



STATISTICS

Digital economy measurement: Challenges and Opportunities

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Central Bank of Chile

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Outline

- **The Digital Revolution – How has economic activity changed?**
- **What are the measurement challenges?**
- **How is the international statistical community responding?**
- **What is doing the IMF?**

The Digital Revolution – How has economic activity changed?

The Digital Revolution: Widespread economic implications

Data, Data Analytics

Data



Managing a Sports Team – Yesterday

Scorekeeper (+)	Team Owner (-)
\$10	\$10

Managing a Sports Team - Today

Data Scientist (+)	Team Owner (-)
\$100	\$100
Data Asset	
\$100	



✓ Companies across a broad range of industries are digitizing information. The “production” of digital data is currently not part of the SNA production/asset boundary. Research is currently underway to determine how to capture this activity in the updated SNA/BPM.

The Digital Revolution: Widespread economic implications

Financial Innovation

Financial Services



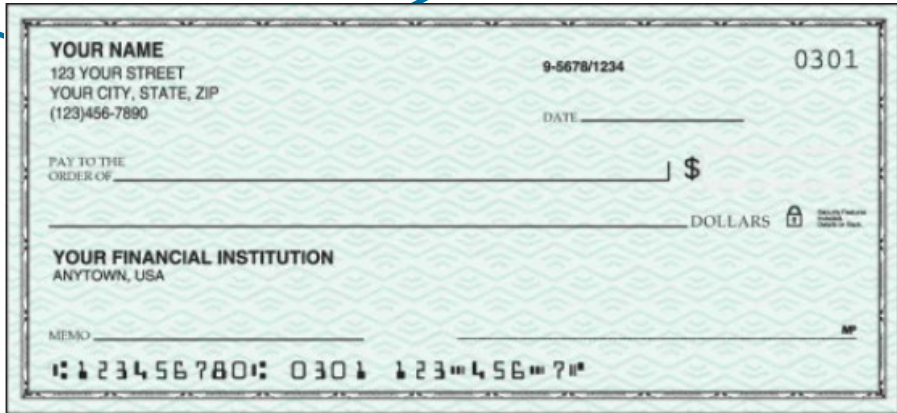
Bank Charges - Yesterday

Bank (+)	Household (-)
\$2	\$2

✓ Digitalization has the ability to transform the financial services industry

Bank Charges (Bitcoin) - Today

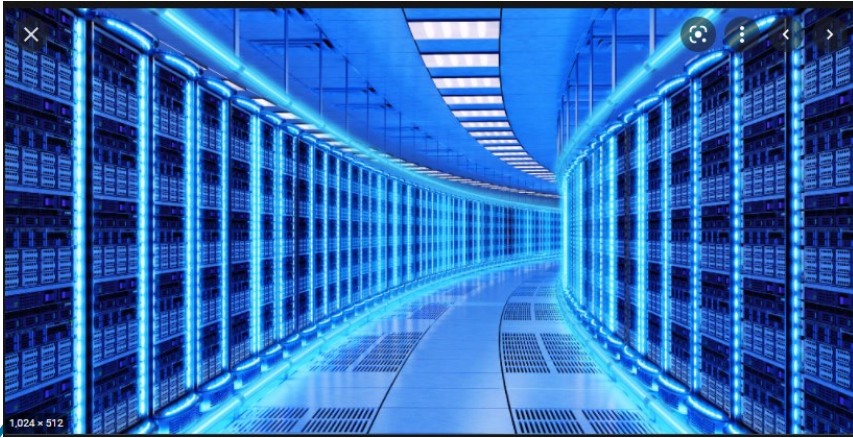
Household (+)	Household (-)
\$?	\$?
Asset (1 Bitcoin)	Liability
38,857.60	?



The Digital Revolution: Widespread economic implications

IT Services

Cloud computing



IT Equipment (+)	Cash (-)
\$100,000	\$100,000
Wages IT staff (+)	Cash (-)
\$1,000	\$1,000

Cloud Services (+)	Cash (-)
\$2,000	\$2,000
IT Equipment	Cash
\$0	\$0



✓ Cloud computing has shifted IT investment towards a small number of large firms, impacting measures of productivity, investment and capital stock by industry.

What are the measurement challenges?

