunications).

Digital-Enabling Economy: Sectors leveraging digital platforms (e.g., e-commerce, digital banking, ride-hailing).

Digitally Transformed Economy: Traditional sectors adopting digital technologies (e.g., smart agriculture, telemedicine, e-learning).

It integrates OECD’s Going Digital Toolkit for indicator design [1], U.S. DESA for satellite account structure [11], and China’s big data approach for real-time monitoring [12]. The framework uses a three-axis model (input, process, output) aligned with SNA 2008 standards to ensure compatibility with Vietnam’s statistical infrastructure [4], [16].

2.4. Validation

Consultations with experts from GSO, MIC, MOIT, and Vietnam Women’s Academy in Q1 2025 validated the framework’s feasibility. Feedback ensured indicators were practical within Vietnam’s data constraints and aligned with national priorities outlined in Decision No. 411/QĐ-TTg [15]. Workshops with 20 stakeholders, including policymakers and academics, refined the framework’s metrics and implementation timeline.

2.5. Ethical Considerations

Data privacy and confidentiality were prioritized, adhering to Vietnam’s Law on Cybersecurity (2018) and international standards for platform data usage, ensuring compliance with ethical guidelines for handling sensitive economic and user data [3].

3. Results and Discussion

3.1. International Measurement Practices

3.1.1. OECD – Going Digital Toolkit

The OECD's Going Digital Toolkit, structured around eight pillars (digital infrastructure, skills, ICT usage, innovation, employment, digital government, cybersecurity, regulatory frameworks), offers a flexible framework adaptable to national contexts [1]. Finland leveraged it to achieve 98% broadband coverage by 2023, deploying fiber-optic networks to rural areas, while South Korea reached 95% 5G coverage, training 2 million workers in digital skills [2]. The toolkit's strength lies in integrating quantitative metrics (e.g., broadband penetration rates of 98% in Finland) with qualitative policy assessments (e.g., South Korea's cybersecurity regulations) [1], [16]. For example, Finland's digital skills programs increased workforce participation in tech sectors by 15% from 2020 to 2023 [2]. However, its reliance on robust statistical systems poses challenges for emerging economies like Vietnam, where data collection is fragmented and analytical capacity is limited [3], [17]. Vietnam can adopt the toolkit's modular approach but must invest in statistical infrastructure to replicate OECD successes.

3.1.2. United States – DESA

The U.S. Bureau of Economic Analysis (BEA) developed the Digital Economy Satellite Account (DESA), categorizing digital activities into products (e.g., software, telecommunications hardware), e-commerce, and digital content (e.g., streaming services, digital advertising) [11]. In 2022, it contributed 10.3% (\$2.1 trillion) to U.S. GDP, growing at 7.8% annually, surpassing the overall GDP growth rate of 2.1% [11]. The DESA's integration with SNA 2008 ensures accuracy, leveraging data from tax authorities, commerce departments, and private firms like Amazon and Microsoft [11], [17]. For instance, e-commerce transactions grew by 12% in 2022, driven by platforms like Amazon Marketplace [11]. Its resource-intensive nature, requiring extensive inter-agency coordination and private-sector data, makes it challenging for Vietnam, where data silos and limited platform access prevail [3]. The DESA model offers Vietnam a blueprint for structuring a satellite account, but adaptations are needed to address data constraints.

3.1.3. China – Big Data Integration

China's Digital Economy Development Index, developed by the Ministry of Industry and Information Technology, uses real-time data from platforms like Alibaba, Tencent, and JD.com, covering infrastructure, commerce, and e-government [12]. In 2023, it reported 15% annual growth in digital commerce, with e-commerce transactions reaching \$2.3 trillion, driven by platforms like Tmall and WeChat [12]. Real-time monitoring captures consumer behavior shifts, such as a 20% increase in mobile payments during 2022–2023 [12]. However, data transparency and privacy concerns, coupled with restricted access for external researchers, limit replicability [3], [4]. For Vietnam, China's approach highlights big data's potential but underscores the need for legal frameworks to mandate data sharing from platforms like Shopee and TikTok, which reported \$8 billion in transactions in Vietnam in 2023 [14].

3.1.4. EU – DESI

The EU's Digital Economy and Society Index (DESI) assesses digitalization across five pillars: connectivity, digital skills, Internet usage, business integration, and digital public services [13]. In 2023, Finland led with a score of 72/100, driven by 99% broadband penetration and 85% digital literacy rates, followed by the Netherlands and Denmark [13]. DESI's standardized approach enables benchmarking across 27 member states, but its qualitative survey-based data limits direct GDP quantification [4], [16]. For example, Finland's high DESI score correlates with a 10% increase in tech sector employment from 2020 to 2023 [13]. Vietnam can adopt

DESI's connectivity and skills metrics but needs quantitative methods like satellite accounts to align with national accounts [17].