The Digital Revolution

A measurement challenge for macroeconomic accountants

- ❑ Even though digitalization is pervasive the current economic standards do not provide much guidance on how to capture this activity and make it visible for users.
- ❑ Nor is it evident in the economic accounts and tables provided to users

System of
National
Accounts
2008

15.90 If a new type of good, for example a digital camera, is introduced in period $t-1$ to replace a non-digital one, then the compiler has only to wait for the good to be on the market for two successive periods before it can be included in the index. This provides a mechanism for changing the

- ❖ *This is the only reference to the word digital in the 2008 System of National Accounts*

GDP by Expenditure	2020
Final consumption expenditure	15,815
Household/NPISH consumption expenditure	13,016
General government final consumption expenditure	2,799
Gross capital formation	4,157
Gross fixed capital formation	4,183
Changes in inventories	(12)
Exports of goods and services	2,105
Imports of goods and services	2,840
Gross Domestic Product (GDP)	19,247
GDP by Industry	
2020	
Agriculture, hunting, forestry, fishing	207
Mining, Manufacturing, Utilities	2,878
Manufacturing	2,258
Construction	747
Wholesale, retail trade, restaurants and hotels	2,678
Transport, storage and communication	2,282
Other Activities	10,541
Total Value Added	19,351

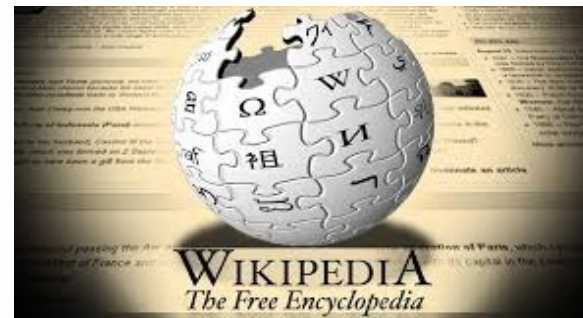
The Digital Revolution

A measurement challenge for macroeconomic accountants

- ❑ The pervasive nature of digitalization makes it difficult to isolate and quantify the economic impact of digitalization.
- ❑ Standard classifications do not define a “digital sector” or set of “digital establishments” whose growth and evolution can be compared to other sectors such as manufacturing and agriculture.
- ❑ The pace of innovation and the application of digital technologies to existing economic activity makes it a challenge to ensure comprehensive coverage of economic activities.
- ❑ While the task of quantifying digitalization is difficult there is value in quantifying this activity to better understand its evolution relative to overall economic activity and its impact on labor markets, inflation, societal progress etc....

The Digital Revolution: Potential mismeasurement issues

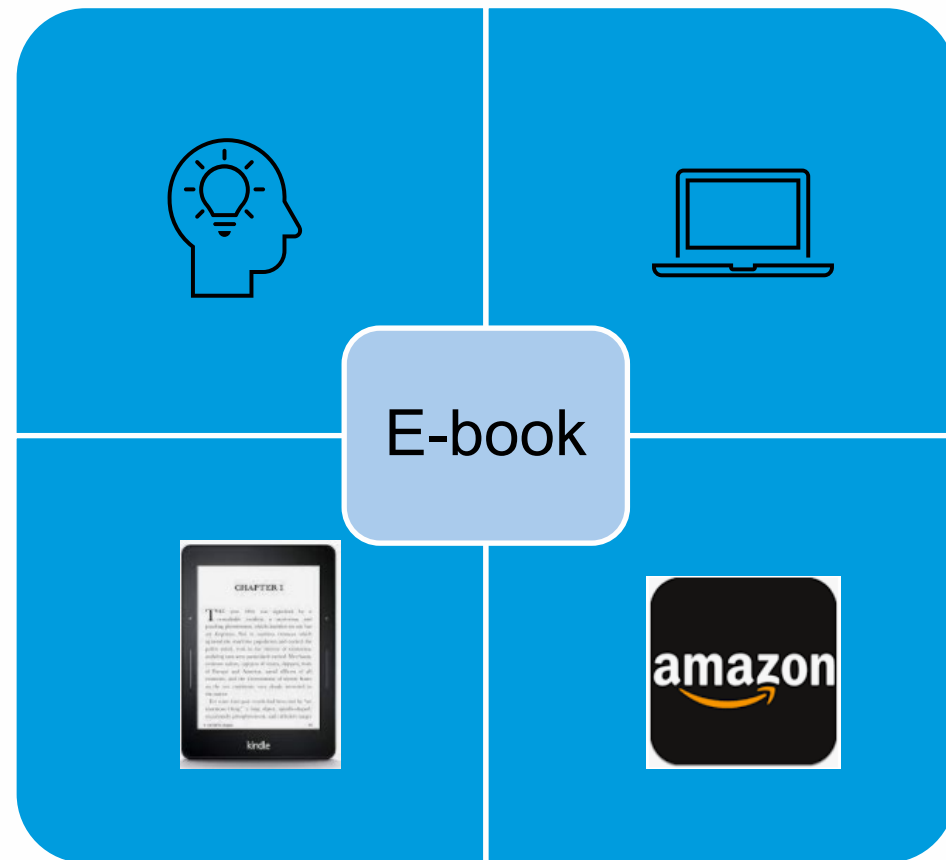
- **GDP** is an adequate concept to measure **market production**, but **concerns have arisen** over a number of areas...
 - ▶ **Prices and volumes**
 - ▶ New forms of intermediation service
 - ▶ **Free and subsidised consumer products**
 - ▶ Consumers as producers
 - ▶ **Certain assets not being measured**
 - ▶ **Cross border flows**



The Digital Revolution

Definitions

- ❑ **Digitization** (from an economic perspective) is the process of converting products into a digital format to be used in production or consumption (*e.g. the ideas of an author are digitized using a computer*).
- ❑ **Digitalization** – Digitalization is the use of digital technologies to facilitate economic activity (*e.g. the digitized book is sold via a digital platform and digitally delivered to the consumer who consumes the book using an e-reader*).
- ❑ **“Digital Economic Activity”** – All of this together reflects digitally facilitated economic activity (i.e. digitalization has many dimensions).



Emerging Guidance

Three “lenses” to view digitalization



Digital Industries – Grouping together firms that rely on and/or utilize digital technologies to produce goods and services.

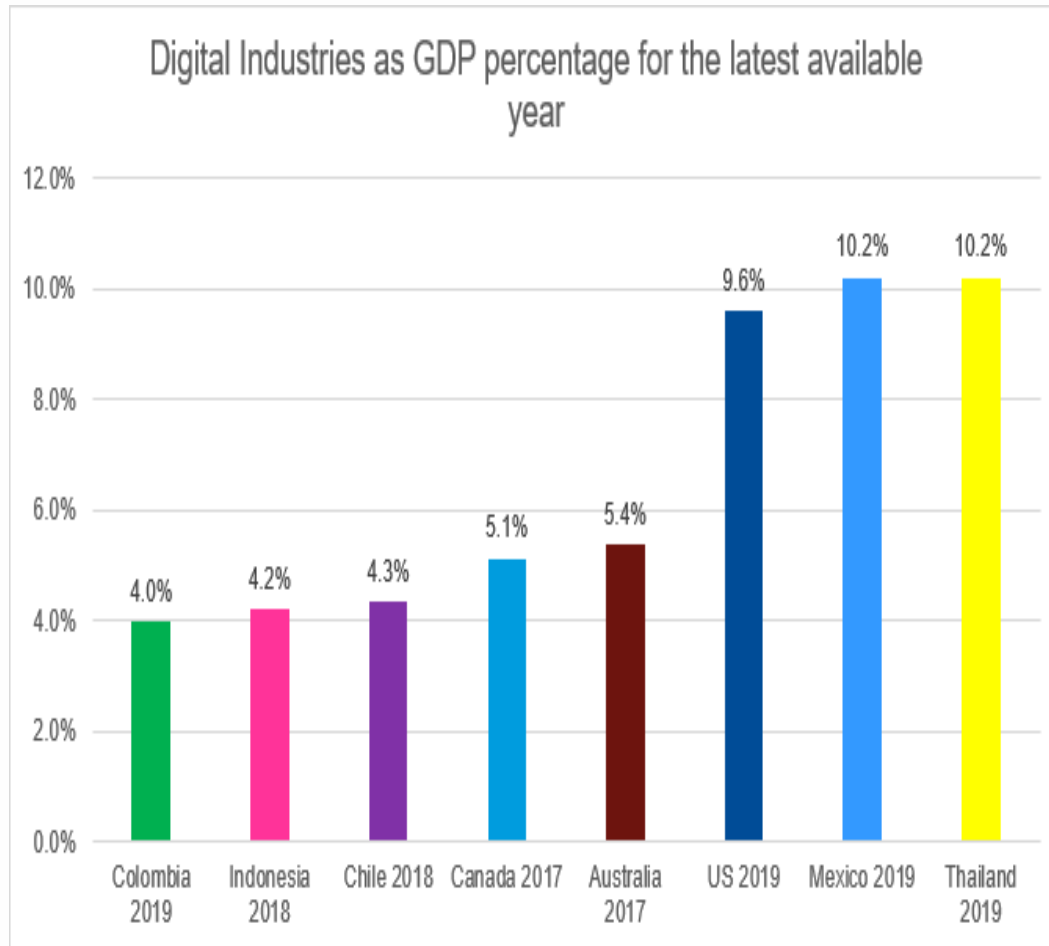


Transactions – Grouping together transactions (exchanges) that are facilitated by digital technologies.