3.1.5. ASEAN and South Korea

ASEAN's Digital Economy Framework Agreement (DEFA) aims to standardize measurement, targeting a \$1 trillion digital economy by 2030, driven by e-commerce and fintech [14]. In 2024, ASEAN's digital economy was valued at \$300 billion. South Korea's input-output model quantifies digital technology diffusion, reporting a 12% productivity increase in digitized industries (e.g., manufacturing, logistics) in 2022, with 8% output growth from IoT adoption [18]. For instance, South Korea's smart factories increased manufacturing efficiency by 15% [18]. These approaches offer Vietnam insights into regional standardization and sectoral granularity, but DEFA's ongoing development and South Korea's reliance on econometric tools require adaptation to Vietnam's resource constraints [17].

3.2. Vietnam's Current Practices

Vietnam's digital economy measurement is nascent and fragmented, relying on the Digital Transformation Index (DTI), E-Commerce Index (EBI), and limited GSO ICT data. The DTI, developed by MIC, assesses provincial digitalization, with Hanoi and Ho Chi Minh City scoring 0.92 and 0.90 (0–1 scale) in 2023 [14]. However, it lacks methodological standardization, using qualitative surveys of 1,000 enterprises per province, missing informal digital activities like livestream commerce [2]. The EBI, managed by MOIT, showed a 20% increase from 2022, but excludes cross-border transactions, underestimating the sector's scale [14]. GSO's ICT data covers basic metrics (e.g., 98% 4G coverage), with no satellite account for GDP estimates.

Key challenges include:

Conceptual Ambiguity: No official digital economy definition, with MIC emphasizing ICT infrastructure and MOIT focusing on e-commerce, creating silos [2].

Data Fragmentation: Data is scattered across GSO, MIC, MOIT, and SBV, with SBV's 65% non-cash payment data unintegrated with GSO statistics [14].

Platform Data Access: Cross-border platforms (e.g., Google, TikTok) lack data disclosure mandates, missing \$1 billion in digital advertising [4].

Methodological Gaps: Qualitative surveys (e.g., GSO's 5,000-firm survey) limit precision, missing informal digital businesses [2].

For example, Vietnam's fintech sector, with platforms like Momo processing \$50 billion in QR transactions in 2023, is underrepresented due to data gaps [14]. These challenges hinder Vietnam's ability to quantify digital contributions, necessitating a comprehensive framework.

3.3. Proposed Measurement Framework

The proposed framework, based on Bukht and Heeks' classification [2], uses a three-axis, three-layer model to capture the digital economy's full spectrum. Figure 1 illustrates a comprehensive framework for measuring the digital economy, structured around an input–process–output value chain. Digital inputs are transformed through digital processes to generate economic and social outputs. Across this value chain, the framework distinguishes three interconnected layers: the core digital economy, which includes ICT goods and digital services; the enabling digital economy, which supports digitalization across sectors; and the transformed economy and society, where digital technologies reshape production, governance, and social interactions. Together, these dimensions provide an integrated view of how digital technologies drive economic transformation.

Input Axis:

Digital Infrastructure: 5G coverage (80% by 2027), broadband penetration (90% households by 2028), data center capacity (500 MW by 2030). Vietnam's 4G coverage reached 98% in 2023,

but 5G is limited to urban areas [14].

Investment: R&D (2% of GDP by 2030), 1,000 annual tech startups, \$1.5 billion venture capital in 2023. Vietnam's startup ecosystem grew 15% in 2023, driven by fintech [14].

Workforce: 50,000 ICT graduates annually by 2030, 80% digital literacy by 2028. Only 20% of the workforce had advanced digital skills in 2023 [2].

Policy: ICT policy readiness (41st globally in 2023), with legal frameworks needed for data sharing [16].

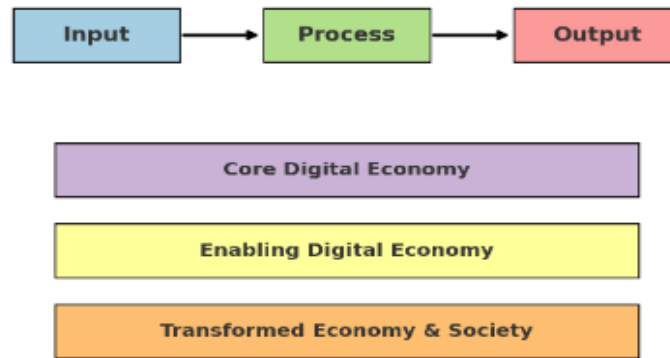


Figure 1. Measuring the Digital Economy: Input/ Process/ Output with 3 Layers

Process Axis:

Digital Government: 70% level 4 services (fully transactional) by 2028, 1.2 billion e-government transactions in 2023, 85% citizen satisfaction in Hanoi [14].

Business: 60% SME ERP/CRM adoption, 10% blockchain/IoT in logistics by 2028, 30% e-contract usage in 2023 [14].

Finance: 80% non-cash payments, \$50 billion QR transactions, 70% adult digital banking accounts by 2028 [14].

Sectoral Transformation: 80% schools with e-learning, 90% hospitals with electronic records, smart logistics (e.g., Viettel's automated supply chain) by 2028 [14].

Output Axis:

GDP Contribution: 20% by 2030 (\$10 billion ICT, \$16.4 billion e-commerce in 2023) [14].