Products – Grouping together products that are either digital themselves (e.g. e-books) or that facilitate the production of digital products and digital exchanges (e.g. communication switches, cell phone towers..).

The Digital Revolution: The Digital Economy or the Economy is Digital?



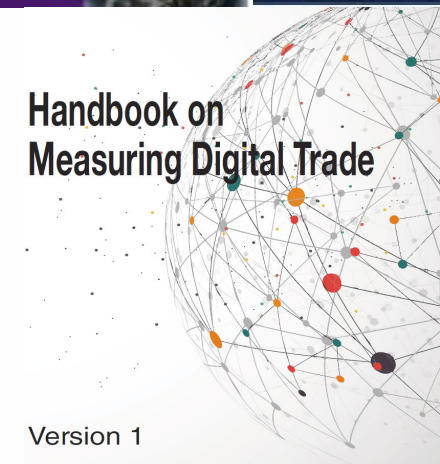
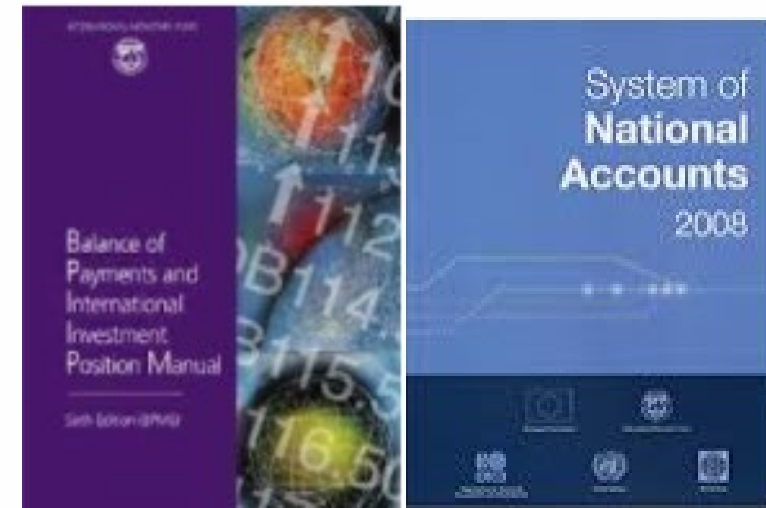
- Update of the standards include guidance on **quantifying the impact of digitalization on the economy**.
- Meeting a wide range of demands and needs
- Recommends countries develop a suite of indicators such as
 - Digital transactions, products and industries.
 - Related to e-commerce, digitally delivered products; digital intermediation platforms, expenditures on information, communication and technology, **Artificial intelligence**, cloud computing and **data**.

Source: Moulton, Tebrake, Tovar (2022) *Experimental Indicators of Digital Industries in Select Countries*

How is the international statistical community responding?

Response of international statistics community

- ❑ Conceptual framework robust, but measurement in some areas may require improvement and new approaches.
- ❑ Recognize that complementary statistics to bridge gaps between consumer surplus and GDP may be necessary
- ❑ In response to user demand for data, making the digital revolution more visible, developing **guidance** that countries can use to **quantify the impact of digitalization** on their economies.
- ❑ The guidance is designed to meet a wide range of demands and needs.
- ❑ Updated standards are also addressing user needs



Digital economy in the updated standards



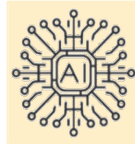
Price and volume measurement of goods and services affected by digitalization



Free products (valuation of free assets and free services)



Cloud computing



Artificial Intelligence



Crypto assets & Non-fungible tokens



Digital intermediation platforms



Recording of data in the national accounts



Increasing the visibility of digitalization in NA (Digital SUTs)

What is the IMF doing?

Support to IMF Members and Outreach

Implement multipronged CD strategy

- Organize regional workshops: Latin America and the Caribbean, Africa, Asia,...others to come
- Provide technical assistance and training
- Develop methodology handbooks and compilation guides: Crypto currencies, digital money, Fintech, data
- Coordinate CD with other international organizations
- Provide TA on the use of a new range of non-traditional data sources that can potentially be used to improve estimates of GDP and for the development of high frequency economic indicators

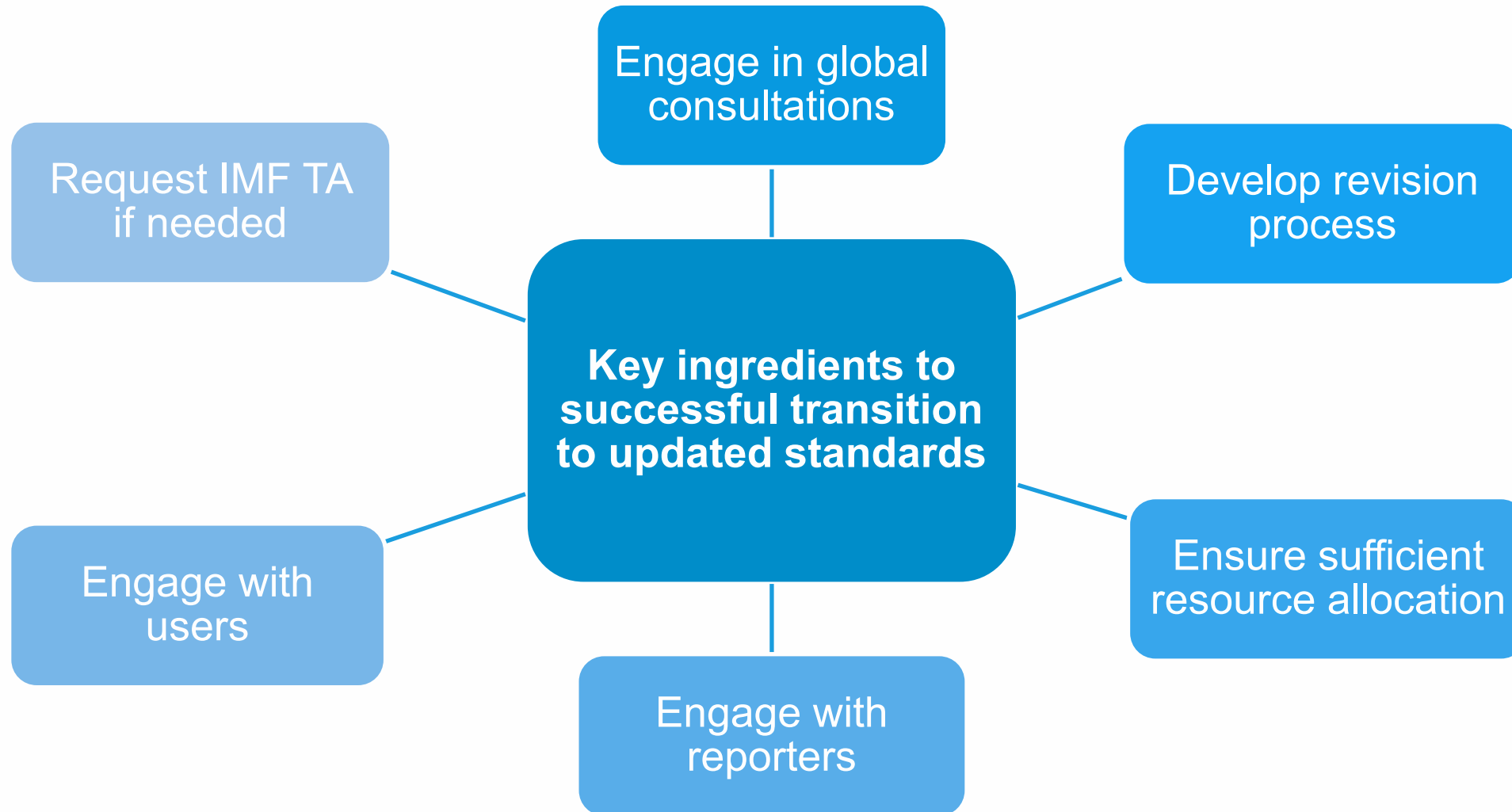


Tailor implementation approach to needs and limitations of fragile and conflict-affected states

Utilize new digital platform for collaboration

- Transition to electronic publications
- Share common concepts across all statistical domains
- Host a forum for interaction between compilers and users and peer-to-peer collaboration
- Development of a compilers' hub to facilitate sharing of best practices

Recommendations to Member Countries



11th IMF Statistical Forum

MEASURING MONEY IN THE DIGITAL AGE

November 15-16, 2023
Washington, DC

#StatsForum



[Forum website](#)

Thank you!