Employment: 1 million digital jobs by 2030 (600,000 in 2023), with incomes 30% above average [14].

Productivity: 15% increase in digitized firms by 2030 (8% in 2023) [14].

Exports: \$10 billion in software/IT services by 2030 (\$6 billion in 2023) [14].

Social Welfare: 90% access to digital public services, 500,000 trained in digital skills by 2028 [14].

This framework draws from global best practices, adapting OECD's modularity, U.S. DESA's structure, and China's big data integration to Vietnam's context [1], [11], [12]. It addresses conceptual ambiguity by defining the digital economy across core, enabling, and transformed sectors, ensuring comprehensive coverage [2].

3.4. Integration with National Accounts

A digital economy satellite account, aligned with SNA 2008, will quantify contributions to GDP, consumption, and exports. Data sources include GSO statistics, tax reports, enterprise financial data, and platform data from Tiki, VNPAY, and Viettel. Cross-border platform data (e.g., Google, TikTok) requires legal mandates for access [4]. Implementation phases include:

2025–2026: Define digital industries using Vietnam's ISIC classification, pilot data collection in Hanoi, Ho Chi Minh City, and Da Nang (covering 1,000 enterprises).

2027–2028: Develop a national satellite account, establish data-sharing protocols via a National Digital Statistics Committee.

2029–2030: Publish annual digital GDP reports, integrating product balance sheets for ICT, e-commerce, and digital content.

This approach ensures consistency with national accounts, drawing from the U.S. DESA model [11]. Pilot programs in urban centers will test data collection feasibility, with Hanoi's 2023 e-commerce transactions (\$5 billion) providing a baseline [14].

3.5. Big Data Integration

Integrating big data from platforms like Shopee, Lazada, and Momo with GSO statistics enables real-time monitoring. Shopee reported \$8 billion in transactions in Vietnam in 2023, but only aggregated data was accessible [14]. Challenges include:

Legal Barriers: No mandates for cross-border platform data disclosure, missing \$1 billion in digital advertising [4].

Analytical Capacity: Limited expertise in processing unstructured data (e.g., user behavior analytics) [3].

Privacy Concerns: Compliance with Vietnam's Law on Cybersecurity (2018).

Solutions include:

Enacting OECD BEPS-inspired regulations for platform data reporting [1].

Establishing a National Digital Statistics Center with AI and machine learning capabilities to process real-time data [16].

Offering tax incentives to encourage domestic platform participation, as seen in China's model [12].

For example, Vietnam's fintech sector, with Momo's \$50 billion in QR transactions, demonstrates big data's potential for real-time economic insights [14]. A National Digital Statistics Center could leverage AI to analyze transaction patterns, improving GDP estimates.

3.6. Policy Implications

The framework supports evidence-based policies by:

Quantifying Contributions: Enables resource allocation (e.g., prioritizing 5G infrastructure in rural areas).

Identifying Gaps: Highlights needs in skills (e.g., increasing ICT graduates from 20,000 to 50,000 annually) and regulation (e.g., data disclosure laws) [2].

Enhancing Competitiveness: Aligns Vietnam with ASEAN's DEFA, targeting a \$1 trillion digital economy by 2030 [14].

Case studies, such as Vietnam's smart logistics adoption by Viettel, which reduced delivery times by 20% in 2023, demonstrate the framework's potential to drive sectoral transformation [8]. By addressing data fragmentation and methodological gaps, Vietnam can foster sustainable growth and global integration.

4. Conclusion

Vietnam's digital economy, valued at \$16.4 billion in e-commerce and 65% non-cash payments in 2023, is a cornerstone of its economic growth, yet its measurement remains fragmented [14]. The rapid rise of platforms like Shopee, Lazada, and Momo, alongside AI-driven services, underscores the need for a robust framework to quantify contributions to GDP, employment, and social welfare [17]. This study synthesizes global best practices from the OECD, U.S., China, EU, and ASEAN, proposing a three-axis, three-layer framework that integrates traditional statistics with big data within a satellite account aligned with SNA 2008 [1]–[4], [11] – [13], [16]–[18]. The framework's input axis (e.g., 80% 5G coverage by 2027), process axis (e.g., 70% digital government services by 2028), and output axis (e.g., 20% GDP contribution by 2030) provide a comprehensive approach to capture core, digital-enabling, and transformed sectors [2].

Implementation requires institutional reforms, including a Digital Economy Law to mandate platform data disclosure, addressing the \$1 billion gap in digital advertising [4]. A National Digital Statistics Committee will unify data across GSO, MIC, MOIT, and SBV, while a National Digital Statistics Center with AI capabilities will enable real-time monitoring [16]. Phased implementation (2025–2030) ensures gradual adoption, starting with pilots in Hanoi, Ho Chi Minh City, and Da Nang [14]. This framework aligns Vietnam with ASEAN’s \$1 trillion digital economy goal by 2030, fostering evidence-based policies, sustainable growth, and global competitiveness [14]. By overcoming conceptual ambiguity, data fragmentation, and methodological gaps, Vietnam can position itself as a leader in Southeast Asia’s digital transformation.

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